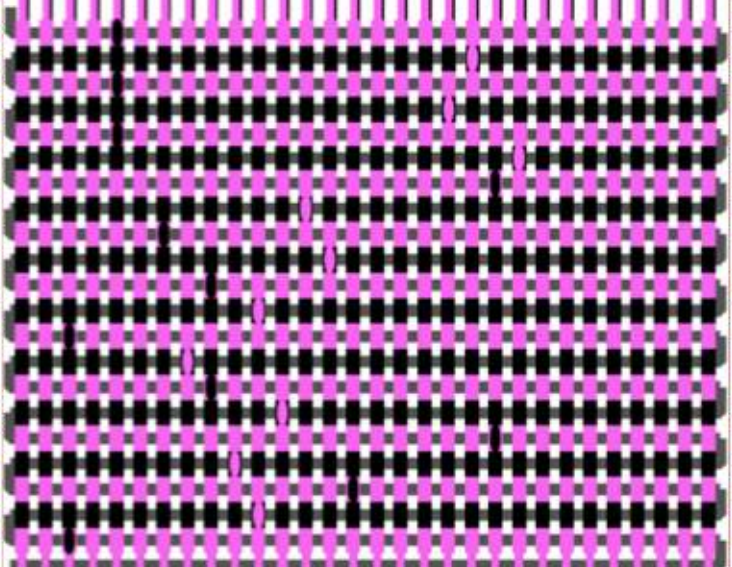
HUNGARIAN UNIVERSITY OF FINE ARTS DOCTORAL SCHOOL

ART AS RESEARCH • HUNGARIAN UNIVERSITY OF FINE ARTS DOCTORAL SCHOOL • ART AS RESEARCH

Juli Laczkó: THE ART OF HACKING



HUNGARIAN UNIVERSITY OF FINE ARTS DOCTORAL SCHOOL

ART AS RESEARCH • HUNGARIAN UNIVERSITY OF FINE ARTS DOCTORAL SCHOOL • ART AS RESEARCH

Juli Laczkó

THE ART OF HACKING

Intersections between Hacker Culture and Visual Arts

2021

ACKNOWLEDGEMENTS

In 2012 I was accepted into the Doctoral School of the Hungarian University of Fine Arts. In the year of the Arab Spring, WikiLeaks and the Occupy Movement, the non-conformist use of technology appeared to be the most exciting and most promising research topic imaginable. I wanted to understand and gain a new perspective of the changes taking place around me and their effects on visual art. This led to my first treatise on the subject, defended in 2017. Having defended my dissertation, it became clear that not only could my work garner widespread interest, it also required thorough-going development. The text you are holding in your hands, which was completed in 2019, was based on the dissertation I defended at the Doctoral School of the Hungarian University of Fine Arts in 2017. In 2019, with the support of an Eötvös Scholarship from the Hungarian State, I had the opportunity to develop my subject further as a guest researcher at Lancaster University's faculty of sociology.

I am indebted to numerous colleagues and friends for the direct and indirect help I received from them while working on both the first and the second version of the text, and for the experiences of my research work in the intervening period.

For helping me towards the completion of my dissertation in 2017, I thank first and foremost my supervisors, János Sugár and Zoltán Szegedy-Maszák, for their expertise and support, and the doctoral school secretary, Réka Szűcs, for guiding me through the administrative labyrinths. For assisting me with the further development of my thesis, I am grateful to my two dissertation committee members, Tünde Mariann Varga and Balázs Bodó,

and to Maxigas, for providing me with such thoroughly written and constructive criticism of my 2017 paper. I thank Steve Kane for his tireless work translating my manuscript, and for working with me shoulder to shoulder on synchronizing it with the Hungarian version then still in progress. I am grateful to Cc of the underground cinemas of Amsterdam and to Victoria Neumann for their selfless work of proofreading the English version.

In the years since my doctoral dissertation was completed in 2017, a number of factors have given me defining experiences for improving and developing my text. On the one hand, I was granted the opportunity to build my research in part on one of the courses I taught at the Budapest Metropolitan University, and on the other hand I participated in numerous events of the European hacker subculture. I would like to express my particular gratitude to the communities of Calafou and the Eclectic Tech Carnival for their welcoming attitude.

The text could not have been written without the Ubuntu Linux operating system, the Libre Office word processing software, Library Genesis, and other free cultural sources. In 2019 my work was supported by the Tempus Public Foundation and mentored by Maxigas. I would like to take this opportunity to thank the foundation for their support. It would be difficult to express in words the contribution of Maxigas to my work, but there is no doubt what without him, the text would not be a shadow of what it is now, because what I obtained from him was not only consistent and patient guidance through my theoretical research, but also the perspective of a practising hacktivist, which I was fortunate enough to experience at first hand.

Dedicated to Erika Pásztor

INTRODUCTION

My aim is to acquaint the reader with the historical and current cultural-artistic phenomena of critical technoculture in accessible terms. The text is primarily, though not exclusively written for university students whose developing professional lives are defined by technology and the media arts. I am hoping that the comprehensive nature of my work closes some gaps in the field and thus serves as a foundation for future research, which with time can and should be surpassed, but not bypassed.

The aim of my dissertation is the analysis of similar behaviour patterns in hacker culture and contemporary art from a historical perspective. The goal of this research is not limited to presenting one of the most exciting developments shaping our globalized digital culture, within the context of arts and academia, but extends to connecting this development to distinct cultural-artistic assumptions and thus sheds light on perhaps elusive structural patterns, laying the groundwork for new discourses. My sources originate from American and European culture and almost exclusively touch upon these cultural areas. Most of them are written in English.

The present work is best viewed as fundamental research paving avenues for future explorations and closing the gap of comparative analyses of hacker culture and visual arts. Because of the fundamental nature of the present dissertation, it clearly encompasses several future research subjects and is as such not a finished, complete whole but rather an introductory text; "an introduction to hacker culture through the arts" could equally have been chosen as the title. The analysis of the historical context is followed by a categorization of the building blocks of contemporary

terminology, which then allows these building blocks to be examined in the context of comparative art history. In the final chapter I present examples of hacktivist art through good practices.

A HISTORY OF HACKER CULTURE

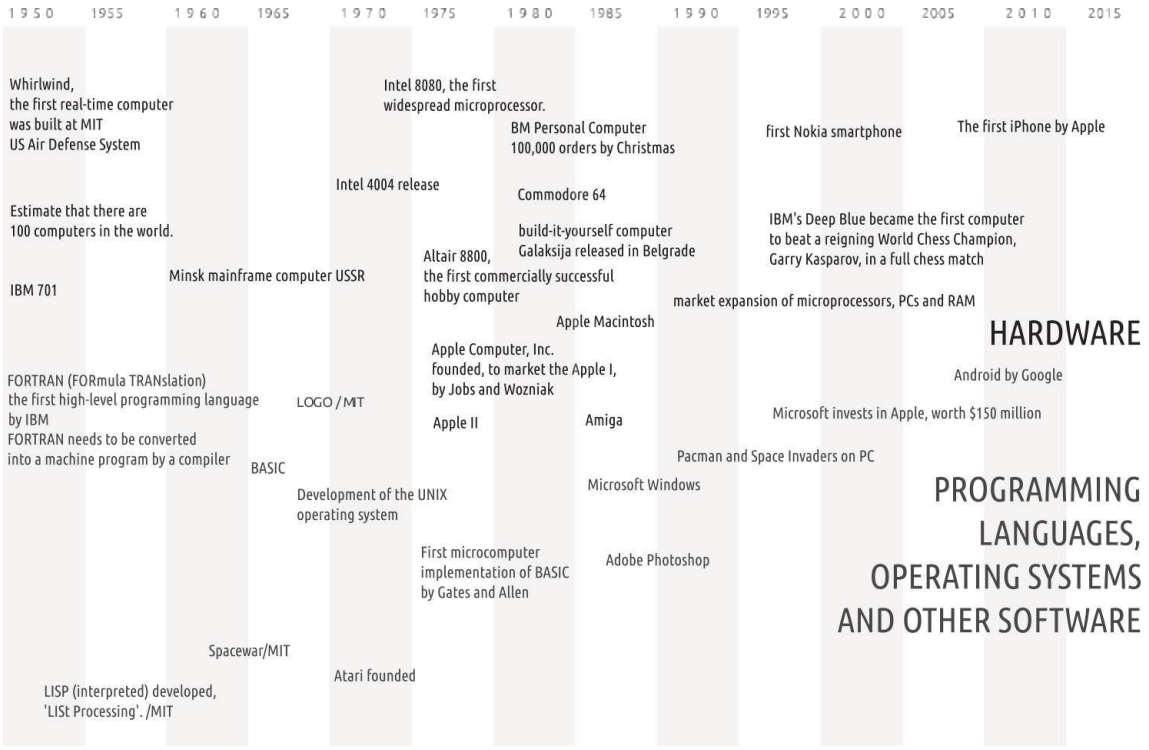
Prehistory

Computers in the future may weigh no more than 1.5 tons.[1]

The history of digital culture is comprised of several, parallelly evolving, intertwined stories, which unfold depending on their socio-economic conditions. The stories surrounding the invention of devices, programming languages, operating systems, artificial intelligence, open-source software, and network technologies, and their socio-cultural impact are all subjects of the separate and distant disciplines of science and art. However, hacker culture impudently impinges upon all these disciplines, which makes thinking about the subject an increasingly complex challenge. Figure one attempts to visually represent the parallels of some fundamental milestones pertaining to the above-mentioned segments, offering a rough guide to both author and reader that does not claim to come anywhere close to exhausting these nearly endless fields.

Steven Levy, chronicler of the hacker genealogy, wrote his 1984 book titled *Hackers, Heroes of the Computer Revolution* with myth-creating ambitions, and in it he presents exhaustive characterizations of many early hackers while positioning them in the history of technology. On the first pages he shares a humble list of the fifty-seven most prominent characters of his "epic", including four computers. As a popular journalist of the Californian digital boom, Levy created a novelistic and ground-breaking document of

1 Andrew Hamilton: *Brains that Click*, Popular Mechanics, March 1949. https://archive.org/details/PopularMechanics1949/Popular_Mechanics_03_1949/page/n91/mode/2up


1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Whirlwind,
the first real-time computer
was built at MIT
US Air Defense System
Intel 8080, the first
widespread microprocessor.
BM Personal Computer
100,000 orders by Christmas
first Nokia smartphone
The first iPhone by Apple
Intel 4004 release
Commodore 64
Estimate that there are
100 computers in the world.
build-it-yourself computer
Galaksija released in Belgrade
IBM's Deep Blue became the first computer
to beat a reigning World Chess Champion,
Garry Kasparov, in a full chess match
Altair 8800,
the first commercially successful
hobby computer
Minsk mainframe computer USSR
IBM 701
market expansion of microprocessors, PCs and RAM
Apple Macintosh
HARDWARE
Apple Computer, Inc.
founded, to market the Apple I,
by Jobs and Wozniak
Android by Google
FORTRAN (FORmula TRANslation)
the first high-level programming language
by IBM
FORTRAN needs to be converted
into a machine program by a compiler
LOGO / MIT
Apple II
Amiga
Microsoft invests in Apple, worth $150 million
Pacman and Space Invaders on PC
BASIC
Microsoft Windows
Development of the UNIX
operating system
PROGRAMMING
LANGUAGES,
OPERATING SYSTEMS
AND OTHER SOFTWARE
First microcomputer
implementation of BASIC
by Gates and Allen
Adobe Photoshop
Spacewar/MIT
Atari founded
LISP (interpreted) developed,
'LISt Processing'. /MIT

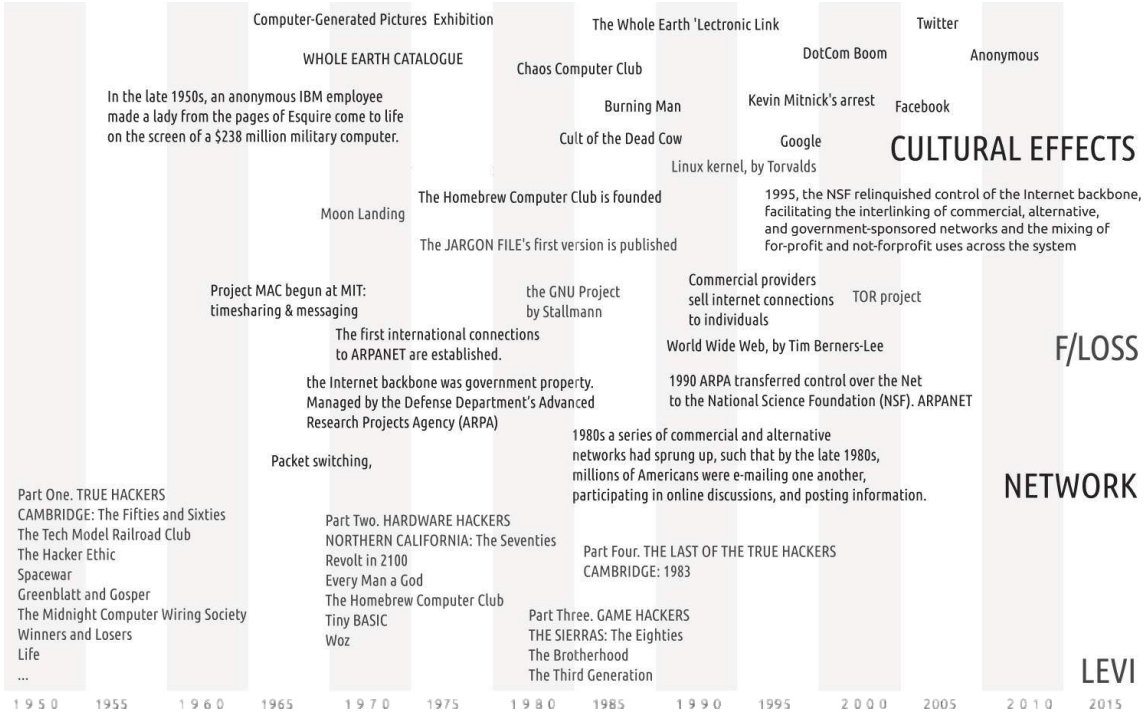


Fig. 1. Overview of hacking history

early hacker culture, essential in part because it represents the first detailed description of the hacker ethic as the central principle. Levy's "Hacker History" is not the story of hardware or software, nor is it the chronicle of the birth of Silicon Valley, but it is intimately connected to all three. The hacker ethics he describes live on in hacktivism, though its modus operandi is present in almost all modern commercial technologies.

Back then, the communities that practised hacker ethics from the 1950s had not yet reflected on the unwritten ethical codex that acted as customary law, nor did they consider themselves a community.[2] Levy defines three separate hacker generations; the monks of MIT, the hobbyists of the West Coast, and the game developers of fresh enterprises profiting from the revolution of personal computers. All three were determined by the momentary technological conditions of their chosen field. In the present chapter, when I mention the hacker culture before Silicon Valley, I refer to it as *early hacker culture*; and to the open-source culture *Free/Libre Open-Source Software, F/LOSS* culture, which is not independent from *early hacker culture*, as it evolved from it in terms of ethics. The prosperous Silicon Valley computer industry, which also evolved from *early hacker culture*, will be referred to as the mainstream hardware and software industry. Any further different terminologies belonging to the networks of hacker culture will be examined in later chapters.

1960s, MIT was one of the few places where students had access to a mainframe computer. At this point, computers, which still weighed several tons, were mostly the privilege of the US military. Accordingly, one of the early

2 Steven Levy, *Hackers: Heroes of the Computer Revolution,* 25th Anniversary Edition, Sebastopol, CA, O'Reilly, 2010, 27.

computers at MIT operated as part of the military-industrial complex. In 1958, the Defense Ministry of the United States created ARPA, the Advanced Research Projects Agency, with the purpose of research and development in defence. The department for information processing technology emerged in 1962, headed by professor J. C. R. Licklider, who was greatly inspired by the cybernetic theses of his colleague, Norbert Wiener, and who published visionary ideas of the communicative symbiosis of man and machine.[3] Then – and this is true for the entire period between the 1950s and the 1980s – the word *hacker* was a collective term used to describe those who advanced this undeveloped field by performing innovative development work on the fringes of the fixed military-industrial research programs, at their own initiative, in their own free time, alone or in groups, contributing to the digital technology of today. The emphasis, as we will later see, is on their own initiative. Well before the inventions of the microchip and the personal computer, the necessary infrastructure, time and inclination was only present outside military institutions in university settings; to be precise, mostly at MIT, where the interest of Tech Model Railway Club members was more and more drawn towards the TX-0 mainframe computer available at the electronic research laboratory of MIT. A decade-long working community of developers gathered around this interest, the results of which laid the foundations for later directions in software development and artificial intelligence research; and their working methods served as a template for an entire industry in the United States.

3 Turner, Fred, *Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*, Chicago, IL, The University of Chicago Press, 2006, 108.

Hacker Ethics

Before we continue, it is important to first examine how Levy defined hacker ethics:[4]

1. The Hands-on Imperative: everything that allows us to learn something about the workings of the world, including computers, must be available without limitation so we can understand and develop them. Anything that limits this should be circumvented, be it a locked door or a regulation.
2. All information should be free: the free exchange of and access to information is essential to improve upon and fix systems.
3. Promote decentralization and mistrust authority: the best way to enable the free exchange of information is to have an open and agile system. Bureaucracies are the opponents of this, be they university, corporate or governmental systems.
4. Meritocracy: hackers should not be judged by their degrees, age, position, or ethnicity.
5. You can create art and beauty on a computer. This does not only refer to components generated by the software: the code itself may hold a high level of masterfully executed engineering or artistry.
6. Computers can change your life for the better.

4 Levy, op. cit., 28–34.

Phreaking

The words phone and freak meet in phreaking, denoting the mostly British and American subculture focused on the inspection, discovery, experimentation with and misuse of phone networks between the 1950s and 1980s. The connecting of phone calls happened electromechanically in the Bell phone centres, converting acoustic signals to electric ones. Thus, eventually, each user could control the connections by transmitting the correct sound frequency in order to establish a phone connection with any other user.

The defining feature of a phreak was the blue box, an electric sound generator used to make experimentation more comfortable. The connecting frequency of long-distance phone calls was 2600 Hz, this is why one of the best-known hacker-zines still carries the name *2600*.[5] Another prominent magazine, the *Phrack* claims its origins from phreaker and hacker cultures with a common ethical system, reflected in its name.[6] With the shift in long-distance communication technologies, phreaking became part of the cult history of hacking by the end of the 1980s. However, hacker ethics were shaped by the phreaking experience in several ways. The system of the Bell Telephone Company, with state-wide monopoly, wound up becoming the favourite toy of phreakers, who themselves opposed the domination of telecommunications giants. It is important to note that in the 1970s the telephone tax contributed to the costs of the Vietnam War, so its evasion could be considered a pacifist statement.[7]

5 https://www.2600.com/
6 http://phrack.org
7 Tim Jordan, Paul A. Taylor, *Hacktivism and Cyberwars: Rebels with a Cause?,* London, Routledge, 2004, 13.

The Californian Ideology

> Techno-utopians: the "Californian ideology", a mix of cybernetics, free market economics, and counter-culture[8]

To be able to understand and interpret hacker culture it is crucial to briefly examine the cultural-historical environment surrounding the evolution of the computer industry. Fred Turner's work *From Counterculture to Cyberculture* accumulated an abundance of background material to decipher the circumstances surrounding the emergence of the Californian ideology. It analyses the discourse between pioneers of the computer industry and counterculture activists in the tense atmosphere of society in the Cold War.

In the sixties, activists of the Free Speech Movement saw the computer as a threatening, alienating tool of the military industry, and they denounced the Artificial Intelligence Laboratory of MIT as part of it.[9] Around this time, due to a protest, in spite of the initially open internal policies, the laboratory ended up hidden behind heavy iron doors and unbreakable locks.[10] As Levy asserts on multiple occasions, publicly opposing the Vietnam War was completely incompatible with the East Coast hacker culture, as were the new leftist movements, the new spirituality popular in California, experimental drugs, or 'free love' and communalism. Levy dedicates long chapters to contrasting the Californian counterculture scene with the strict, rigid, monastery-like lifestyle of MIT hackers.[11]

8 Richard Barbrook, Andy Cameron, *The Californian Ideology* condensed version, Metamute, vol.1, no3, https://www.metamute.org/editorial/magazine/mute-vol-1-no.-3-code
9 Turner, op. cit., 1.
10 Levy, op. cit., 124.
11 *Ibid.*,139.

"The microcomputer industry would be ruled by the hacker ethic dream."[12]

By the early seventies the experimental heroic age of MIT neared its decline while a new kind of hacker culture emerged on the West Coast. Despite the differences, this also operated parallel to developments in the military industry. When the microchip entered the market, it gave a huge push to the DIY culture of hardware hackers. The personal computer would only take its place among consumer goods in the following decade, as we will see later, partly due to these innovative developments. Enthusiastic hobbyists pieced together unique hybrid machines in hobby circles from individually purchased components and do-it-yourself assembly kits, including the software that would run on them. This was when Gates's now-famous writing, the *Letter to the Hobbyists* was born, in which Gates, who entered the scene from phreaking, severely criticized the attitude of hobbyists: they are happy to pay for physical parts, but nobody honours the intellectual work invested into software development.[13]

The *Homebrew Computer Club* was one of the most important forums on the West Coast computer DIY scene. Its members placed their engineering skills at the service of building and developing their own computers. The major players of the later computer industry almost all started out as members of the club. The new enterprises that grew out of the club (e.g. Apple, Microsoft) sought to align themselves with the hacker ethic, while profiting from their knowledge in the market environment.[14]

12 *Ibid.*, 213.
13 *Ibid.*, 213, 276.
14 *Ibid.*, 221.

The Comprehensive Designer

Repulsive as the military background of university computer science research was for members of the counterculture, they could identify with the cybernetic science of Norbert Wiener, the systems theory of Buckminster Fuller and the media theory theses of Marshall McLuhan.[15] In his book *Ideas and Integrities* Fuller coins the term *comprehensive designer*, meaning an individual who, by modelling invisible patterns found in nature, designs new technologies for everyday life using the industrial sources made available by the business world and the military industry.[16]The most important thing is, writes Fuller, that the designer should be a generalist from outside the disciplines of science and industry to see everything in its connectedness.[17] McLuhan, Fuller and Fuller's student Viktor Papanek all strove to work as comprehensive designers. Fuller's concept had a huge impact on several alternative communities. It provided a coherent theory encapsulating their existing experiments and approaches. This theory, while viewing technology as a shaper of society, at the same time rejects bureaucratic and mainstream institutional systems.[18] A notable example of this is USCO, a well-known artist group of the 1960s counterculture scene that created media environments using everyday electronic devices serving a ritualistic purpose.[19]

The dissolution of borders between common and artistic objects and actions, and between audience and artist, echoed Fullerian and McLuhanian inspiration. This is

15 Turner, op. cit., 43, 53.
16 *Ibid.*, 56.
17 *Ibid.*, 56.
18 *Ibid.*, 52.
19 *Ibid.*, 49.

precisely what happened with the experimental attempts of Allan Kaprow, John Cage and Robert Rauschenberg,[20] culminating in the 1967 foundation of the Experiments in Art and Technology (EAT). EAT was born from the collaboration of engineers and artists and was an early herald of the innovative trend concerning common experimental frameworks in technology and art, which, since the millennium, has become the default.[21] The work of Stewart Brand proved to be defining in the relationship between technology and counterculture. He became familiar with the positive effects of networking, the entrepreneurial attitude, and the open models of creative research collaborations by working on military research projects in his twenties. Later, he used his experience to build bridges between previously isolated playing fields. Examples were the hippy culture of San Francisco, the East Coast art groups, the new communalist Back to the Land movement, the Merry Pranksters, the reservations of Native Americans, and the emerging computer culture.

Naturally, it was not Brand himself who brought together distant subcultures, but the innovative platforms of information technology that he invented and owned, such as the *Whole Earth Catalog (WEC)* and the *Whole Earth 'Lectronic Link (WELL)*, which not only contributed to the birth of the internet as we know it, but produced the shift that made his generation view these new technologies, especially the personal computer and network

20 *Ibid.*, 58.

21 Zoltán Szegedy-Maszák, *Art as Research: Experimentalism in Media Arts = Art as Research*, organised by the Hungarian University for Fine Arts, the Hungarian Academy of Sciences and the C3 cultural and Communication Center Foundation with lectures held on November 24, 2006. Ed. Kürti Emese, Budapest, Magyar Képzőművészeti Egyetem, Semmelweis Kiadó, 2007, 168–195.

communication, more and more as the key to equality in society.

This techno-utopianism defines hacker culture even today, in contrast to the pessimism towards institutions and machines embodied by the *Unabomber Manifesto*, created at the same place and time.[22] The 2006 movie *Das Netz*, which dealt with the *Unabomber Manifesto* and the biography of its author, Ted Kaczynski, currently serving a life sentence in federal prison, also clearly states that the histories of counterculture, hacker culture and the computer industry are for the most part inextricably intertwined.[23] Bazzichelli, among others, emphasizes that the values of openness, freedom and exchange of information, which were originally the values of early hacker culture, have become business models of modern IT corporations.[24] Brand founded the *Whole Earth Catalog* in 1968, which became one of the earliest and most treasured printed journals of network culture. The WEC was first published in 1968 and served as an information base and communication network to the above-mentioned communities, since many topics relating to these communities appeared as a kind of montage, and readers could also send in content. This subject deserves its own research, and the dissertation of Dorien Zandbergen (2011) is a great starting point for this.[25]

Brand chose the image of the globe as the symbol of his journal, which was already documented in photography in 1968, due to the space race of the Cold War. Through

22 Kaczynski's famous manifesto is still available: https://unabomber manifesto.com/ ; Turner, op. cit., 43.

23 Tatiana Bazzichelli, *Networked Disruption: Rethinking Oppositions in Art, Hacktivism and the Business of Social Networking*, PhD Dissertation, Aarhus University, 2011, 149.

24 *Ibid.*, 150.

25 Zandbergen, Dorien, New Edge: Technology and Spirituality in the San Francisco Bay Area, PhD dissertation, Leiden, University of Leiden, 2011.

this gesture, the editor-in-chief of the *Whole Earth Catalog* showed commitment to (besides psychedelics) technology, Fuller's comprehensive design theory and ecological thinking. It was Fuller who laid the foundations for the latter with a metaphor spanning his entire body of work, according to which our planet is a spaceship and we are its crew, therefore we are responsible for it.[26] Apart from the theses of Fuller and Papanek, the tools needed by the West Coast Back to the Land communes or do-it-yourself craft ideas, the journal also published news of cybernetics and early computer culture.[27] With its unprecedented working model the WEC expressed the Zeitgeist of the counterculture.[28]

"Dealing the hacker dream as if it were the most potent strain of sinsemilla in the Bay Area."[29]

At American universities in the 1950s several working groups performed experiments on student volunteers to research the psychological effects of LSD.[30] The desire to

26 Turner, op. cit., 55; Levy, op. cit., 219.

27 sections of the WEC were, among others,"Understanding Whole Systems; Shelter and Land Use; Industry and Craft; Communications; Community; Nomadics; Learning."

28 Turner, op. cit., 146.

29 Levy, op. cit., 152.

30 Among the volunteers were Brand and Ken Kesey, not only known as the author of *One Flew over the Cuckoo's Nest*, but as the cult figure of the magician guru of the Merry Pranksters in West Coast hippy culture. Kesey was a consumer turned advocate and distributor of psychedelics. For years it was his mission to spread a neo-nomadic freedom of consciousness all over the continent, travelling and living in an old school bus with his community. For Kesey, LSD was a tool for building a new world aligned with Fullerian principles and for overcoming the frigidity in society caused by the grip of the Cold War. It is a noteworthy fact that Kesey and his commune funded his counterculture practice with the revenues from *One Flew over the Cuckoo's Nest*.

regulate human social interaction, with the aim of preventing another fascist mass psychosis, brought about the Macy conferences in the 1970s, which addressed the topics of Wiener's early systems theory and the societal application of cybernetics.[31] The international group of scientists and artists present at the Macy conferences envisioned a post-national, multi-ethnic global culture. The participants consisted of Brand, Cage, Fuller and several members of the digital, artistic and academic elites.[32]

Within a few years, new communalism dissolved itself because in its small communities it kept reproducing precisely the same societal conflicts that it was attempting to liberate itself from in the long term: conventional gender roles, financial dependence, the separation of cultural

31 A fragmented documentation of the Macy conferences is accessible on the website of the American Cybernetics Association: https://asc-cybernetics.org/foundations/history/MacySummary.htm

32 Not everybody endured the psychedelic experiments and the spread of computers as positively as Brand or Kesey. As a Stanford student, Ted Kaczynski also participated in LSD experiments. He wrote his manifesto *Industrial Society and Its Future* as a mathematician and adamant environmentalist, which became known as the *Unabomber Manifesto*. John Brockman, in his book *Third Culture*, pointed out the risks associated with artificial intelligence and cybernetics as well as the dangers of the all-encompassing power of the new global techno-elite (the *digerati*) emerging with the paradigm shift. In the concept of cybernetics, the human nervous system is analogous to a complex computer, which Kaczynski contrasts with nature and personal freedom. For him, computer culture is not the key to freedom and equality, but its exact opposite. Kaczynski lived as a recluse in the American wilderness, in a DIY cabin known from the *Whole Earth Catalog*. The FBI arrested him on three counts of murder with a mail bomb and 23 counts of causing injury. He was sentenced for life. With his homemade bombs, he targeted people he considered members of the *digerati* from the academic and business worlds. The Leipzig-born Lutz Dammbeck created the movie *Das Netz* in 2004 about the controversies surrounding Kaczynski.

otherness and the traditional hierarchical group structures.[33] The generation of countercultures had to reassess belonging to the despised "mainstream" society, despite the continued presence of the Cold War and societal pressures which, a few years earlier, had driven them to the periphery to form into communities. Brand, who always adapted to the Zeitgeist with an excellent business sense, created a quasi-online version of the WEC functioning in the form of network conference the Whole Earth 'Lectronic Link (WELL). With the demise of the new communalism, Brand saw the personal computer as a potent force for elevating society, just as he had first viewed LSD.[34] The WELL and other forms of early network communication (especially similar platforms called BBS-es) presented the emerging computer industry with novel working methods: the networking strategy of the new information technology is described as hacker culture by Himanen and Castells and as the working method of the hacker class by McKenzie Wark.[35] Howard Rheingold, who later went on to become the editor-in-chief of the *Whole Earth Review*, then of the 1995 *Millennium Whole Earth Catalog*, was the first to use the term "virtual community" in an academic publication when he described his early WELL user experiences in 1985.[36] The fundamental shift in the relationship between counterculture and computers can be attributed to the microchip and thus to the birth of the personal computer and information networks.[37] For countercultures, the latter technologies seemed

33 Turner, op. cit., 76.
34 *Ibid.*, 139.
35 *Ibid.*, 7.
36 Howard Rheingold, *The Virtual Community,* http://www.rheingold.com/vc/book/
37 Levy, op. cit., 221.

to be guarantees of decentralization and freedom of information. These technologies truly brought about a paradigm shift – however, not in the way imagined in 1970s California, at least not in the rest of the world. The legacy of the new communalism and hippy culture of Brand's generation lives on in the open working models of hacker ethics.[38]

Community Memory

While research progressed with decreasing freedoms and growing government intervention in the laboratories of MIT on the East Coast in the seventies, on the West Coast several new initiatives emerged in parallel with the Homebrew Computer Club and the WEC, which still exert a defining influence on today's hacker culture.[39] The aim of Resource One Collective was to establish an open technology infrastructure in public spaces which could serve as a community memory for the locals, a sort of information network of small, everyday information exchange. The Community Memory was universally accessible to the same extent as Brand's projects can be criticized for their elitism.[40] The project was short-lived due to a lack of funding, but it managed to set up and maintain a few terminals in public places, which served as a model for projects created decades later.

***"This is the Woodstock of the computer elite!"*[41]**

These communities were linked through personal connections and official or semi-official institutions, influencing

38 Turner, op. cit., 139.
39 Levy, op. cit., 146.
40 *Ibid.*, 161.
41 Ted Nelson = Turner, op. cit., 168.

each other in an environment that would become one of the most prosperous and innovative economic centres of the computer industry; Silicon Valley. In 1984, Brand, who was running an international network by then (Global Business Network), was also the organizer of the first Hacker Conference in California, which served as the venue for the release of Levy's book *Hackers: Heroes of the Computer Revolution*.[42] This event became the prototype for all later hacker meetings (HOPE,[43] Defcon,[44] CCC)[45], where members who were previously only connected virtually could meet in person, allowing them to strengthen and consciously validate the existence of the subculture and reflect on their own identity within it. Brand, Turner, Levy, Bill Gates, Steve Wozniak, Steve Jobs, and several other members of the digital elite each constitute a node in the net of computer history.[46] Hacker ethics, fundamental in the paradigm shift in networked culture, live on referentially in the institutional working models of today's tech giants.

Jordan's *programming proletariat*[47] works in an environment reminiscent of the symbology of hacker culture, despite the fact that nowadays these companies function no differently from any other multinational company in any

42 Stewart Brand, *The Whole Earth Catalog* = Levy, op. cit., 455; Turner, op. cit., 155.

43 The Hackers on Planet Earth is "one of the most creative and versatile hacking events in the world;" in the United States https://hope.net/about.html;

44 DEFCON is one of the oldest and largest repeatedly organized hacker conferences; https://defcon.org/html/links/dc-faq/dc-faq.html

45 The Chaos Computer Congress is organized annually by the Chaos Computer Club (Europe's largest hacker association); https://events.ccc.de/

46 Ted Nelson, *Computer Lib: Dream Machines*, Revised Edition, Redmond, (WA), Tempus Books, Microsoft Press, 1987, 2.

47 Tim Jordan, *Hacking: Digital Media and Technological Determinism*, Cambridge, Polity, 2008, 112.

other industry.[48] It is worth mentioning the Burning Man festival here, the Mecca of techno-utopian, LSD-inspired, new-age spirituality since 1986, and which also happens to be the favourite vacation spot of Silicon Valley CEOs and business owners, recovering from the exhaustion of the countercultural ecstasy at guarded private parties in their air-conditioned luxury RVs. According to Bazzichelli, the Burning Man festival, despite its roots in countercultural and experimental artistic communities and its flag-waving of anti-traditional values, has in truth become a commercialized "social network". Its business model creates a perfect networking opportunity for upper-middle-class attendees, filling the pockets of the festival owners, who are, by the way, members of the very same circle.[49]

Critique of the Californian Ideology

Richard Barbrook and Andy Cameron published their critique of the Californian Ideology in 1995, interpreting it as a manifestation of Jeffersonian economic liberalism:

> Their utopian vision of California depends upon a wilful blindness towards the other – much less positive – features of life on the West Coast: racism, poverty and environmental degradation.[50]

48 Coleman, Gabriella, *Hacker, Hoaxer, Whistleblower, , Spy: The Many Faces of Anonymous*. London, New York, Verso, 2014, 164.
49 Bazzichelli, op. cit., 173.
50 Richard Barbrook, Andy Cameron, "The Californian Ideology", in *The Internet Revolution: From Dot-com Capitalism to Cybernetic Communism*, Network Notebook #10, Amsterdam, Institute of Network Cultures, October 2015, 13.

Barbrook and Cameron draw attention to the paradox that, while the Jeffersonian ideology of liberal democracy claims to regard natural freedoms, civil rights and democracy as the foundations of the social contract, it not only idealizes unregulated free-market capitalism (traditionally a right-wing rallying point in the US), it also tends to exclude non-whites in the definition of "human".

In their reasoning, though the West Coast generation of the 1970s took a stand against militarism, racism, sexual discrimination, the exclusion of homosexuals, and against mindless consumerism and environmental pollution, and despite the new technology promising to bring equality within reach, in reality the developments remained elitist and exclusive. By the turn of the millennium, the direction was determined by the economic liberalism of the New Right instead of the collective liberalism of the New Left. Similarly to what Geert Lovink wrote about the dichotomies of freedom/openness and closedness/commercialism in 2002 when reflecting on European net culture, in the American context Barbrook and Cameron view the future of the World Wide Web in the dynamic contrast of the two economic-ideological extremes. These two extremes are the egalitarian electronic agora and its leftist advocates, and the unregulated electronic market attractive to the right-wing values of economic liberalism. They remark that classical Jeffersonian liberalism, which is in part the foundation of the Californian ideology, is not only Darwinist, but also a slave-keeping ideology.[51] "The deprived only participate in the information age by providing cheap non-unionized labor for the unhealthy factories of the Silicon

51 Geert Lovink, *Dark Fiber: Tracking Critical Internet Culture,* Cambridge, London, MIT Press, 2002, 77.

Valley chip manufacturers."[52] Barbrook and Cameron remind the reader furthermore, that neither the web nor the computer industry were ever truly independent from the American military industry.[53]

In sum, the computer industry has fundamentally changed since the seventies; the mainframes and supercomputers of the Cold War have been replaced by the personal computer in every household, becoming the basis for the exponential spread of the global network, the internet. By the turn of the millennium, the World Wide Web enmeshed every corner of the planet that has access to electricity. This impactful technological change brought about a cultural paradigm shift, which was greatly influenced by the Californian countercultural generation, who tried to develop collective, open, and sustainable alternative working models and opposed the bureaucratic, calculating and mechanistic approach of the military-industrial complex.[54] These models were characterized by flexibility and adaptability and were implemented by information technologies. They turned the personal computer, network communication and the communities that created them on the one hand into symbols of the cultural counter-revolution, and on the other hand into defining economic factors.[55]

Free Software

The third chapter of Levy's book details the birth of gamer culture. He continues to refer to the software developers he considers third-generation as hackers. It would be

52 Barbrook, Cameron, op. cit., 22.
53 Barbrook, Cameron, op. cit., 22.
54 Turner, op. cit., 237.
55 *Ibid.*, 238.

challenging to fit these well-paid employees of dynamically growing companies into the definitions coined by the other authors mentioned.[56] This is the historical moment when hacker ethics vacated Levy's definition of the hacker, almost unnoticed, and when hackers became the indispensable capital of freshly emerging Californian startups. Levy, apparently reflecting on this shift in meaning, dedicated his last chapter to Stallman and the GNU,[57] elevating him to the position of 'the last real hacker'. In the rapidly evolving computer industry, software as a commodity entered the profitable economic field of intellectual property by the early 1980s. The companies that produced trademarked software, whose leaders and developers had enjoyed the experimentation afforded by the openness of hacker ethics just a few years earlier, suddenly lined up with Hollywood movie industry giants to live off intellectual property.[58] Levy calls Stallman the last hacker because as an employee of MIT he experienced this rapid and radical shift and decided to dedicate his entire oeuvre to obstructing the process. Stallman frequently published the new, not yet trademarked projects of IT companies emerging from the MIT laboratories, calling out his colleagues for going against hacker ethics.[59]

The software developer movement serving as the continuation of hacker ethics first became known as Free

56 Levy, op. cit., 427.

57 Richard Stallman worked from 1983 on the development of the GNU operating system at the Artificial Intelligence laboratory of MIT. Preserving the ethics of early hackers, he developed an open-source operating system, the components of which were mostly built into the Linux operating system.

58 Coleman, E. Gabriella, *Coding Freedom: The Ethics and Aesthetics of Hacking*, Princeton, NJ, Oxford, Princeton University Press, 2013, 88.

59 Levy, op. cit., 450.

Software, and later as the Open Source revolution. Today, it is commonly referred to as Free/Libre Open Source. The software developed and published by the F/LOSS movement contain four freedoms not included in closed software:

free to use (the program)
free to study (the source code)
free to share (the source code)
free to develop (the source code).

In the case of proprietary software only the first freedom applies, whether using an illegal or legal version (as in stolen or paid, as well as gratis). As we can see, it is not forbidden to sell a further developed version of a given F/LOSS software, so the free software is not necessarily 'for free', but since it is also accessible without payment, the retailer will have a difficult job selling it. The General Public License is a license displaying this reversed logic,[60] and its first version was developed by Stallman, who is still the legendary hero of the copyleft (all rights reversed) movement due to his activist work. As such, the F/LOSS license protects the source code as public property, developed through the collaboration of a wide-reaching network of independent developers reminiscent of the method of academic knowledge production. Several sources describe this developer experience as a living system in contrast with the closedness and objecthood of proprietary software.[61] It is interesting to compare the fundamental concept in F/LOSS culture with the theory of contemporary

60 GNU Public License, https://opensource.org/licenses/GPL–2.0 ; Coleman, Coding Freedom, 69.
61 Levy, op. cit., 121; Coleman, *Coding Freedom*, 40, 41.

anarchism, according to which it is not the disruption of the status quo that is bad, but the existence of the status quo as default (capitalism, and software as intellectual property). F/LOSS culture describes this with the sarcastic "copywrong vs. copyleft" dichotomy.

The Digital Underworld of BBS Systems

The period between the late eighties and the late nineties was in certain ways the golden age of hacker culture. The personal computer and the internet were present in more and more households in North-West Europe and the United States. The image of the hacker in popular culture, now present in countless movies and literary works, invokes the hackers of this period, coalescing in console cowboy groups like the infamous Legion of Doom, the Masters of Deception or the 10pht Heavy Industries.[62] Following the American Secret Services' *Operation Sundevil*[63] the cyberpunk author Bruce Sterling started covering the fate of this subculture as an investigative journalist.[64] When researching the phenomenon, it is important to note that back then the internet was a new, little known, promising, underutilized experimental technology – permeated equally by European techno-activism, the enthusiasm of Californian start-up culture and by the ambitions of nation

62 Legion of Doom: LoD, one of the most important hacker groups in the US in the 1980s; similarly to their main opponent, the New York Masters of Deception entered hacker culture via phreaking. The 10pht hacker collective founded the first hackerspace in Boston.

63 Az Operation Sundevil was a large-scale FBI operation in 1990 to dismantle the hacker underground.

64 Bruce Sterling, *The Hacker Crackdown: Law and Disorder on the Electronic Frontier*, digital edition, 1992, https://www.mit.edu/hacker/hacker.html

states in applying the commonly accepted laws outside the internet to the web. Although all three approaches failed in their original form by the early 2000s, the image of the hacker not only survives as a cheap ingredient in Hollywood filmmaking, but has also become a revolutionary archetype of the information society – this is addressed in future chapters.

Patryk Wasiak's summarizing research published in the *Zeithistorische Forschungen* in 2012 considers cracker culture analogous to the parallel youth subcultures (graffiti, rave) present in Western Europe in the 1980s.[65] For him, the term cracking means breaking the proprietary code of video games, where the inventor of the crack marks the cracked game with their personal signature, and after removing copyright protection, corrects other mistakes in the code. Various groups of crackers circulate the games widely in competition with each other. According to Wasiak this subculture, just like other contemporary groups, was a unique way of experiencing manhood in the community, and can be considered the forebear of the demoscene culture.[66] The identity-shaping forces of the cracker community, which are found in the characteristics of illegality, intellectual challenge, and in the appreciation of creative excellence, rebellion, and sustaining perpetual identity constructs is as such reminiscent of hacker culture – beyond, of course, the fact that

65 Patryk Wasiak, *'Illegal Guys': A History of Digital Subcultures in Europe during the 1980s,* Zeithistorische Forschungen / Studies in Contemporary History, vol. 9, 2012, http://www.zeithistorische-forschungen.de/2-2012/id=4746

66 An international computer-based subculture, its members program short audiovisual presentations (demos) to showcase at their events. The demo scene is a continuation of the game cracker demos of the 1970s.

it is also aimed at the innovative exploitation of computer technologies.

Wasiak notes further that, contrary to the practices of European cracker communities, which were organized around personal meetings and seasoned at exchanging files, the United States crackers preferred to communicate through *Bulletin Board Systems*.[67] At the same time, the personal computer and the internet gained popularity in Poland and Hungary following the fall of communism, and so, albeit after a ten-year delay, piracy could begin here too.[68]

The above-mentioned BBS platforms where the hacker culture lived its golden age were interconnected with pirated file exchange. Back then the current directions and movements within hacker culture were not as refined: Sterling's *Hacker Crackdown* clearly states how parallel and intertwined the evolutions of phreaking, file exchange, credit card fraud and the *Phrack* magazine were.

Sterling is known as a sci-fi and cyberpunk author. Nevertheless, in 1992 he turned to investigative journalism propelled by the experience of the American Secret Services dragging one of his sci-fi publisher colleagues into a hacker scandal.[69] Sterling felt that as the outside world

67 Wasiak, op. cit., 265. A collection of services available on a server through a terminal, the services being a public bulletin board, file upload and download, maybe the exchange of messages. The popularity of BBS systems was ended with the Mosaic browser and modem-based internet in the mid-nineties.

68 Wasiak, op. cit., 264.

69 Steve Jackson, a game company owner, employed a game developer who spent his free time creating a BBS exposing confidential documents of the Bell Company. Under the guise of looking for evidence, the FBI searched the headquarters and confiscated their computers. To compensate for causing undue harm, the FBI would years later have to pay $300,000 in reparations.

had entered the realm of fiction, he also needed to shift his perspective towards reality. Sterling arranges the history of American phreaker/cracker/hacker subculture from the mid-1980s until 1990 along the lines of a federal investigation uncovering an attack against the Bell Telephone Company (which did happen) and one against the 911 helpline (which never happened).

For the Secret Services, the motivation behind getting rid of the crackers was not a matter of unearthing a specific crime, but to disband the network of underground hackers. The Secret Services interpreted the BBS subculture as a novel underground threat to society. The Legion of Doom (see above) made the most noise at this time. The Secret Services spent years collecting data and attempting to become members of their BBS systems (setting up their own BBSes just to conduct sting operations) before they finally managed to scramble together enough evidence to arrest a few members for a short time. In contrast, two months later, during Operation Sundevil they did not conduct the investigation based on a specific group or document – following two years of preparation, they took over 10% of the BBS servers (25 servers) operating in the United States, which naturally also meant confiscating the personal computers of hackers.

Operation Sundevil served a political purpose, intended by the Secret Services as a territorial message not only for the hacker subculture, but to the commonly targeted banks, phone providers and the FBI, which they considered rivals in dealing with computer crime.

Sterling, who also analysed the legal repercussions of the operation, notes a surprising fact: while the (by now wealthy and older) tech gurus of the Californian ideology generally condemned the young BBS cracker

generation, they were outraged by the use of law against them. Recognizing the similarities between their values and remembering the confrontations with the authorities in their youth in 1968, John Perry Barlow and his network came to legally protect members of the Legion of Doom and Phrack, thereby advocating for the freedom of the internet.[70]

In reaction to the excessive use of force by the authorities, Barlow published the *Crime and Puzzlement* manifesto in 1990 and founded the Electronic Frontier Foundation with Mitch Kapor.[71] With the foundation, they raised awareness that the authorities attempted to put a few arrested hackers on trial for the actions of a network of countless participants, and crimes that only a network of such size would be able to commit.[72]

To the untrained eye it might often seem that hackers have power over technologies that were easily available but hard to understand, without permission from any institution to use that power. This could explain the excessive police attention and general media hysteria surrounding hackers. The summary of Sterling's chronicle highlights the contribution of the EFF and later academic research to the opportunity of an important societal breakthrough: the hacker culture is not a destructive hobby of antisocial juvenile delinquents, but instead is a symptom of the fight for knowledge and power in the age of information.[73]

70 Sterling, op. cit.
71 One of the most influential non-profit organizations fighting for digital civil liberties and personal freedoms.
72 John Perry Barlow, Mitch Kapor, *Crime and Puzzlement Manifesto,* https://www.eff.org/pages/crime-and-puzzlement
73 Sterling, op. cit.

The Plough Down of Cyberspace

In the nineties, the often-mentioned cyberspace must have seemed akin to a new continent, like a virgin trembling to be discovered. The prefix *-cyber* seemed a key to ensuring business success. The best example for this illusion is the dot-com bubble.[74] Equating cyberspace with physical space can, however, be misleading, since undiscovered continents are physical entities, albeit not yet known, completely different from the virtual space created by gadgets connected to a network, which did not exist before they were known.

Cyberspace operates differently from a real space, chiefly because it does not exist without human experience and interference. Its infrastructure is constructed from, or even by, economic, technological and cultural determinations, and international treaties, but is not the same as the cyberspace it creates and supports. Therefore, if we are adamant in finding a physical metaphor for it, we should rather imagine a space station or oil extraction site instead of bountiful and untouched nature with an undisturbed native civilization. Innocence and colonialism only emerge as concepts from the collective behavioural influence stemming from the power of market concentration. In simpler terms, the colonized space is the behaviour of the user, while the process of colonization is the business model of the investor, company owner, military industry etc.

While the United States was busy pumping the dot-com balloon, completely different winds blew in Europe,

74 The dot-com bubble came about around the turn of the millennium, when the soaring values of technology shares, caused by speculation based on largely unfulfilled potential, suddenly plummeted on the American, European and Japanese stock markets.

as detailed in the sections of the second chapter. Using the words of Geert Lovink, Europe was bathing in a creative net euphoria.[75] Lovink's collection of essays, the 2002 *Dark Fiber*, is a call to arms for a democratic World Wide Web. Incited by the economic failure of the dot-com bubble, the then-young squatter-activist-researcher Lovink sees the guarantee of digital freedoms in developing cultural and technological competence. He shouts for a net critique, nowadays advocated for by (among others) the Institute for Network Cultures, headed by him.

His predictions for after the dot-com boom, called the digital gold rush by Lovink, have since proven to be true; according to him, the survivors of a crisis are in a monopoly position, because they can, at a whim, rewrite the rules dictating the market segment of the industry.[76]The five largest IT companies in this position today are GAFAM (Google, Amazon, Facebook, Apple, Microsoft). What Lovink perhaps could not foresee was the sinister addition to this monopoly, namely, that these tech-giants also make most global internet-cable investments.[77]

In 2002 Lovink was more worried for the young internet in the sense that the vacuum generated by the dot-com crisis would be filled with the normalizing efforts of tech companies and governments, removing the values that

75 Lovink, op. cit., 115.
76 *Ibid.*, 4.
77 Google itself funded 14 cable investments. Amazon, Facebook and Microsoft invested in other projects, for example in connecting data centres in North America, South America, Asia, Europe and Africa, according to the research of TheoGraphy, The New York Times, https://www.nytimes.com/interactive/2019/03/10/technology/Internet-cables-oceans.html; https://www.blog.google/products/google-cloud/delivering-increased-connectivity-with-our-first-private-trans-atlantic-subsea-cable/

made the internet irresistible to the artist-activists of the nineties, which he was also part of.[78] The suggestions he made to oppose this process in *Dark Fiber* turned out to be freakishly prescient seventeen years later: he envisioned an anti-racist search engine, a temporary public terminal, collective free software, an anti-aesthetic browser, and living algorithms munching on proprietary software, which, as we will see, are not at all distant from reality.

78 Lovink, op. cit., 11–12.

DEFINING HACKER CULTURE

The Term(s) of Hacker Culture

> Hacking is the clever circumvention of imposed limits, whether imposed by your government, your IP server, your own personality, or the laws of physics.[79]

The meaning of the word *hacker* is volatile, depending on topic or historical context. Addressing hacker culture is a challenge not just because of how colourful it is, but because every author defines it somewhat differently; therefore, it might be more correct to speak of *hacker cultures*. In this chapter I collect and contrast the various definitions that contribute to a complementary and nuanced view of this collective term. The different meanings belong to different 'generations' along the lines of technological paradigm shifts.

Until the nineties, as visible in texts about that era, the word hacker was used synonymously with the self-propelled, innovative, independent program developers (MIT, East Coast), and with computer enthusiasts (hobbyists, West Coast), succeeded by a third generation, growing up in the nineties and viewing the personal computer from the user's perspective. It was only when designing and selling programs become a prosperous industry, that software became a commodity, and so F/LOSS culture emerges. The hacker culture develops co-dependently with the technological and legal conditions of digital culture.

79 Jude Milhon = Coleman, *Hacker, Hoaxer, Whistleblower, Spy,* 167.

Eric S. Raymond, editor of the *Jargon File* and author of the book *The Cathedral and the Bazaar*,[80] is one of the first hackers to reflect on his surroundings with his theoretical work.[81] The *Jargon File* describes hacker culture as a comprehensive network of loosely connected subcultures,[82] and what is of even more interest here, especially viewing the *Code as Speech* chapter of the present dissertation, is its inclusion of hacker slang, those linguistic terms acting as distinguishing features of the online and offline communication of hacker subculture beyond the code of software. A clear separation of the terms 'cracking' and 'hacking' is important in the *Jargon File*, both from a cultural and legal standpoint. Cracking is considered as fundamentally destructive here, while hacking is constructive in its nature. They are in sharp contrast with each other. Further on we shall observe that the complexities of the contemporary situation do not always allow for the type of extreme delineation present in the *Jargon File*.[83] This distinction primarily serves to separate the various subcultures of the eighties. However, there are common features, such as working with computers, playing, learning with and about them, and the development of high-quality software.

Gabriella Coleman, as a cultural anthropologist researching F/LOSS and hacktivism, defines hacking along

80 Eric S. Raymond, *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary,* Sebastopol, CA, O'Reilly Media, [1999] 2001.

81 Raymond's lecture at a conference about the open-source revolution in English: https://www.infoq.com/presentations/Culture-hacking-Open-Source

82 Raymond, Eric S. (ed.), *The Jargon File, The New Hacker's Dictionary,*third edition, Cambridge, MA, MIT Press, 1996, http://www.catb.org/jargon/html/introduction.html

83 Raymond, Erik S., *A Brief History of Hackerdom,* 2000, http://www.catb.org/esr/writings/homesteading/hacker-history/

the lines of *craft for craftiness*,[84] meaning an accomplished technical craftmanship, where the highest level of the craft is performed for its own pleasure.[85]This definition is broad enough to include carpentry and bomb-making, but is also a peculiar response to how the Finnish philosopher Pekka Himanen defines hacking, claiming that hacker culture overcomes the protestant work ethic with the revolution of open network culture.[86]

The definition of *hacking* by media sociologistTim Jordan is the newest and most aimed at synthesis. Bearing in mind the writings preceding him he notes: *hacking* is a material practice which causes change or innovation in the system of a computer, network or communication technology.[87] Jordan approaches hacker culture from its technological determinations. According to him, hackers produce new technological determinations by reforming existing structures, resisting original intents. If they encounter a technology determining user interaction in a way that they disapprove of, they change it, and as such, interaction with the altered technology alters in an unprecedented manner.[88] Jordan, similarly to the *Jargon File*, separates hacker practice into two main categories: followers of either Kevin Mitnick or Linus Torvalds, or respectively, cracking (wilfully breaking into systems) and F/LOSS, associating

84 Pekka Himanen, Manuel Castells, LinusTorvalds, *The Hacker Ethic, and the Spirit of the Information Age,* New York, Random House Trade Paperbacks, 2001, 5–7; Coleman, *Hacker, Hoaxer, Whistle blower, Spy,* 162.
85 *Ibid.*, 17.
86 Himanen, Castells,Torvalds, op. cit., 7.
87 Jordan, *Hacking,* 12.
88 *Ibid.*, 15.

the first with the behaviour of bandits, the second with that of engineers.[89]

Further down the line, in the context of institutional systems we will see that destruction can occur with a constructive intent, and the engineering approach can also be very attractive for the business scene. The present work does not deal with the hacker terminology or the phenomenon Jordan describes as Mitnickian, which appears as a stereotype in Hollywood and the media, and fulfils personal financial interests,[90] because this work aims to examine effects with a primarily socio-cultural meaning instead of the technical, economic or legal impact.

Understanding the motivations behind hacking is a central question for researchers of hacker culture. Most authors emphasize enjoyment, the search for boundaries and thrills, especially a thirst for knowledge and curiosity – besides a desire for control and power. In the hacker gestures I examine, political beliefs also play an important motivational role. This is chiefly what differentiates hacking from 'cracking'. The abuse of knowledge, opposing a given system of rules, and the elegance and know-how of refined technological solutions are also intents that should not be overlooked.[91] Apart from the driving forces and result, the focus of my essay is the working process itself.

89 Kevin Mitnick: the most notorious cracker/hacker of all times. (see Kevin D. Mitnick, William L. Simon, *The Art of Intrusion: The Real Stories Behind the Exploits of Hackers, Intruders and Deceivers,* Indianapolis, John Wiley & Sons, 2005). Linus Torvalds: the visionary of the free and open-source Linux operating system, and lead developer of its system core even today (see Moody, Glyn, *Rebel Code: Linux and the Open Source Revolution,* Cambridge, MA, Perseus Publishing, 2001; Jordan, *Hacking,* 4.

90 Levy, op. cit., 456, 457.

91 Jordan, *Hacking,* 8, 10.

Graham's collection of essays *Hackers and Painters* devotes one essay to the 'nerd' phenomenon, shortly and simply defined as students with above-average intelligence, who end up in a socially disadvantaged position in their peer groups because they are different. For example, Andrea Kárpáti writes about the situation familiar to most teachers, that (visual art) students with an above-average ability require more challenges of higher complexity to stay focused than their peers performing at an average level would need for the same period of time.[92] Further research would need to address the question of whether prominent members of hacker culture (regardless of political affiliation) felt sufficiently challenged by the institutional practices of software and hardware development to feel that their intellectual abilities were sufficiently exhausted at maximum capacity; ergo whether it is not due to mere boredom that they were able and willing to proceed to less constrained intellectual domains allowing for more experimentation.

Community versus Individuality

A unique blend of humility and arrogance, as well as the importance of a community, and the need for individual recognition are some of the dichotomies that define hacker culture.[93] Coleman analyses the tensions between communalism and liberalism, and between elitism and individualism present in the subculture in the detailed description of the hacker 'lifeworld' (Lebenswelt), including the fact that despite the appearance of tension,

92 Dr. Kárpáti Andrea, *A kamaszok vizuális nyelve* [The visual language of adolescents], Budapest, Akadémiai, 2005.

93 Levy, op. cit., 92; Coleman, *Coding Freedom,* 105.

hacker culture manages to incorporate these extremes side by side in some form. As a cultural anthropologist, Coleman feels the need to note the similarities between the attitude of hacker culture and mythical 'trickster' figures. This denotes an archetypal character who uses their wits to sabotage or circumvent rules, taunts authority figures and does this playfully, often as a shapeshifter. Examples of the trickster are the mythical characters of the northern Loki, the Greek Hermes or the Celtic folklore-inspired Puck in Shakespeare's *A Midsummer Night's Dream*.[94]

Lockpicking

> My crime is that of outsmarting you, something that you will never forgive me for.[95]

Levy writes at length about the lockpicking strategies of MIT hackers which allowed them to apply their ethics in opposing institutional bureaucracy. Hackers made a sport of accessing restricted machines and data without damaging the locks (for example with homemade skeleton keys or by code breaking), and they even enjoyed flaunting their success to those with access. Such actions are best labelled *pranks*, although pranks, as opposed to tricks, are not simply motivated by a playful, child-like intent, but often by crude disrespect, even though an aura of nonsense and playfulness surrounds both terms. The term *trick* is in some sense correct if used to denote that hackers truly had their bag of tricks to crack the locks and hatches of the MIT AI laboratory. It is certainly important to address here the

94 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 35.
95 *The Conscience of a Hacker,* http://phrack.org/issues/7/3.html (2017. 07. 05).

recurring phenomenon that practitioners of hacker ethics not simply question authority, but ignore it, circumvent it, jump over it, or transgress it without permission. We are speaking of peremptory, arbitrary actions which are not in conversation with power structures but question the nature of authority by overcoming technological boundaries.

Play

I find it surprising that none of the authors I read dedicated lengthy chapters to the psychological definition of play, considering that the occurrence of play permeates the culture almost entirely. According to this definition, play is a self-directed action without a particular goal, but through it one can experience and practice the steps of goal-oriented action, furthermore, players bring excess energy into motion. It is true for almost all fields of hacker culture that it is a self-directed action with the purpose of experimentation, exploration and learning, removed from the gravity of physical reality, but constrained by fixed rules (network systems, programming languages) in the virtual world. According to Sterling, hackers view the hack as play.[96] The tension appears in relation to the rules of technology and legal regulations – the hacker defies both, and though staying within the rules of the game, creates new playing conditions in terms of technological determination.

An important aspect of play is excess energy. The opposite of play is automated routine, an unconditional adherence to the rules, the absence of space for intellectual roaming, the complete lack of unbound energy – though

96 "Hacking is perceived by hackers as a "game"." *The Hacker Crackdown,* https://www.mit.edu/hacker/part2.html

automation gains a different meaning in this world sustained by machines; playing with a machine is when we use it differently from its mechanical purpose. One of the most crucial elements of the external perception of hacker culture is the tension generated between the game, the player and physical reality. This tension becomes visible when a politically, economically, or socially-driven hacker is arrested in the physical world. The early and impactful hacker movie *Wargames* plays with the same type of tension by portraying a teenager who breaks into the digital control system of NASA's atomic plans, believing that he is playing an ultra-realistic game the entire time. Let us compare this with the first mainframe game developed at MIT, SPACEWAR, and it becomes immediately apparent that the severity of the game (and in this case its conditions) is closely related to its momentary societal environment.

Humour

> Humor is the most crystalline expression of the pleasures of hacking.[97]

The quality of a hack is also judged by the refined linguistic aspects or wittiness of the execution. To be precise, the refined linguistic wit with which the hacker circumvents the barriers of the canon of a given language (program). Considering this, it is not surprising that we often encounter similar approaches at the level of personal communication. The unique, complex linguistic approach to humour is characteristic of hacker culture, which primarily

97 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 7.

operates by jumping between various verbal symbols or code systems.[98]

This type of humour is a mark of competence in complex linguistic play, and thus serves as proof of initiation into a given subculture. The hacker humour, which earned its own chapter in Raymond's *Jargon File*, and which, in Coleman's phrasing, is the most crystalline expression of the pleasures of hacking, is usually built on a linguistic invention that can operate in between the channels of and with the toolboxes of programming languages, online chat jargon and natural languages, whichever the actual channel may be.[99] We can discover several important elements of hacker ethics here: firstly, the surpassing or circumvention of technological determinations, which is daily practice in hacker culture; and secondly, it sheds light on the fact that any canonical pattern has the potential to lose its validity.[100] (See the section Culture Jamming).

An Alternative

Kirkpatrick's *Critical Technology: A Social Theory of Personal Computing*[101] provides the discourse on the definition of hacking with a novel perspective. His view questions all previous and following interpretations. We can start to appreciate Kirkpatrick's angle once we are familiar with the milestones of hacking history and acknowledge simpler definitions and values.

98 Coleman, *Coding Freedom*, 7.
99 *Ibid.*; Raymond, *Jargon File,* version 4.4.7.
100 Coleman, *Coding Freedom,* 105.
101 Kirkpatrick, Graeme, *Critical Technology: A Social Theory of Personal Computing*, Farnham, Ashgate Publishing, 2004.

The core thesis of his study is that power and money monopolize the untapped potential of computer culture cutting ahead of societal consensus, thereby preventing experimental pathways in technology which go against their interests.[102] The social agreement could debate what the true purpose of a personal computer is. The absence of this discourse is not a coincidence – it is not accidental that power and money spearhead technological innovation. The sooner they succeed in shutting a new technology in a pretty box, away from users, the more technology will continue serving their interests. It is strictly forbidden to take apart the gadget in the closed box: the warranty becomes void, it is illegal, it will not work properly etc.

According to Kirkpatrick hacking is the natural approach of working to disrupt this course of events: it opens up the gadget, takes it apart, puts it back together. This attitude should not only be interpreted in terms of natural curiosity, but also in accordance with the direction of the history and characteristics of computer culture. Considering this idea, it is not hacking that changes throughout the history of hacker culture. Actually, the concept of hacking as an attitude is timeless, while computer technology is the industry that continuously attempts to secure new profit-maximizing sources by investing in innovation.

Network Patterns in Information Society

The paradigm shift brought about by new technologies caused the innovative, open working methods initially

102 Kirkpatrick, op. cit. = Maxigas, *Notes on Kirkpatrick: Critical Technology: A Social Theory of Personal Computing,* manuscript, [n. p.].

only characteristic of early hacker culture to become a widespread feature of the academic and business worlds by the late eighties. Turner and Himanen call this *network mode*. The ethics of the network mode is hacker ethics overflowing and becoming the fundamental working model of the information society, building on the values of openness, adaptability, decentralization, freedom, and creativity; it considers employees as hubs in the information technology system.[103] It favours project-based thinking, where each project requires experts with the competences necessary for the given situation, even within the closed system of a company. Similarly, companies form networks project by project.[104] In the new network mode of cultural production, previously impassable barriers separating professions, departments or industries become permeable.[105]

Manuel Castells's *The Information Age. Economics, Society, Culture* examines the patterns of network society in the context of structural societal changes.[106] In this new, knowledge-based social hierarchy, information technology permeates every process of individual and collective existence, while also enabling large-scale adaptability and allowing for the application of network mode logic in connecting systems.[107] The information society fundamentally changed the world of work; Castells interprets this as beneficial only for a narrow "knowledge worker" elite, while it does not benefit "generic workers" as a whole.[108]The network mode means freedom for the elite and vulnerability for the masses.

103 Turner, op. cit., 175.
104 *Ibid.*, 149.
105 Pekka Himanen =Turner, op. cit., 149.
106 Manuel Castells, *The Information Age I–III*, London, Blackwell, 1996, 2000, I.
107 *Ibid.*, 24.
108 *Ibid.*, 296.

Castells and Pekka Himanen invited Linus Torvalds to collaborate on a book after being struck by sudden inspiration at a conference. *The Hacker Ethic* was the outcome, its body written by Himanen, with a foreword by Torvalds and an epilogue by Castells.[109] The latter two serve to validate the core of the study. *The Hacker Ethic and The Spirit of the Information Age* is not about hacker culture, nor about hacker ethics, but instead addresses how the internet and digital technology shifted societal attitudes towards the concepts of work and time compared with the protestant work ethic,[110] and about the role that early hacker culture and the F/LOSS movement played in this shift.[111]

The foreword by Torvalds (F/LOSS) focuses on the motivations of the hacker. He highlights curiosity, personal drive, commitment, the desire for discovery and knowledge and problem-oriented thinking, which distinguish hackers from non-hackers. In his definition, the hacker is a person for whom the computer is not only a means but an end in itself, regarding both work and social life.[112]

Himanen divides the extended phenomenon he refers to as hacker ethics into three parts: the relationship towards work, money, and *nethics.* To help understand the hacker attitudes to time and work, Himanen provides a lengthy analysis of Weberian protestant ethics,[113] according to which, work and money are ends in themselves, and work

109 Himanen, Castells, Torvalds, op. cit.
110 Himanen, ix.
111 Jordan, *Hacking*, 7.
112 Himanen, Castells, Torvalds, op. cit., xvii.
113 Max Weber, *The Protestant Ethic and the Spirit of Capitalism, 1904–1905*, id. Himanen, Castells, Torvalds, op. cit., 9.: "work must be seen as an end in itself, at work one must do one's part as well as possible, and work must be regarded as a duty, which must be done because it must be done."

must be performed as the highest duty, because it must be performed, and as the most important task in life, it must be done as well as possible.[114] While in the creation myth of the Old Testament the creator rests on Sunday after completing his work, for people living in society according to the protestant work ethic, the period after Friday afternoon is the time for self-realization outside the world of work.[115]

Hackers, as Himanen writes, driven to throw all-nighters by curiosity and by a thirst for knowledge, surpass even the rigid order of the protestant work ethic: the self-fulfilling freedom between Friday and Monday, which is a consequence of the protestant work ethic, is present in the work itself for the hacker, as work can be performed any time the hacker feels like working.[116] Before the information society, the power to determine working hours and a passion for work used to be the privileges of the academic world.[117]

While in the protestant work ethic originating from monasteries, work and money are ends in themselves, in the hacker work ethic they are not.[118] What is considerably more important, as many authors agree, is peer recognition. Most hackers, despite being labelled as antisocial by the outside world, consider peer recognition a high priority, especially in the F/LOSS scene.[119] The peer review, familiar to the world of academics, plays a crucial role in the hacker/F/LOSS work ethic, not simply because of the importance of recognition, but for practical efficiency. The key

114 *Ibid.*, 12.
115 *Ibid.*, 13.
116 *Ibid.*
117 *Ibid.*, 6.
118 Himanen, Castells, Torvalds, op. cit., 12.
119 *Ibid.*, xiv.

momentum of knowledge development is peer review free from the bureaucratic obstacles of authority.

Himanen argues at length for the idea that the open model of hacker ethics was greatly influenced by academics, who also stand in stark contrast to closed, authoritarian, institutional ways of functioning.[120] The lack of hierarchies is not equated with a lack of organization in either case, but rather with the formation of groups according to areas of interest and affinity, and their network communications. In the economics of an information society aligned with a task-oriented project culture, creativity and flexibility are the main sources of cultural production.[121]

Castells calls the labour force of the information society *flex-workers.*[122] Therefore, we can consider the *freelancer* lifestyle of the contemporary media and cultural industry to be the maximization of *network culture*.

Brian Holmes published his study *Flexible Personality* in 2002.[123] This work pinpoints the main attractions of network society in the lack of hierarchy, the quality of interpersonal relationships, spontaneous communication, mobility, the adaptability of micro-networks and short reaction time. The characteristics of "flexible personality" are extremely similar to Castells's flexworkers.

According to Holmes, the newest gadgets in computer science on the one hand liberate the user, but on the other hand control them. The "flexible personality" in Holmes's terms is as follows:

120 *Ibid.*, 63–64.
121 *Ibid.*, 39.
122 *Ibid.*, 24.
123 Brian Holmes, *The Flexible Personality: for a New Cultural Critique*, Nettime Mailing List, January 2002, http://amsterdam.nettime.org/Lists-Archives/nettime-l-0201/msg00013.html

> It is a distorted form of the artistic revolt against authoritarianism and standardization: a set of practices and techniques for 'constituting, defining, organizing and instrumentalizing' the revolutionary energies which emerged in the Western societies in the 1960s, and which for a time seemed capable of transforming social relations.

Claire Bishop thematizes the ideal of the contemporary artist in comparable terms regarding the neoliberal economy: flexible, mobile, not trained to perform one specific task, adapting creatively to new situations, and becoming a brand for themselves.[124] Bishop, like Castells, remarks that the ideal serves the purpose of allowing states to be freed from the expenses of welfare obligations, and large corporations from the financial burdens of permanent staff.[125] As such, nobody assumes responsibility for the welfare of the contemporary artist, but instead expects from them not only a service to the production of culture with their concepts and skills, but also enterprising, risk-taking, personal interest-fulfilling, brand-building business acumen.[126] In Bishop's interpretation the lifestyle of the contemporary artist is spreading as an example for other professions (the "No Collar" workforce).

Money and private property are the chief organizing factors of capitalism, which the F/LOSS culture clearly opposes with the creation of intellectual public property: if the code of proprietary software cannot be made public, then open source can conversely not be closed off from the public.[127]

124 Claire Bishop, *Artificial Hells: Participatory Art and the Politics of Spectatorship*, London, Verso, 2012, 12.
125 *Ibid.*, 15.
126 *Ibid.*, 15–16. . (see also Andrew Ross, *No-Collar: The Humane Workplace and its Hidden Costs*, New York: Basic Books, 2003, p. 258)
127 Himanen, Castells, Torvalds, op. cit., 59.

Making money for the hacker money ethic is rather a natural consequence of the realization of passion, inasmuch as it is a consequence at all. Naturally, this can slip into a profit-oriented work ethic reminiscent of protestant work culture, whether in the computer industry or in the information society in general. With the term *nethic* Himanen deems the freedom of expression, the right to data protection and the right of own activity to be fundamental.[128]

With an entertaining sense of humour, Himanen uses the metaphor of self-help books to explain why the information society still follows the protestant ethos at the turn of the millennium. The pillars of this ethos are vision, optimality, flexibility, stability, industry, money, and result accountability.[129] Contrastingly, in the extended hacker ethics he developed, the main values are: passion, freedom, money ethic, social worth and openness, nethic, activity, and caring.[130]

McKenzie Wark's *Hacker Manifesto*[131] describes, in the comprehensive, universal style of the *Communist Manifesto*, a hacker culture it worships, from the perspective of social theory. Wark refers to Himanen as a crypto-Weberian, while calling herself a crypto-Marxist. She defines the hacker culture as a social class in the Marxist trichotomy of agricultural, industrial, and informational production and privatization (*hacker class*) – as a somewhat abstract group, thus transcending societal determination and the

128 *Ibid.*, X.

129 "Vision, optimality, flexibility, stability, industry, money, result accountability." Himanen, Castells, Torvalds, op. cit., 139.

130 "Passion, freedom, money ethic, social worth and openness, nethic, activity, caring." *Ibid.*, 140.

131 McKenzie Wark, *A Hacker Manifesto,* Cambridge, MA, Harvard University Press, 2004.

industrial society, which, due to its virtual nature, at the time of writing has not yet become conscious of its class-like character.

The rhetoric of the *Hacker Manifesto* is alien from both a practical representation of phenomena, and from the general voice of the literature on the topic of the information society. The writing is perhaps closer to the genre of manifestos demanding societal utopia than to the truly heterogenous manifestations of hacker culture, which always remains true to itself. The latter is described as a removed, broad phenomenon which is impossible to concretize.

It is likely that the reason behind this vagueness is that Wark, a researcher and professor of media theory, sought to create a comprehensive, descriptive language that attaches the novel phenomena of the information society to concepts from the disciplines of philosophy and sociology, building them into the writings of history and the rhetoric of Marxism based on the heritage of the Situationist International.[132] Wark's text is so universal that if we switched all the words *hack* to *revolution* or *innovation*, maybe even *technological innovation*, it would be equally valid.

Even as such, it is an important manifesto defining the hacker class as the new revolutionary class, of a society based on the third type of property division, which follows the properties of land and capital, namely on information. She describes these as accumulating layers and adds a ruling and rebelling class to each layer. The hacker class

132 The Situationist International was a group of socially oriented European avant-garde artists and intellectuals in the sixties and seventies, attempting to encapsulate late-stage capitalism based on Marxist theory. The archive of the Situationist International: https://www.cddc.vt.edu/sionline/si/situ.html

is the rebelling class of the twenty-first century for Wark, because of their fight for creative freedom.[133]

Another interesting feature in Wark's rhetoric is that it finds the relationship between the hacker class and authority comparable to anarchy, which I can use in my research. The chapter in the present work entitled *The Avant-Garde Spirit in Hacker Culture* deals with the points of connection between the historical avant-garde and hacker culture, with Manifestos claiming a prime spot. Wark's *Hacker Manifesto*, congruous with the manifestos of avant-garde -isms, attempts to legitimize an imagined future trend.

"The boys and their toys"[134]

The role and position of women and the question of feminism in cyberculture, or contrastingly, the role of cyberculture in feminism is a comprehensive research area in its own right. In the present sub-chapter I would merely like to scratch the surface of the topic with a few suggestions.

In writings about hacker culture, it is common for male authors to express their pity when addressing the fact that the decisive majority of heroes and participants in early hacker culture were almost exclusively middle-class white males with English as their first language. It is important to point out that women play a much larger role in contemporary discourse compared to the beginnings, not only within each subculture, but also in reflecting on them.

In his list of 50 main characters in *Hackers: Heroes of the Computer Revolution*, Levy introduces three female

133 Jordan, *Hacking*, 6.

134 https://www.theguardian.com/technology/2003/aug/08/guardianobituaries.obituaries "The boys and their toys"

characters, among others Jude Milhon, the hacker who coined this chapter's title quote. In Levy's description all of them are validated by their male partners as members of the scene.[135] In the same list a mainframe computer appears with the adjective "sexy".[136] I am mortified to report that, as late as 1984, Levy wrote of women as unpredictable and imperfect systems, engaging with whom was a waste of time according to MIT hackers. We can take a moment to note the Pygmalion metaphor, according to which women are software-like systems on which men perform qualified intellectual creative work.[137]

"The sad fact was that there never was a star-quality female hacker. No one knows why,"[138] writes Levy pretending naiveté. To be precise, no *man* knows why: the nature of privilege is that it acts as a closed system which recreates itself, invisible to those who are "inside" it. Jordan also underscores Levy's point, observing that there are considerably more females among programmers working in engineering compared to those found in early hacker culture. Jordan somewhat singularly explains the gender ratio disparity by contrasting the constructive, safe world of engineering with the risky and destructive nature of hacker culture.[139]

Turner details how most communities of Californian counterculture rapidly regenerated suburban gender stereotypes, and only the digital network of WELL provided slight relief, where female-only conference channels were created for the first time. Of these, WOW or "Women on the

135 Levy, op. cit., XV.
136 *Ibid.*, XIV.
137 *Ibid.*, 75.
138 *Ibid.*, 76.
139 *Ibid.*, Jordan, *Hacking,* 35.

WELL" rose to prominence. By the eighties 40% of WELL users were female.[140]

In 1998, Sadie Plant estimated female internet users at 50% compared to just 5% at the beginning of the 1990s. This phenomenon can be attributed not only to the general emergence of feminism in society, but also to the nature of virtuality as separate from physical presence, as Coleman also later stresses.

On the channels of Anonymous IRC, for example, it is often impossible and unnecessary to know someone's gender; in fact, Coleman's research reveals that gender identity has become far more heterogeneous in the activist scene since the turn of the millennium than it was a few decades earlier. Coleman also notes that while the LGBTQ community is overrepresented, the participation of women (born as or identifying as women) is low.[141]

Barbara Pini, Kerry Brown and Josephine Previte published an interesting case study with the title *Politics and Identity in Cyberspace: A Case Study of Australian Women in Agriculture Online*.[142] Among phreakers or developers of the early Bulletin-Board Systems (BBS) we can occasionally find a lone woman, although this ratio becomes more encouraging in later projects.

140 Turner, op. cit., 152.

141 Coleman, *Hacker, Hoaxer, Whistleblower, Spy,* 157.

142 Barbara Pini, Kerry Brown, Josephine Previte, "Politics and Identity in Cyberspace: A case study of Australian Women in Agriculture Online" = *Cyberprotest: New Media, Citizens and Social Movements*, eds. Wim van de Donk, Brian D. Loader, Paul G. Nixon, Dieter Rucht, foreword by Peter Dahlgren, London, Routledge, 2004.

From Loom to Keyboard

> The more sophisticated the machines, the more female the workforce becomes[143]

Zeros + Ones, the landmark technofeminist work of Sadie Plant, accords the female workforce a key role in the development of the information society and emphasizes that feminism can trace its economic and political foundations to the character of the information society. Although technology is principally designed to maintain the status quo, the diminishing role of heavy industry and manufacturing, coupled with the expansion of the service industry and automatization, all contributed to the growing economic irrelevance of raw muscle power and thus to the inclusion of the female workforce.[144] In Plant's understanding, the fear of artificial intelligence belongs to a minority: the male worker.[145]

As expected, this does not mean that female workforce, education, or innovation get the credit they deserve. In early computer history countless women and female working groups remained almost completely invisible. In 1968 in Japan, the engineers Masatoshi Shima and Tadashi Sasaku, working for Busicom and Sharp, "took over" the concept of the single-chip CPU from a (still unnamed) woman, who participated in a brainstorming session as a student at Nara Women's College. Busicom released the world's first

143 Sadie Plant, *Zeros + Ones: Digital Women and the New Technoculture*, London, Fourth Estate, 1998, 39.
144 *Ibid.*, 38.
145 *Ibid.*, 39.

microprocessor, the Intel 4004, in collaboration with Intel the following year, without mentioning her.[146]

In recent years, the number of texts uncovering such stories keeps growing. Before the emergence of computers, female working groups were deployed to calculate by hand the projected trajectories of rockets and bombs. They were called 'computers' by profession.[147] The 'ENIAC girls' were a group of pioneering female programmers who connected the relays of the ENIAC mainframe, programmed punched cards and maintained the electronic systems.[148] The reason why almost solely women performed this job in the 1950s and 1960s was partly due to the fact that the work was considered inferior; male mathematicians and engineers were busy with the exalted challenges of theory and design.

Even a cursory examination of the nature of privilege should not overlook the invisible masses of women manufacturing microchips, since this practice still depends on the underpaid labour of Far-Eastern, African and Native Indian women living in deep poverty.[149] From Silicon Valley to Thailand, throngs of young Indian, Filipino, Mexican and Vietnamese women assemble these miniature parts to this day, suffering the associated detrimental health consequences.[150] Plant remarks that this process adds

146 "That was the chip based on the idea created by that lady on the four division-type chip. The first model was the 4004. The model 4004 is said to be the first microprocessor in the world." *Interview with Tadashi Sasaki,* http://ethw.org/Oral-History:Tadashi_Sasaki

147 Plant, op. cit., 145.

148 Wolfgang Hagen, "The Style of Sources: Remarks on the Theory and History of Programming Languages" = *New Media, Old Media: A History and Theory Reader*, eds. Wendy Hui Kyong Chun, Thomas Keenan, New York, Routledge, 2006, 164.

149 Levy, op. cit., 217.

150 Plant, op. cit., 74.

a new technology to the long list of obscure, removed technologies passed on to women, following in the wake of the telephone, typewriter, punched card, weaving, sewing machine and spinning wheel.[151]

Lisa Nakamura's research titled *Indigenous Circuits*[152] examines the factory of the Fairchild Semiconductor company established in a Navajo Indian reservation in the seventies, focusing on the underpaid work performed by women in the factory, the assembly of microchips and the rhetoric emphasizing the particular suitability of Navajo women for the role. In an uncanny coincidence, investors seemed to find the same cultural values in Chinese women later on: manual dexterity, humility, precision, a tradition of handiwork. The Fairchild brochures attempted to convince the public that the Navajo women were not only innate bearers of such virtues, but that for them, assembling microchips was a means of self-expression. Fairchild forgot to mention in these brochures that creating workplaces in a reservation was backed by government loans and subsidies.[153]

The work of women, especially non-white women, is systematically silenced in computer history, which strengthens the societal status quo that tends to keep them away from high prestige jobs.

Hacking Patriarchy

When discussing the role of women in early cyberculture we need to speak about three researchers whose

151 *Ibid.*, 75.
152 Lisa Nakamura, *Indigenous Circuits,* American Quarterly, Vol. 66, No. 4, December 2014.
153 *Ibid.*, 926.

contributions to the digital revolution and its theorization are lasting and recognized: Ada Lovelace, Grace Hopper and Donna Haraway. Ada Lovelace, a mathematician and duchess born in 1815, is considered one of the first programmers in pre-computer history for her theoretical work on the analytical engine of Charles Babbage.[154] The iconic work and portrait of Lovelace is used to brand several fem/tech initiatives, such as the Berlin Ada Lovelace Festival – Connecting Women in Computing and Technology, or the Ada Lovelace Award, which is awarded by the association of women in informatics to worthy candidates.[155]

Grace Murray Hopper was an American Naval Admiral and an established software programmer. She is credited with creating the first machine-independent high-level programming language, COBOL; fundamentally this translates high-level language into the language of the hardware. Additionally, her legacy lives on in an interesting linguistic abstraction. Hopper is responsible for the widespread use of the term *bug*; as team leader, she recorded that when her colleagues working on the Harvard Mark II mainframe detected an electronic malfunction in the system, the culprit was identified as a moth in relay 70 of the F panel. The hot air circulating around the computers, gigantic compared with today's standards, attracted insects, which frequently got themselves fried all over the place, thereby disrupting electronic systems.[156]

154 http://www.fourmilab.ch/babbage/sketch.html

155 Lovelace translated and annotated the description of Babbage's analytical engine from French to English. Although the analytical engine was never built, a theoretical calculation was found among Lovelace's notes, which is considered the first algorithm in computer history; https://www.ada-lovelace-festival.com/ ; http://awc-hq.org/ada-lovelace-awards.html

156 Annals of the History of Computing, vol. 3, no. 3, July 1981, 285–286.

The feminist work of Donna Haraway is a classic in the field of technology and sociology. She wrote the impactful 1983 *Cyborg Manifesto*,[157] which projects the idea that cyborgs should be removed from physical gender constraints, thus encouraging the rethinking of language frameworks in line with traditional feminist critique. Her *Manifesto* is an inspiration work in post-humanist/post-gender socialist feminism, which delineates technology and gender studies discourses until today.

In contemporary hacker/cracker subcultures, the active she-hackers, self-identifying as female, face almost constant sexist attitudes on IRC channels, while face-to-face, at hacker conferences they are met with positive discrimination.[158] We can find more and more tech projects in the contemporary hacktivist scene where women develop software to help women, such as the Indian Hack4Change.[159] The current demands of feminism and LGBTQ culture also merit attention as they aim to occupy spaces in hacker culture by working together against sexist institutions and practices (#hackingpatriarchy).

157 Donna J. Haraway, "The Cyborg Manifesto" = *The Cybercultures Reader*, eds. David Bell, Barbara M. Kennedy, London, Routledge, 2000.

158 Kat Baybrooke, *She-Hackers: Millennials and Gender in European F/LOSS Subcultures,* Chaos Communication Camp, 2011; see also: Coleman, *Hacker, Hoaxer, Whistleblower, Spy,* 174–175.

159 Annual hackathon in Delhi, developing projects with the goal of protecting women's rights – a hackathon is an event where several hackers work intensely on finding a solution to a specific problem for days, without much rest. https://hack4changedelhi.wordpress.com/

THE TYPOLOGY OF HACKER CULTURE

The aim of the first two chapters was to clarify the fundamental terms of hacker culture embedded in its historical milestones. In this chapter I examine hacktivism in conjunction with contemporary hacker culture. The works of Tim Jordan, Paul Taylor, Gabriella Coleman and Tatiana Bazzichelli help define the course of this chapter.

Technological Typology of Hacking

Jordan's 2008 summary *Hacking* segments the meanings of hacker culture based on a variety of approaches.[160] His first division is based on the relationship to technological systems; as such, a crack is destructive towards an existing system while F/LOSS works on the creation of a previously non-existent alternative. My analysis is further complicated by the fact that those who are consistently defined by hackers as 'crackers' actually define themselves as hackers. Jordan lists four categories regarding the possibilities of breaking into a system:

1. 0-day exploits: exploiting a vulnerability in a system which was previously unnoticed. The 0-day exploit is the most lauded in the hacker subculture, because it requires a combination of considerable knowledge and creativity. A good old example is the discovery made by the iconic phreaker John Draper, a.k.a. Captain Crunch, that the little plastic whistle found in a box of cereal resonates at the same frequency as the automatic commend signal

160 Jordan, *Hacking*.

of long-distance calls in North America. (See more about Phreaking in the sub-chapter of that title.)
2. 0+1-day exploits: the repetition of a given 0-day exploit until the security breach is sealed. When a known vulnerability exists, the act requires less expertise. Phreakers, for example, often repeatedly used the same technology known from the first 0-day exploit.
3. Social engineering: an abuse of the rules of social conduct; exploiting people by tricking them into releasing information via the use of different communication strategies or the abuse of social norms, which are not restricted to the digital environment. This type of 'trickery' is much older than the computer, but it is a wide-reaching and simple method of extracting personal data. (For example: someone pretends to be an official representative in a convincing manner online/on the phone, thus gaining access to private information.)
4. Script kiddies: on various platforms, experienced hackers refer condescendingly to beginner hackers operating with almost universally accessible knowledge as script kiddies, who often perform hacks that require neither genius nor innovation.

For both Jordan and Coleman, the Free/Libre Open-Source Software culture is an important pillar of hacker culture as the subculture ensuring the continuity of hacker ethics. In Jordan's typology, *non-coding hackers* are authors of journals and academic publications on the F/LOSS culture and the workers and volunteers of the institutions concerned with its legal matters. He also places the Creative Commons in this category, alongside similar legal/cultural hacks which represent hacker ethics in the direct circles of

computer technology.[161] The free (software) culture and legal and cultural hacking obviously differ from the above-mentioned four categories in that it does not interfere with the technological system but instead overwrites given political and cultural power structures by building new protocols. Therefore, the present chapter later examines these phenomena separately within the category of hacktivism.

Progprol/Microserfs

Jordan calls non-hacker software developers the "programming proletariat". They are clearly far from adhering to hacker ethics but, interestingly, as Coleman reflects on it, most tech companies provide their developers with the visual and architectural work environment that instils hacker ethics in its formalities. Jordan notes the key difference, that in contrast to real hackers, the programming proletariat is not the owner of the intellectual property they create.[162] The security experts of information technology, called white hat hackers, mostly belong to this category. Though their relationship with institutional systems is equivalent to that of software developers, their technical tasks and qualifications are identical to those of black hat hackers, except they do not fully carry out *exploits*. Jordan's programming proletariat is tantamount to microserfs (serfs of microcomputers), an academic term originating from Douglas Coupland's fiction.[163]

161 *Ibid.*, 104.
162 *Ibid.*, 113.
163 Douglas Coupland, *Microserfs*, New York, NY, Regan Books, Harper Collins, 1995.

Social Typology

Jordan's second categorization examines the hack in the context of its social relations instead of technological ones. He defines four basic motives:

1. political change,
2. national interest,
3. the political impact of violence,
4. and personal gain.

Of these four categories he only considers hacktivism working for political change as a continuation of hacker ethics, because of how it interferes with societal and technological constraints by making them fluid, thereby changing social and technological relations.[164] In terms of hacktivism, cyber war, cyber terrorism, and cybercrime, the latter three are only interesting to us because by defining them, we can remove them from the subject of our research, which is hacktivism.

Cyber war is information technology warfare between nation states, directed against each other; cyber terrorism is the destructive action of an individual or group which serves a religious, ethnic, national, or other agenda with the intent of creating fear; cybercrime is cracking driven by personal (financial, sexual, or other) interest.[165]

Below we examine the phenomena of hacktivism, which are thus separate from hacking driven by national, ethnic, religious, or individual interests.

164 Jordan, *Hacking*, 96.
165 *Ibid.*, 92.

The motivational and technical categorization of Jordan can be visualized in a diagram summarizing the motivational and technical dimensions of a hack simultaneously. This allows us to draw conclusions about, for example, the general use of tools by hackers with different motivations. Although neither Jordan nor any other authors categorized hacks based on their outcome, it is also important to observe this. Experience shows that a hack is either aimed at publishing confidential data (leak, doxxing), or at making something malfunction (delete, break), or at blocking or disrupting something (hijack, spoof, redirect), or at constructing an entirely new system (F/LOSS). We can successfully place most hacks in a triangle representing the sub-categories of motivation, technique, and outcome. Some simple examples:

1. WikiLeaks is a hacktivist platform which brings to light hidden but, according to the editors, publicly relevant information in the manner of 0-day exploits.
2. Stuxnet ruined the nuclear programme of a nation state (Iran) using simple social engineering methods, by exploiting several 0-day bugs.
3. The Shadow Brokers blackmailed Windows users for money with the WannaCry virus, exploiting a known vulnerability within the operating system.

In figure 2, WikiLeaks appears with a staggered line, Stuxnet with a solid line, and WannaCry with a dotted line.

Hacktivism in Hacker Culture

Below I examine the practices of politically committed hacking that works for societal change, also known as

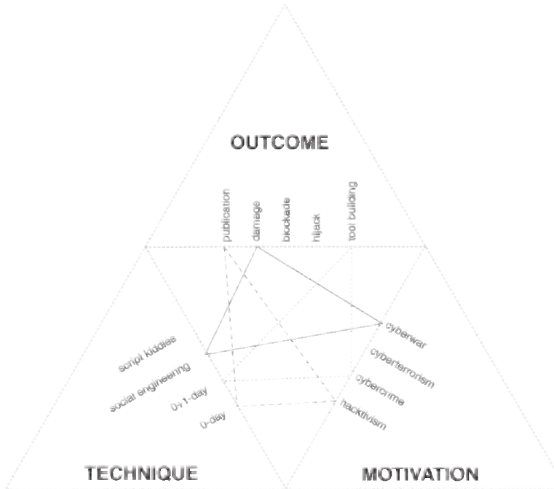


Fig. 2. Hacking typology

cyberactivism or hacktivism, and then I attempt to synthesize the various hacktivism definitions of the literature. The present writing does not deal with the specificities of the so-called "alt-right" infotech culture, but it is an important fact that the alternative new-right movements occasionally profit from the use of technostrategies that have been developed by the anti-globalist, egalitarian, activist left since 1989.

We can delineate two 'generations' of hacktivists. The first was defined by the information technology tools used by the alter-globalist movement that emerged in the mid-nineties, while the other was shaped by the global wave of revolutions between 2011 and 2013. The former boasts a relatively well researched literature, although by

today, these texts have mostly lost their actuality in terms of technopolitical reflections. The second wave is both geographically and culturally heterogenous.

It includes, for example, the revolutionary wave referred to as the *Arab Spring*,[166] WikiLeaks,[167] the Stop PIPA/SOPA campaign,[168] and the American Occupy Movement.[169] For the first hacktivism generation, the community-shaping innovations of the personal computer and the internet are dominant, while for the second, the primary tool is the civil monopolization of 'smart' devices. It is apparent how transformative an impact the momentary mass distribution of commercial technologies can have on democratic civil movements. Jordan, who follows these movements in several of his books, attempts to summarize and systematize the phenomena in each subsequent work, although in hindsight this effort always turns out to have had a short temporal validity.

The book *Hacktivism and Cyberwars* by Taylor and Jordan, published in 2004, naturally only deals with the phenomenon I refer to as first-generation hacktivism. Continuing from Levy's work, they identify seven

166 Arab Spring: a series of demonstrations and revolutions fundamentally shaking and shaping the Middle East in the early 2010s, which begun with the aim to topple oppressive regimes, and partially restructured the political relations of the region.

167 Wikileaks: civil organization publishing documents made secret by governments or other organizations, though the knowledge of their contents carries severe consequences for society (e.g. corruption, violence)

168 Stop PIPA/SOPA: the Protect Intellectual Property Act and the Stop Online Privacy Act were two legal proposals in the United States, that would have considerably controlled the freedom of speech on the internet by confronting piracy.

169 Occupy Movement: A progressive, grassroots movement originating from the United States in 2012, fighting against social and economic inequality, its main opponents being capitalist multinational companies.

generations of hacker culture. The first three generations correspond to Levy's writings: the pioneers at MIT, the hobbyists, and the programmers. They consider the fourth generation to be the hackers/crackers mentioned in the *Golden Age* sub-chapter of the first chapter of this book. The fifth generation is defined as the afore-mentioned microserf phenomenon, while the sixth is the free software movement. These are included in the present chapter. The seventh generation are the hacktivists. The subsequent generations do not replace each other, but instead, build on each other and evolve side by side. In their work, Taylor and Jordan somewhat broadly define hacking as the original, unorthodox, inventive use of technology.[170] The analysis Jordan wrote a mere four years later is considerably more nuanced, as we saw at the beginning of this chapter.

Demonstrating Hacktivism

Jordan denotes two fundamentally different attitudes to information technology regarding the concept of hacktivism: online demonstration and the protection of access to information. As power shifts from the domination of physical space to the regulation of access to information in the evolving information society, so does the critique of the power shift.[171] Because the economic and industrial powers operate in the context of globalization, the significance of local street activism diminishes, and the virtual world becomes the space for global demonstration; the globalism-critical activist groups that emerged in the 1990s adapted to the novel conditions of the information society

170 Jordan, Taylor, op. cit., 6.
171 Jordan, *Hacking*, 71.

and occupied virtual space, erecting virtual obstacles to obstruct virtual public traffic.[172] One of the most utilized tools of this paradigm shift in counterculture is the DoS (Denial of Service) Attack, used frequently by several activist groups since the 1990s and to this day.

In terms of technique, it is worth distinguishing between when participants manually repeat a service request over and over on various computers, and when automated algorithms developed for this purpose perform the same task (DDoS – *Distributed Denial Of Service*).

Among the previously explained categories of hacks, the DDoS is a script kiddies-level intervention, since neither the use of the application, nor the manual reloading of the page require extensive knowledge. An important difference between the manual and automated DDoS is that if an activist group overwhelms a site and the server supporting it with download requests by using one computer per person, then that provides a realistic figure regarding the number of protesters; while if this is aided by Stacheldraht[173] or some other application of the same kind, it could very well be that there are only a few or even only a single skilled activist behind the attack working from multiple computers at once. The FloodNet was one of the first automated DDoS tools and was developed by the Electronic Disturbance Theatre to support the Zapatist movement. The pioneer activist group the Cult of the Dead Cow, established in the United States, was the first to use the term *hacktivismo*, and they released several

172 Critical Arts Ensemble: Electronic Civil Disobedience: And Other Unpopular Ideas, https://monoskop.org/images/d/df/Critical_Art_Ensemble_Electronic_Civil_Disobedience_and_Other_Unpopular_Ideas.pdf 13

173 The Stacheldraht is a malware, or virus, which mounts a DDoS attack against a given website. *Stacheldraht* is German for barbed wire.

types of data-protection software (e.g., Camera Shy, ScatterChat). The Cult of the Dead Cow also published the Back Orifice software, which allowed for the control of Windows systems, without the knowledge or consent of the user.

Several authors regard the series of activist attacks against the 1999 World Trade Organization summit in Seattle as the first truly large-scale infotech demonstration, where the coming together of NVDA (Non Violent Direct Action) and MVDA (Mass Virtual Direct Action) ensured the success of the action. Jordan and Taylor connect the rapid explosion of public awareness about the alter-globalist movement to this particular event.[174] Alexandra Samuel published her dissertation with the title *Hacktivism and the future of political participation* not long after the monography of English hacktivism came out by Jordan and Taylor, and called the world's most successful virtual protest thus far the "Battle of Seattle".[175] Holmes celebrates Naomi Klein's book *No Logo*,[176] according to which the events of Seattle reflect the organic, decentralized, interconnected paths of the Internet in the physical world as a model of activism.[177]

MVDA: Mass Virtual Direct Action

Jordan introduces the expression MVDA in his book *Activism!* and defines it as comparable to and a variation of NVDA, Non-Violent Direct Action. The purpose of *direct*

174 Jordan, Taylor, op. cit., 59.
175 Alexandra Whitney Samuel, *Hacktivism and the Future of Political Participation,* Phd dissertation, Cambridge, Harvard University, 2004, 12.
176 Naomi Klein, *No Logo, Taking Aim at the Brand Bullies,* Knopf Canada, Picador, 1999.
177 Holmes, Brian, *Escape the Overcode: Activist Art in the Control Society,* Paris, Van Abbemuseum Public Research vol. 2, 2009, 28.

action is to prevent or obstruct a specific event. NVDA is a widespread tactic utilized in numerous non-violent public demonstrations. The main aspect is that participants block or hinder an event with their physical body and presence, without vandalism or violence. Various organizations such as Greenpeace conduct training in this method to prepare their members and other participants for their protests.

Jordan derives the term MVDA from NVDA and compares the two types of obstruction: an example of NVDA is a large number of participants placing a building under blockade, while an example of MVDA is a large virtual crowd of protesters blockading IT channels. He sees it as a challenge for the latter that it cannot rely on the involvement of chance bystanders, and that participants rarely sense the presence and solidarity of peers.[178] In his analysis, the series of protests interfering with the 1999 World Trade Organization summit can attribute their success to the complementary aspects of NVDA and MVDA, which allowed people to get involved who otherwise might not have participated. The Electrohippies hacktivist group claimed responsibility for the online aspect of the action.

Information Hacktivism

The other main category of critical hacking politicized in Jordan's taxonomy is aimed at gaining access to information for the good of the public. This type of hacktivism is primarily, though not exclusively performed with the collaboration of human rights and civil rights activists battling oppressive regimes.[179] The almost invisible components of

178 Tim Jordan, *Activism! Direct Action, Hacktivism, and the Future of Society*, London, Reaktion books, 2002, 124–126.

179 Jordan, *Hacking*, 73.

activism that provide access to information are those that cater for opposition/silenced/isolated groups by supplying info-tech logistics. Maxigas emphasized the importance of the unseen and thus uncredited background work of such hacktivism in the introduction to *+KAOS. Ten Years of Hacking and Media Activism*.[180] The construction, maintenance and restoration of infrastructure is perhaps less conspicuous, but serves as the basis for all other action, and therefore is a type of work of historical significance.[181] Examples of this are the creation and maintenance of servers, mailing lists and encrypted email services that allow activists to communicate, organize, publish, stream etc., independently from national regimes and financial constraints, and without the risk of being monitored.

Veran Matić details the story of the Belgrade broadcaster B92 in *Civil Networking in a Hostile Environment: Experiences in the Former Yugoslavia*.[182] B92 started out as a youth radio in 1989, but due to its perseverance and the censorship of the Milošević regime, by the mid-1990s it had grown into a widely known centre of opposition, community and activism.

It was banned four times from the time of its foundation until the end of the Yugoslav wars. The journalists constantly played cat-and-mouse with the authorities. Members of B92 used to broadcast from secret locations, and continuously

180 Autistici/Inventati, *+KAOS. Ten Years of Hacking and Media Activism,* Amsterdam, Institute of Network Cultures, 2017.

181 Maxigas, *Hacklabs and Hackerspaces: Tracing two Genealogies,* Journal of Peer Production, http://peerproduction.net/issues/issue-2/peer-reviewed-papers/hacklabs-and-hackerspaces/

182 Veran Matić, "Civil Networking in a Hostile Environment: Experiences in the Former Yugoslavia" = *Shaping the Network Society: The New Role of Civil Society in Cyberspace*, eds. Douglas Schuler, Peter Day, Cambridge, London, MIT Press, 2004.

developed new hybrid technological solutions to maintain the continuity of their news reports. In 1999, the authorities assumed control over B92 and banned its founders from the studio. The group then resorted to broadcasting via the internet and satellite, with the help of the Amsterdam-based internet provider XS4ALL and Geert Lovink, as they had done earlier in 1996.[183] They commonly copied the news segments intended for publication onto VHS cassettes, which were then played in public places. Sometimes they took the material to a satellite transmitter by car, where it was relayed to Amsterdam, and then from there, again via satellite, to listeners elsewhere.[184] The original news stories were sent to readers by SMS, and eventually they developed an encrypted email service with the help of XS4ALL.[185] Lovink actually highlights something surprisingly different from his memories of the collaboration between the XS4ALL and B92: he focuses on the civil voices whose diaries he had published.[186]

For Matić and colleagues, the medium is not the technology, but a technologically well-versed investigative journalist.[187] The founder Matić is still the operational director of B92, which, post-war, evolved into a cultural centre, TV channel, publisher, internet provider, concert organizer and archiving company.

Another excellent example of info-hacktivism is the case of the Cuban intranet. The internet is practically unavailable for the majority of people in the Republic of Cuba. Civilian methods of accessing information are

183 *Ibid.*, 162.
184 *Ibid.*, 167, 162.
185 *Ibid.*; 168, http://news.bbc.co.uk/1/hi/world/europe/302344.stm
186 Lovink, op. cit., 324.
187 Matić, op. cit., 169.

incredibly innovative, ranging from hard-drive exchange services to mobile data sharing apps. A previously isolated subculture was what brought change to this unusual situation: a home-made network of intranet nodes emerged from the shift in the local networks of gamers participating in LAN parties and by now boasts several hundred thousand users in every major city. This network is currently the world's largest civil intranet, which is completely independent from the World Wide Web and which was created by civil volunteers who built its infrastructure.[188]

In a less hardware-focused interpretation of the term, info-hacking also extends to whistleblowing, as done for example though the prominent platform WikiLeaks, whose director is Julian Assange.[189] Richard Thieme regards WikiLeaks as the direct manifestation of the hacker ethos. Jacob Appelbaum represented the WikiLeaks organization on behalf of Assange at the HOPE (Hackers on Planet Earth) conference in 2010. He named the NGOs serving as watchdogs for democracy the "fifth estate" of power, including hacktivists, independent journalists, and every other group working for the freedom of information, protecting the right to information when the fourth estate, the media, fails to live up to this task.[190]

The Tor network is more general, but still belongs here; it was published under an open license by the Naval Research Laboratory of the United States. A unique feature of the

188 *A Story of Community Resilience: The Internet in Cuba*, 33c3, https://media.ccc.de/v/34c3-8740-the_Internet_in_cuba_a_story_of_community_resilience

189 An interesting piece of trivia is that when Mastercard refused to forward the funds transferred to WikiLeaks, Anonymous attacked it to express its support for WikiLeaks. The Chaos Computer Club expelled Domscheit-Berg after he left WikiLeaks, despite him being the deputy of Assange.

190 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 84.

Tor project stems from providing apparently unrestricted freedom of data and anonymity, thereby encouraging not only the presence of often important and humanitarian content scarcely available on the open internet, but allowing a glimpse into the darkest corners of human existence on the dark web / deep web; furthermore, it also caters to the logistics of abuse and black-market trade.

The entirety of hacker culture is permeated by the dichotomies of privacy/encryption and access/connection, which might seem contradictory at first sight, but in reality are comprised of elements that strengthen one another. Perhaps it is most sharply visible here that the right to privacy refers to the activist, civilian, or private individual, who, besides the right to a private sphere, also has the right to know about the pernicious actions of institutions functioning in positions of authority above these individuals. We can observe the "mistrust authority" principle of hacker ethics at play here, as well as the egalitarian notion that the people constituting a system have the right to the power of information concerning the governments, companies, and institutions that serve them; not the other way round.

Culture Jamming

Jordan examines the phenomenon of culture jamming, which targets and hijacks traditional advertising technologies to bring across strange, contorted messages, not in his book about hacker culture, but in the book on the typology of activism.[191] It is essential to mention it here, because of the later hacktivism definition. Jordan views culture jamming as electronic terrorism that diverts the

191 Jordan, *Activism!*, 102.

cultural codes of consumerism portrayed by corporations and institutions.[192] The aim of this is to question the codes that stimulate consumerism, to confiscate them, and then to use them against themselves by unveiling the visual linguistic characteristics of this coding.[193] Jordan defined this visual language as the "language of corporate desire." Culture jamming introduces a gap between message and medium, which exposes the visual symbology of corporate desire, thereby questioning the power structures controlling this desire.[194] The most successful culture jamming groups of the past decades have been the Billboard Liberation Front, the Buga-Up (Billboard Utilising Graffiti Against Unhealthy Products), the Adbusters, the Yes Men, the Barbie Liberation Front, the Simcopter, the Etoy campaign, and the Space Hijackers.[195] In Hungary, the Two-Tailed Dog Party is an outstanding representative of culture jamming.[196]

Despite culture jamming generally being humorous and subversive, Jordan sees one aspect particularly pessimistically; namely that it denies the possibilities of visual language outside the corporate control of desire.[197] Jordan draws our attention to the problem that corporations view

192 *Ibid.*, 103.
193 *Ibid.*, 102, 104.
194 *Ibid.*, 104, 112.
195 Billboard Liberation Front, http://www.billboardliberation.com/; Buga-Up, http://www.bugaup.org/; Adbusters, https://www.adbusters.org/ ; Yes Men, https://theyesmen.org/ ; Barbie Liberation Front, https://beautifultrouble.org/case/barbie-liberation-organization/; Simcopter: the first action of one of the Yes Men members, whereby he hid gay couples in the game Simcopter. Etoy campaign is one of the most exciting series of actions in culture jamming, http://www.etoy.com/;Space Hijackers, https://spacehijackers.org/
196 The homepage of the party: https://ketfarkukutya.mkkp.party/, Wikipedia article about the party in English: https://en.wikipedia.org/wiki/Hungarian_Two-tailed_Dog_Party
197 Jordan, *Activism!*, 116.

culture jamming as a kind of free market-research, the results of which they can then use in their next campaign or as part of their branding elements.[198]

Tactical Media

> Tactical media are post-1989 formations. They are a set of dirty little practices, digital micro-politics if you like.[199]

As defined by the Critical Art Ensemble, the term *tactical media* refers to heterogeneous forms of digital intervention whose roots stem from the historical avant-garde.[200] A crucial element is that tactical media transmit subversive, non-profit, activist agendas, characteristically with the use of experimental technologies,[201] although different authors include different phenomena here. Kluitenberg, after Geert Lovink and David Garcia, defines tactical media as follows: it is the unique fusion of art, politics and media, that enters into public consciousness as a critical interdisciplinary

198 One of Jordan's examples is the Nike campaign, where the brand makes its own advertisements as if they were culture jamming actions: by then, Nike had been criticized for decades for the terrible conditions they subjected their workers to. In 2020, as part of their advertising campaign for football boots in Australia, it hired a group to organize a pretend demonstration against Nike – but not to demand humane working conditions, but because sportspeople wearing Nike shoes have an unfair advantage over wearers of other brands. The fake demonstrators gave away anti-globalist fliers and Nike marketed the shoes with the slogan "The most offensive shoe we have ever made". Jordan, *Activism!,* 113–115; https://corpwatch.org/article/us-nike-capitalizes-anti-capitalists

199 Lovink, op. cit., 267.

200 Erik Kluitenberg, *Legacies of Tactical Media: The Tactics of Occupation: From Tompkins Square to Tahrir,* Amsterdam, Institute of Network Cultures, 2011 (Network Notebooks 5), 13, https://issuu.com/instituteofnetworkcultures/docs/legacies

201 *Ibid.*, 17.

practice with a forceful societal, political, and cultural influence; and which was made available by the increased affordability of tools for media production and circulation.[202] Kluitenberg compares the demonstrations taking place in virtual and real space; attaching electronic isolation to the former and the feedback loop of libidinal energies to the latter.[203] Tactical media is where virtual and real spaces touch, creating a new, hybrid space, which only exists because it is at the same time physical and mediatized.[204] In this physical-virtual space, which participants simultaneously experience and transmit, the broadcasting is not centralized, not professional, and can be described as a network of hubs.[205] As in the case of the internet, the key to continuous communication lies in the decentralized network comprised of multiple hubs.

Brian Holmes describes the versatile nature of tactical media as the organizing aesthetic of network activism, meaning that consumerist digital devices are rapidly and amateurly appropriated to serve a pre-defined goal. In this sense, tactical media are valuable, because they bring to life a common civilian subjectivity through commercial electronics, defying commercial and authoritarian practices.[206] To Holmes, tactical media are a phenomenon of the nineties. In contrast with Kluitenberg, who regards the use of social media during the Arab Spring as tactical media, Holmes supports the introduction of a new term to describe the newest phenomena.

202 *Ibid.*, 8.
203 *Ibid.*, 7.
204 *Ibid.*, 11.
205 *Ibid.*, 9, 7.
206 Holmes, *Escape the Overcode*, 286.

Contemporary Subculture AFK

Hackerspaces, hacklabs, and hacker meetups/conferences are all community-run physical spaces of the contemporary subculture. Each of the three is a place for technological experimentation, common learning and collaborative projects. Conferences (Chaos Computer Congress, HOPE, DefCon etc.[207]) are organized annually, being the only space where many parties can meet AFK (away from keyboard), even though they might regularly work together online. Contemporary hacker meetings are in Coleman's understanding ritualistic events that strengthen the identity of their members. Turner expands on this, saying that participating in the first Hacker Conference organized by Stewart Brand in 1984 was a strong identity-shaping experience for members of the as-yet undefined, less conscious subculture.[208]

Hackerspaces and hacklabs are community spaces for regular collaborative experimentation, work, and learning. Maxigas pointed out in his 2016 lecture at the Lüneburg Hackademy that hacklabs are community spaces that evolve as part of social movements, while hackerspaces are workshops for technological experimentation that are contingent on membership. He differentiates between hacklabs and hackerspaces in terms of politicized technology and the politics of technology.[209]

207 The Hackers on Planet Earth is "one of the most creative and versatile hacking events in the world"; in the United States https://hope.net/about.html; DEFCON is one of the oldest and largest repeatedly organized hacker conferences; https://defcon.org/html/links/dc-faq/dc-faq.html; Chaos Computer Congress is organized annually by the Chaos Computer Club (Europe's largest hacker association); https://events.ccc.de/

208 Levy, op. cit., 456.

209 Maxigas, *Writing against the Grain: Keep Empirical Political* (lecture

Based on this, hacklabs, usually operating as part of the *social centres* of squats, work with low-tech computers constructed from dumpster-dived parts, placing technology at the service of politics, while hackerspaces observe the technopolitical approach in that they make various technologies and know-hows accessible to their members in a way that is independent from the market conditions of consumer society.[210] Of the several underground hacker groups that formed and operated in the nineties, 10pht Heavy Industries is credited with founding one of the first hackerspaces.

Bazzichelli and Maxigas both describe the culture of hacklabs and hackerspaces as geopolitically heterogeneous, reflecting on the differences in practices between Europe and the United States, or between Northern and Southern Europe. Brian Holmes remarks that the internet became mainstream around the time the Iron Curtain fell, thereby enabling the World Wide Web to become an essential part of the toolkit of societal change in Europe, unbound by compulsions stemming from coding traditions.[211]

Bazzichelli, who started out with a background in media activism, regards the anti-capitalist practices of hacktivism that are familiar to European hacker communities as alien to American hacker culture. She believes this despite the fact that, historically, hacker culture gained its anti-authoritarian, techno-utopian, network-building inspiration from the United States, and also applied American approaches to local societal and political conditions.[212] Simultaneously,

at the Hackademia, Lüneburg Summer School For Digital Cultures, 2016, Leuphana Universität of Lüneburg, DE), 6.

210 *Ibid.*, 6–7.

211 Holmes, *Escape the Overcode*, 291.

212 Bazzichelli, op. cit., 186.

the politically committed European practice had an effect on novel American methods, exemplified by the Tor Project or the Noisebridge hackerspace.[213] In the opinion of Maxigas, European hacker culture learned to apply the American computer culture in a socially conscious manner, and in discourse with local political struggles.[214]

The main European facilitator in this learning process was the German Chaos Computer Club (CCC). The club, which grew continuously from the 1980s onwards, is not only an advocate and developer of freedom of information and the technology of encryption, but when it comes to technology, it is also a partner in the debate on German federal law-making. Of the club's tens of thousands of members, most are German, Swiss or Austrian. The work of the CCC extends to civilian data safety, digital literacy among the youth, good practices, and the protection of good practices. Their broad professional activities not only determine legal agendas, but also serve as a force in defining public opinion. As a community of critical experts on the European technopolitical scene, the club has represented leftist values from the start. Their manifesto expands the original hacker ethics with two further points. The first is "protect private data, release public data", which underlies their commitment to politicized hacktivism. They were the ones to expose – and obstruct – the secret spyware of the German federal government, the Staatstrojaner (state-sponsored trojan horse). Bazzichelli quotes the ex-Tor-developer, WikiLeaks correspondent Appelbaum:

213 *Ibid.*, 188.
214 Maxigas, *Hacklabs and Hackerspaces*.

> In Europe people weren't working towards becoming millionaires per se, they were working on improving their own communities and on improving their own lives, and writing software that was really relevant. It was like people who were carpenters for the sake of building their chair for their home. They became great carpenters and they built amazing chairs and everyone had different furniture that they'd all built.[215]

Critical Making

Hackerspaces and hacklabs are also the settings of the open hardware movement: in a manner equivalent to the ethics of the F/LOSS movement they "decolonize" technological know-how with the aid of shared community knowledge and tools; to remove it from its protective confines, just like Repair Cafés, Maker Spaces, FabLabs and community bike repair workshops. By open hardware we mean the type of community development of technology, where the plans and the process of construction are publicly available and repeatable, with the goal of overcoming closed technologies.

The initiatives driven by common technopolitical attitudes could best be referred to – if they had a shared name – as Free/Libre Open Source Technology, although in common parlance they are seen as components of the DIY revolution. Nevertheless, we should not forget that the technologies made available by this movement previously existed exclusively as national, military or economic monopolies, so much more is at stake than a pleasant weekend doing DIY or even than the not-insignificant

215 Jacob Applebaum = Bazzichelli, op. cit., 189.

phenomenon of the information society described as the *shared economy*.

The approach of the open hardware movement is largely missing from maker culture, because it is chiefly organized in a profit-oriented manner, serving the startup culture. Regina Sípos's lecture *The Critical Making Movement* at the 2018 Chaos Congress[216] summarizes this duality present in the maker movement, according to which most Makerspaces and FabLabs, and the members of each space themselves, are not motivated by social innovation. Sípos exclaims with relatable sense of humour, "No more Yoda figures, please!" to express the critique of DIY consumerism as opposed to the socially sensitive side of maker culture. For Sípos, the most important features of critical making are of the abstraction, loneliness and linguistic basis of critical thinking, and the interconnected influences of making, the physicality and the sensuality of the hardware.

The critical making attitude is summarized in the *Critical Engineering Manifesto* published by Julian Oliver, Gordan Savičić and Danja Vasiliev.[217] Each element of the manifesto chimes in with Papanek's work written forty years before. The arguments that appear as worries for the future in Papanek's book *Design for the Real World*[218] are pressing issues of the past and present in the CE manifesto: engineering design is the language wielding the largest force at present, determining how we think, behave and

216 Regina Sípos, *The Critical Making Movement,* presentation at the 2018 Chaos Computer Congress, Leipzig, December 2018, https://media.ccc.de/v/35c3-9971-the_critical_making_movement

217 Julian Oliver, Gordan Savičić, Danja Vasiliev, *The Critical Engineering Manifesto,* http://criticalengineering.org, Berlin, 2011.

218 Victor Papanek, *Design for the Real World: Human Ecology and Social Change*, New York, Pantheon Books, 1971.

communicate. In Papanek's 1969 work, design appears as the most important influence on human behaviour. The CE manifesto does not only demand an understanding of the technological products we depend on in terms of their effects and evolution, but also asks that we deconstruct them physically, and start shaping them with our own hands.

Open hardware, as well as F/LOSS culture, can be interpreted as a cultural and economic behavioural shift of the consumer towards the producer.[219] Paul Graham approaches the subject from the other end, comparing hackers to painters, and describing makers as the connecting link. As such, in his opinion the maker culture is not a continuation of hacker culture, but hacker culture is a continuation of the fine arts; in the present paper, a later chapter explores this perspective.

The Berlin Telekommunisten collective builds shared network services, among other activities. The iconic phreaking is applied to smartphones; they build offline data-sharing networks.[220] The telecommunists occupy the "softcore" end of the open hardware spectrum of values, if such a spectrum existed. A more radical example of open hardware is the Hackerspace Global Grid, with its goal of creating a network of DIY satellites,[221] or the feminist GynePunk project of the Catalonian Post-capitalist, Eco-Industrial Colony, supplying (primarily underprivileged) women with DIY gynaecological instruments and examination methods.[222]

219 Coleman, *Coding Freedom,* 109.
220 Bazzichelli, op. cit., 227.
221 Webpage of the project: http://hgg.aero/
222 http://www.makery.info/en/2015/06/30/gynepunk-les-sorcieres-cyborg-de-la-gynecologie-diy/

Free Culture

Coleman points out the significant difference in the fact that, whereas global network society increasingly experiences the expression of individuality through consumerist behaviour, Free Software developers oppose this with the artistic attitude of a 'producer'.[223] Fundamentally, all IT gadgets that work by circumventing closed data-sharing systems are part of the free culture movement. Components of free culture consistently exclude the profit-oriented go-betweens from their business models, who take credit for the work of culture production without contributing to it creatively.

Such are free software, free knowledge, free music or free literature. The freedom of these elements always means something different: outstanding examples of free knowledge are Wikipedia or, at the academic level, Library Genesis, where users upload and manage content. Often, authors themselves share the codes necessary to access their works on Science Hub, because they disagree with the surreally high profits and publishing monopolies of academic publishers.

The case of free music is special among the objects of shared files: perhaps it is the only element of file-sharing where the eventual profit can actually reach the creator, provided the creator is independent, instead of the money ending up in the pockets of an agency or institution. The peer-to-peer piracy revolution of the information society radically transformed the culture industry: it reformed the business models of giant agencies in monopoly positions (music and movie industries, academic publishers,

223 Coleman, *Coding Freedom*, 14.

software manufacturers, videogame creators). The latter, for fear of losing their exclusive market position, come up with increasingly bizarre business solutions to sustain their profit margins.

The Definition of Hacktivism

> Mass self-communication provides the technological platform for the construction of the autonomy of the social actor.[224]

The previous points place hacktivism in a novel light. Continuing along the lines of the too brief and cursory, Jordan-defined *politically motivated hacking*, we need to broaden the terminology of hacktivism to encompass not only free culture, but also the analyses of critical making, or civilian tactical media usage. Jordan, for example, does not consider the Cypherpunk movement to be a type of hacktivism[225] (not to be confused with the justifiably popular artistic/literary cyberpunk), though on the basis of my extended definition it does belong here, since Cypherpunk is also an infotech subculture, where both the use of technology and the countercultural behaviour are non-conformist.

Bazzichelli's proposal is more detailed and accurate than Jordan's: hacktivism reflects on the relationship of technology and society with the tools of digital culture, questioning the power structures of the information

224 Manuel Castells, Preface = Manuel Castells, *The Networks of Outrage And Hope, Social Movements in the Internet Age*, Cambridge, Polity, 2015, 7.

225 Eric Hughes, *Cypherpunk Manifesto* 1993, https://www.activism.net/cypherpunk/manifesto.html ; see also: John Gilmore, *Privacy, Technology, and the Open Society,* 1991, http://www.toad.com/gnu/cfp.talk.txt

society.[226] According to Samuel, hacktivism is separate from other aspects of hacker culture due to its cultural, tactical and moral principles.[227] She also calls our attention to the fact that hacktivism, while often illegal, is always non-violent, and always respects the value of human life.[228]

I expand Jordan's definition to include the original hacker ethics coined by Levy, the collectivism emphasized by Coleman, and the observations of Samuel. Below I examine the phenomena surrounding this terminology. Accordingly, hacktivism:

– creates new technological determinations in a pre-existent technically determined field, in which the new technological determination defines the modes of action in a new manner compared to the original intentions (Jordan);
– fulfils the principles of hacker ethics: the hands-on imperative; freedom of information; decentralization; questioning authority; meritocracy; the positive aesthetic dimensions of the computer (Levy);
– it does not primarily serve individual interests; its practices and aims are collective (Coleman);
– though it may cause considerable financial damage, in terms of physical safety and life it is always non-violent (Samuel).

The determinations that hacktivists face when creating something new are not merely technological, but also have a communal and cultural aspect; and the ethic behind their actions is the original hacker ethic. Hacktivism is

226 Bazzichelli, op. cit., 229.
227 Samuel, op. cit., 3.
228 *Ibid.*, 2.

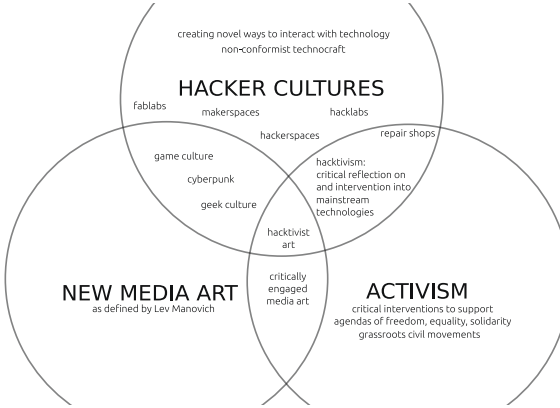


Fig. 3. Hacker cultures, activism, new media art

fundamentally politicized, non-violent, non-conformist techno-activism, which not only utilizes, but also shapes the technological toolbox of the information society.

In this chapter, we distinguished between the parallel phenomena of hacking and hacktivism. The aim was firstly to define hacktivism and secondly to familiarize ourselves with its divergent contemporary practices. We move on now to examine the working models of hacker culture in the context of art history, and to shed light on good practices in hacktivist art. For this we will need the methodical structures outlined in this chapter. After defining the horizontal and vertical dimensions of hacker culture, we added the elements of the contemporary scene. The Venn diagram below illustrates the intersections between new media art, hacker culture and twenty-first-century activism; hacktivist art is in the centre, and includes the case studies presented

in the chapter entitled Yet Unrestricted Trespassings. This diagram will serve as a crutch to prop up our understanding of contemporary meanings, and to examine how these meanings relate to art and activism.

AVANT-GARDE IDEOLOGY IN HACKER CULTURES

The central proposition of my dissertation is that hacktivism can be interpreted in the context of art history and contemporary activist artistic praxis. In this chapter I shall attempt to prove this proposition and then apply it in practice: I will examine the possibilities of systematically analysing non-conformist cultural patterns. In the second half of this chapter I explore the constellations between contemporary hacker culture and the historical avant-garde within the theme of anarchism, to illuminate the similarities in how aesthetics and media tactics relate to the social status quo. Finally I examine the question of source code as speech via the relationship between the avant-garde and language, and that between hacker culture and programming languages. The core questions of my research are whether the traditional interpretive framework of avant-garde art is capable of providing analytical criteria that are relevant to hacker culture, more specifically to hacktivism, and what the methodology of hacktivism implies for the subversive efforts of media art.

The Historic Avant-garde as a Prerequisite for Hacktivism

According to the definition of hacktivism outlined and expanded upon in the preceding chapter, by overcoming technical determinations, hacktivism creates new ways of interaction in the realm of hacker ethics that are non-conformist not only in the use of technology, but also in terms of cultural behaviour. The striking basic element of hacker culture is its "disrespectful" attitude towards the prevailing technical, institutional and social authority. It tends not only to challenge but also to disregard authority, doing so

not only in a disrespectful way, but using unashamedly resourceful methods.

In the first section of this chapter, I would like to show that a significant role in laying the intellectual prerequisites for hacktivism can be ascribed to the twentieth-century avant-garde of the art world. In demonstrating this, I make use of the chapter entitled *Autonomy of Art in Bourgeois Society* in Peter Bürger's book *The Theory of the Avant-Garde*,[229] the foreword by Jochen Schulte-Sasse in the same volume, Claire Bishop's book *Artificial Hells*,[230] and the collection of studies by András Kappanyos entitled *Dancing on the Cutting Edge: Ideas on the Avant-Garde*.[231] Bürger's work is an essential standard text on the criticism of the avant-garde. Bishop reflects on activist art through an examination of futurism, proletarian culture, and the Paris Dada. Kappanyos outlines innovative analytical methods for understanding works of avant-garde art.

Bishop identifies three social turns in recent art history that were decisive from a Western European perspective: the historic avant-garde, which began in 1917, the neo-avant-garde that lasted until 1968, and the transformation that followed the fall of the Berlin Wall. In this interpretation, these turns constituted experiments in the collective reconsideration of art, which placed the focus on participation and cooperation. All three social turns came about as the after-effects of a collapse of collectivist visions of society. According to Bishop, these collapses

229 Peter Bürger, *Theory of the Avant-Garde,* Translated by Michael Shaw,Theory and History of Literature, vol. 4, Manchester University Press, University of Minnesota Press, Minneapolis, 1984

230 Bishop, op. cit.

231 Kappanyos András, *Tánc az élen. Ötletek az avantgárdról* [Dancing on the Cutting Edge: Ideas on the Avant-Garde], Budapest, Balassi, 2008.

were necessarily followed by a utopian rethinking of the relationship between art and society, requiring a rethinking of the creation, consumption and criticism of art.[232] Part of the programme of avant-garde activism is the experiment to remove the boundaries between life and art.

Bishop attempts to create the preconditions for an aesthetic examination of committed, collective participatory practice. The basis for this is derived from Debord's ground-breaking 1967 work, *The Society of the Spectacle*.[233] According to him, activist art rehumanizes society that has become deafened and fragmented by the instrumentalizing effect of capitalist production. If the visual culture is dominated by market conditions, artistic practice cannot allow itself to produce artworks that encourage passive reception. In place of this, argues Debord, art must consist of a series of actions that create friction with reality, which are dedicated to the resuscitation of solidarity.[234] For Bishop, Debord's text was at least as relevant in 2014 as when it was originally published.

The hacker culture of the 1990s can be seen to have undergone a similar transformation, simultaneously with the third participatory turn in art history defined by Bishop. In order to understand this, let us examine the first turn Bishop identified, namely the historic avant-garde, with the help of Bürger's text.

In Bürger's interpretation, the avant-garde was the first artistic revolution whose fundamental aim was to attack, challenge and question the institutional system of art, the status it held in (bourgeois) society, and its traditional

232 Bishop, op. cit., 3.

233 Guy Debord, *The Society of the Spectacle*, translation by Ken Knabb, February 2009, at theanarchistlibrary.org, http://theanarchistlibrary.org/library/guy-debord-the-society-of-the-spectacle

234 Bishop, op. cit., 11.

forms.[235] The programme of breaking down the boundaries and the distance between art and life, and the rejection of creative practices that had become estranged from life in favour of bringing about new ones, are the central themes of Bürger's interpretation of the avant-garde.[236]

One of the key factors in any examination of the avant-garde is the cult of novelty, which, while circumventing the institutional system that constantly hungers for something new, immediately becomes a part of it. According to Helen Molesworth, in her study entitled *From Dada to Neo-Dada and Back Again*,[237] the social criticism of Dada was a sublime failure, since the concept of the work of art and the institutional systems were able to resist its symbolic assaults without suffering serious harm, by embedding Dadaism to themselves.[238] Kappanyos calls this the paradox of success,[239] which is present in hacker culture as a permanent contradiction, in that hackers who attack the system often end up becoming caterers for power, and eventually its full-time servants. The innovativeness of free culture recalls the Dadaist search for the new, while the software industry, information technology and security industry that incorporate this innovativeness recall the innovation-hungry institutional system of art. The integration of system-critical culture jamming into the advertising

235 Bürger, op. cit., 42, cited in: Jochen Schulte-Sasse, *Foreword* = Peter Bürger, *The Theory of the Avant-Garde,* transl. Michael Shaw, Minneapolis, Manchester University Press, University of Minnesota Press, 1984 (Theory and History of Literature vol. 4), XIV.

236 *Ibid.*, cited in Schulte-Sasse, op. cit., XXXVI.

237 Helen Molesworth, *From Dada to Neo-Dada and Back Again,* October no. 105, Summer 2003.

238 *Ibid.*, 178.

239 Kappanyos, op. cit., 12–13.

industry, referred to in the preceding chapter (*Information Hacktivism*), is another process of the same kind.

Like the avant-garde, hacker culture also legitimizes itself on twin foundations[240] and rewrites the text of the existing canon (website, code), so it is self-evident that the existence of the canon and of invention is a basic prerequisite of both.

The presence of the paradox of puncturing the bourgeoisie is the next parallel, for exponents of hacker culture/hacktivism conduct their actions through provocation and technical and cultural non-conformism, and by doing so, they too, like the avant-garde artists, strive to impact on the canon while remaining outsiders.[241]

A further important similarity between the avant-garde and hacker culture is that they both not only reject the existing structures, but also project an idealized image of the future. Among the second generation of hacker culture, there is hardly a single group or movement that has not defined its ethic in a manifesto. For F/LOSS this is the GPL license; for Cypherpunk it is the *Cypherpunk Manifesto*; Kaczynski, who is more than sceptical towards technology, has formulated his notorious *Unabomber Manifesto* his whole life through; these, as well as the anti-Scientology manifesto of Anonymous, the text entitled *The Conscience of a Hacker*, and Wark's *Hacker Manifesto*, all "undertake to compose utopian ethical needs that are directed towards the future".[242] Like the artists of the historic avant-garde,

240 *Ibid.*, 12.

241 *Ibid.*, 13.

242 *The Conscience of a Hacker,* http://www.phrack.org/archives/issues/7/3.txt ; *GPL license,* https://www.gnu.org/licenses/old-licenses/gpl-1.0.html ; *Cypherpunk Manifesto,* https://cypherpunk.uk/a-cypherpunks-manifesto/ ; *Unabomber Manifesto,* https://archive.nytimes.com/www.nytimes.com/library/national/

members of hacker culture also feel authorized or even personally called upon to dismantle harmful obstacles and break down boundaries, working towards the realization of their own autonomous ethic.[243]

Kappanyos summarizes the interpretive outline of avant-garde strategies within the triad of *abstraction* (composition) – *activism* (action) – and *anti-art* (invention), where the various -isms can be classified as variations of this triad.[244]

The parallel with activist art is apparent in the hands-on imperative, in F/LOSS culture, and in Himanen's hacker ethic: thanks to hacktivism, information technologies that initially exclusively served the military-industrial complex were placed at the service of (made available to) social changes. This radically intervenes in political power relations and alters the social role of info-technologies, often in such a way that they not only escape the sphere of influence of the institutions, but also fall out of the control of hacktivist specialists. As such, borders are broken down not only between the institutional system and the specialist (artist/hacker), but also between the specialist and the "non-artist", "non-hacker", and in a sense the general public, so the experience of participation and initiation allows comparisons between a DDoS attack and a Cabaret Voltaire performance.

The emancipation of composition from representation, that is, abstraction, can be seen resonating in the hacker ethic statement that "Code can be beautiful". This implies

unabom-manifesto-1.html ; Anonymous, *A Message to Scientology,* https://www.youtube.com/watch?v=JCbKv9yiLiQ See also: Kappanyos, op. cit., 102, 104.

243 *Ibid.*, 146.

244 *Ibid.*, 33.

that the program code has value not only in functionalist terms, but also through the quality of the program itself due to its structural elegance. This phenomenon is discussed in detail in the sub-section entitled *Code as Speech*.

Among the works of the Dadaists and later of Fluxus artists, there are numerous instances of reconstructible, recipe-like instructions, and in the same way, Anonymous and other hacktivist groups also make their "recipes" widely available, facilitating the reconstruction of their own performative actions.[245] One of the fundamental aspects of F/LOSS and open hardware culture is that performativity can be reconstructed on the basis of documentation.

While it may also be classified within the third, anti-art category, the questioning of the ethos of the autonomous creator also fits in here, in the case of both the avant-garde and hacker culture. Bürger cites Duchamp's ready-mades, in which he added his signature to mass-produced goods, to illustrate the repudiation of individual creation as a category.[246] In her examination of F/LOSS culture, Coleman provides an in-depth analysis of the conflict between individualism and collectivism.[247]

From the above it can be seen that the traditional interpretive framework of avant-garde art can provide us with valid criteria for analysing hacker culture in general, and hacktivism in particular. The non-conformist creative attitude of hacktivism towards the prevailing canon, the typology of its border transgressions and its working methods reactivate the intellectual and spiritual heritage of the historic avant-garde. As several important theorists of the avant-garde have explained, its revolutionary momentum

245 Bürger, op. cit., 45.
246 *Ibid.*, 44.
247 Coleman, *Coding Freedom,* 210.

neither destroyed the system of art institutions nor eliminated traditional art forms, but it did intervene in the history of art so radically that its effects changed it irrevocably.[248] In a similar way, hacktivism has irreversibly shaped, and continues to shape the relationship between society and technology.

The Hacker Typology of Avant-garde Working Methods

Rosalind Krauss's work entitled *Originality in the Avant-garde and other modernist Myths*[249] deals with the question of the original artwork in connection with the oeuvre of Rodin. After the sculptor's death, the casts he had prepared (in many cases only half-prepared) were inherited and used by the French state, to whom Rodin had bequeathed his studio and the rights to reproduce his works, to create numerous "Rodin sculptures", that is, pieces of art that were attributed to Rodin by the state, as agent or distributor. Krauss's analysis, while taking account of the changes in social, art commercial and art historical specifications, does not provide a generally applicable answer to the question of where the line ends, in the case of a reproduction, between authorship of a work and the author of that work. There is less argument over where it begins. Art historical discourse is capable of igniting furious debates about posthumous casts, but never about the very first cast, made in Rodin's lifetime and with his approval. The perception of a work of art closely depends on the extent of novelty and creativity experienced when it first appeared, and the same is true for 0-day hacks. A rubber

248 Bürger, op. cit., 48.
249 Krauss, Rosalind, *The Originality of the Avant-Garde and Other Modern Myths,* Cambridge, MA, MIT Press, 1986.

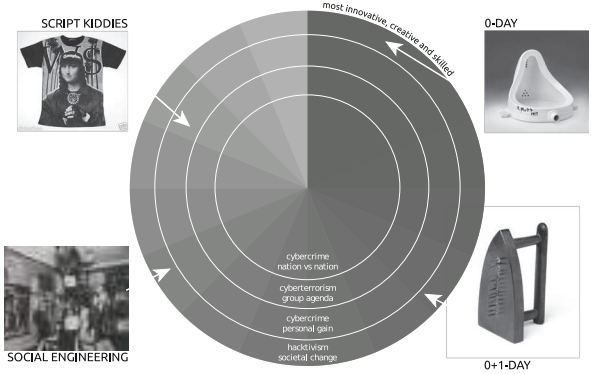


Fig. 4. Avant-garde gestures on the hacker scale

keyring depicting Duchamp's appropriated urinal on sale in a Parisian souvenir shop cannot be compared with the value of the ready-made at its first showing, neither in innovation nor creativity. If we interpret the debut presentation of the *Fontaine* as an original and masterful 0-day hack, then the keyring is at best a 0+1-day hack.

Schulte-Sasse and Kappanyos both emphasise that avant-garde creative strategies concentrate far more on the working method and the process than on the final product.[250] Below I examine how avant-garde processes can be applied to Jordan's novelty-, complexity- and process-centred hacking typology. The inverse of this question is whether the phenomena of hacktivism can be examined within Kappanyos's avant-garde process typology.

250 Kappanyos, op. cit., 125.

The 0-day exploit, as the exploitation of a previously undiscovered vulnerability in the system, is in itself the most novel of novelties and the most provocative of provocations, representing the highest value achievable in the subculture (creativity index, intellectual product). Duchamp's *Fontaine* is an outstanding example of identifying and penetrating a breach in the information network of the canon. The security breach precisely represents the paradoxes of novelty and the puncturing of the bourgeoisie. Every additional ready-mate can be seen as a 0+1-day exploit: the "security breach" continues to exist, and whoever acts similarly to the 0-day originator will achieve a similar outcome.

Examples of social engineering as the circumvention of social conventions can be found mainly in performance art. To continue the list of significant examples, we could mention the eighth and final Dada event, the Soirée Grande (sometimes referred to as 8th evening) held on 9 April 1919 at the Saal zur Kaufleuten in Zurich, which riled the substantial audience with a deliberate bluff, and whose very aim was to provoke the crowd.[251] Matthew S. Witkovsky describes the event in detail in the volume entitled *Dada: Zurich, Berlin, Hannover, Cologne, New York, Paris.*[252] Witkovsky defines the scandalous tipping point as the recitals of Tzara and Walter Serner (Serner: *Letzte Lockerung*, or *Final Dissolution*[253]), after which the performing Dadaists were heckled by the audience, who pelted them

251 http://www.artpool.hu/dada/mozgalomZ.html

252 Matthew S. Witkovsky, *Dada: Zurich, Berlin, Hannover, Cologne, New York, Paris,* ed. Leah Dickerman, D. A. P., The National Gallery Of Art, 2005.

253 Walter Serner, *Letzte Lockerung,* Berlin, Paul Steegemann, 1927, http://walter-serner.de/data/documents/Letzte-Lockerung.pdf

with coins, cigarettes and trash, to the utter satisfaction of those on stage.

The Avant-garde Typology of Hacker Working Methods

Kappanyos analyses the deconstruction of the traditional relationship between the artist and the artwork under the classification of anti-art: just as the inclusion of the random in the concept of the work of art challenged the hitherto implicit artistic intent, so too did the ready-made challenge the craft or skill in art, while performance art questioned the aspect of temporal and spatial permanence.[254] In the typology of avant-garde processes, distinctions are made between *ephemeral*, *interactive/combinatorial*, *aleatory*, *performative*, *self-referential* and *recontextualizing* types of processes.[255]

To deal firstly with the ephemeral character, it is striking that the majority of hacks are short-lived and leave no long-term trace on their target interface, lasting only until the security breach is resolved and the website is recopied onto the server, that is, until the attack is repelled.

Numerous hacks bear the hallmarks of chance and are of an aleatory character. As we can see from Coleman's stories about Anonymous, the victim of an activist cyber attack is often determined not by who the preferred target would be, but by which member of the wide group of potential targets happens to be susceptible to breach by the particular technical solution found by the hacker. Countless hacktivist initiatives never reach their target, never become a story, and remain failed attempts, while

254 Kappanyos, op. cit., 32.
255 *Ibid.*, 63–69.

numerous targeted attacks reach unintended targets. Intentional chance and the intent of chance are therefore present and active in the hacktivist methodology.

Examples of the combinatorial process can be seen in the working methods of F/LOSS developers and hacker groups, where several individuals work separately, but via personal affinities, on different details of a particular software or version, and then test each other's variations.

There is probably no example of the self-referential process that is more sophisticated than live coding, a type of digital performance, in which the code, which generates visual elements as text, appears on an interface at the same time as it is being coded by the creator. Less sophisticated, and derived rather from street art, is the phenomenon in which the "work" is none other than the creator's "signature": when we can see, in place of a homepage, a text like "tango down. Hacked by [name]", or "you have been owned", this is the kind of self-referencing which, in terms of complexity, comes close to being the diametric opposite of live coding. (The phrase "tango down", meaning the target has been eliminated, like so many phrases used in hacker actions, imitates the jargon used by the US military.)

Recontextualization is a comprehensive characteristic of hacker culture, in that it transgresses and eliminates the borders between institutional and private, state and activist, and commercial and anti-globalizational information technologies. Perhaps performativity and the transcending of nature of the medium are not applicable to hacktivism, if it implies the eradication of mediatization. This would apply if it involved transcending or eliminating the character of the medium, but as a proposition this may be valid only in the category of linguistic play.

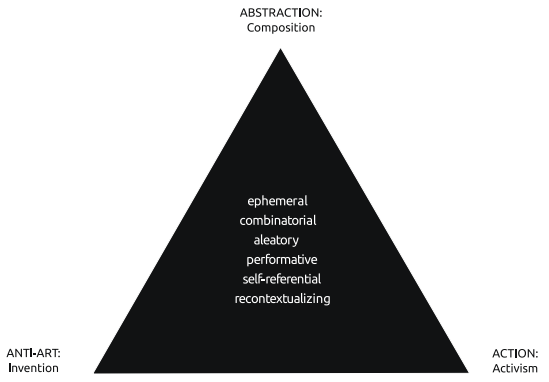


Fig. 5. Abstraction, action and anti-art

In his volume of studies of 2008, Kappanyos foresaw a significant chance of Dada working methods spreading into digital culture, for example through the creation of digital works that maintained grammatical form but operated by suspending logical form.[256]

Dadarchism

In this section I would like to direct the attention of art theoretical and media sociological discourse towards anarchism, as a devalued concept that occasionally appears peripherally. The general understanding of the term, used colloquially as a synonym for anarchy, has very little in common with the notion of anarchism as a political

256 Kappanyos, op. cit., 47.

ideology. It does not mean chaos, which it is often conflated with, but a radical utopia of self-government that comes into being in the absence of hierarchical law enforcement institutions, in which groups organized around the smallest possible affinity cooperate without external coordination. The different movements of anarchism are left-wing, anti-power, anti-state and anti-bureaucracy endeavours that lie along a scale between the extremes of individualism and collectivism.

At the start of the twentieth century, anarchism, as a radical left-leaning ideology, gathered members into underground circles in a similar way to communism. Today's colloquial meaning of the word was undoubtedly influenced by the later political and ideological history of the Eastern Bloc: Soviet communist power saw anarchists as potential rivals who had to be crushed. It is partly due to the nature of anarchist ideology that, unlike fascism or communism, it has never been a hallmark of historic totalitarian or authoritarian regimes. Rather, its influence was as a horizontal organizational force among micro-communities. In the ideological naivety at the start of the century (when neither fascism nor communism had yet been implemented on an experimental basis in Europe, and when the first thing that came to mind in association with anarchism was not violence), for the historic avant-garde, anarchism represented a vision of egalitarian social criticism, radical liberalism, anti-authoritarianism, and revolution.

In her work entitled *The Liberation of Painting, Modernism and Anarchism in Avant-Guerre Paris*, Patricia Leighten examines the relationship between the Parisian avant-garde and the anarchist ideology in the period before the First World War. In the view of the leading anarchist writers, such as Proudhon, Bakunin and Kropotkin, art, by serving the

values of the bourgeoisie, was condemned to fall apart, and they insisted that art should instead be placed exclusively in the service of social solidarity and the revolution.[257]

As narrated by Leighten, the art world of pre-war Paris responded to this radical demand in three different ways: salons continued to exhibit naturalist paintings, but efforts were made to deal with socially sensitive topics; some artists turned away from elitism and voluntarily offered their work to anarchist periodicals and propaganda materials; and other artists turned towards visual abstraction, as a way of distancing themselves from bourgeois values and of creating the consciousness of a new society by means of a new aesthetic.[258] She sees the work of Kupka and Picasso as being even more radical than this, for in her opinion, with their individualist expressive power and their rejection of any aesthetic consensus about art, the demonstrated their commitment to anarchism. Besides Picasso and Kupka, numerous other artists found it easy to identify with the individualist direction of anarchism, which they saw as defending the autonomy of individual artistic expression.[259]

Roger Farr examines Hugo Ball's commitment towards anarchism during the period when the Cabaret Voltaire in Zurich operated as a Dadaist venue. Although Ball himself did not proclaim his anarchism, and no trace of it has been uncovered by researchers to this day, Farr draws attention to the fact that as early as 1914, Ball published a study of the collectivist Bakunin's writings, entitled *Bakunin Brevier*.[260]

257 Leighten, Patricia, *The Liberation of Painting: Modernism and Anarchism in Avant-Guerre Paris,* Chicago, IL, University of Chicago Press, 2013, 5–6.

258 *Ibid.*, 7.

259 *Ibid.*

260 Roger Farr, "Poetic License: Hugo Ball, the Anarchist Avant-garde, and Us" = *A Creative Passion: Anarchism and Culture*, ed. Jeff

In Farr's opinion, Ball's work in Zurich from 1915 onwards was greatly influenced by his knowledge of Bakunin's writings, especially his idea of destruction as a creative act, and his critique of language as an instrument of power.

Network and Anarchism

> What a hacker does and will do is embarrass the power elite as dudes on the ground can't [...] by puncturing the illusion of power.[261]

Almost every contemporary activist endeavour has something in common with anarchism, either in its ideology (eco-anarchism, anarcha-feminism etc.), or in its tactics. Contemporary anarchist efforts vehemently criticise and challenge the institutions of patriarchy and indirect democracy, which offer the possibility of choosing from a fixed set of options, rather than the means of directly shaping the options. Anarchist ideology provides inspiration to contemporary activist movements, and also has a great influence on the practical (operational, demonstrational) tactics of numerous movements.

The most important cornerstones of anarchism are decentralization and autonomy, and instead of resting in the hands of some external hierarchy, power is distributed through affinity among every member of the community. In the functional principles of anarchist communities, principles of decision-making that may seem innovative to the outsider are put into practice, such as consensus; cooperation without agreement; small, cooperative groups

Shantz, Cambridge, Cambridge Scholars Publishing, 2010, 20.

261 Peter Ludlow, professor of philosophy, Northwestern University, https://www.youtube.com/watch?v=-zwDhoXpk90

without leaders, whose members work within the group for common goals; and direct action, involving interventions without the need for authorization. The following observations shine a light on patterns in the history of hacker culture that recall anarchism.

The multi-authored book *Expect Resistance*,[262] for example, published by the CrimethInc. Ex-Workers' Collective, is more than a radical critique of capitalism, for with its anarcho-primitivism, it criticizes specialization in the same way as Fuller and Papanek do, and seeks to maintain the autonomy of local micro-communities.[263]There is an even more substantial similarity between anarchism, on the one hand, and the Californian ideology and network culture, on the other. An examination of the infrastructure of the internet reveals the same system architecture as the one imagined and implemented in the operations of anarchist communities: a network of decentralized hubs, functioning without a controlling hierarchy, which interact with each other to form a dynamic network that can reorganise itself if necessary. In the case of the World Wide Web, the data stores of the servers are the hubs and the network itself is the flow of information, while in the case of anarchism, it is the syndicates, collectives, affinity groups and working groups that are the hubs. Both systems are decentralized and non-hierarchical, so maintaining the networks is not rendered impossible by the outage of any of the individual hubs, and any hub can connect to any other.

If we examine the birth of this network architecture in a historical context, Brand's WEC is one of the most striking innovations (See the sub-chapter *The Californian*

262 CrimethInc. ex-Workers' Collective, *Expect Resistance*, Salem, OR, CrimethInc. Skeleton Crew, 2007.
263 *Ibid.*, 7.

Ideology in the chapter entitled *A History of Hacker Culture*). The *Whole Earth Catalogue* is an information network created by linking together colonies, towns, reserves and other actors. Of course, the ideology of anarchism existed long before Brand and the internet, so obviously the presence of anarchism-inspired activist groups on the virtual horizon is not a direct consequence of the internet. What is certain, however, is that the architecture of the World Wide Web and that of anarchism are mirror reflections of each other, and the former is a prerequisite (one of the prerequisites) for the operations of every (known) contemporary activist movement.

Eric S. Raymond, editor of the *Jargon File*, describes himself as an anarchist.[264] Levy mentions several times that the AI laboratory at MIT operated according to anarchist principles.[265] The writing entitled *An Anarchist's Guide to Free Software*[266] explains in detail to anarchists who are less familiar with technology why the use of F/LOSS software, and that alone, is legitimate for an activist who is critical of capitalism and globalization. The original hacker ethic echoes the ideology of anarchism in direct access, in the questioning of authority, and in being opposed to bureaucracy.

Contemporary Networked Anarchism: Anonymous

The most recent participatory turn defined by Bishop, marked by the fall of the Berlin Wall, is discussed in terms of the tendencies in the information society by Tim Jordan in his book entitled Activism!. Jordan explains how

264 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 3, 7.
265 Levy, *Hackers,* 123.
266 DC Radical Tech Collective, *An Anarchist's Guide to Free Software,* 2009, https://we.riseup.net/rtc/an-anarchist-s-guide-to-free-software+34940

turn-of-the-millennium activism freed itself from the rhetoric of class struggle, and became transformed in accordance with a new set of values, which are not independent of each other and not hierarchically organized.[267] The Anonymous movement represents this activist generation, and is an excellent example of how, in the global virtual space, the internet shapes operating structures that reflect the operating principles of anarchism.

Coleman does not articulate Anonymous as anarchist, and indeed, when writing about the period between 2008 and 2012, when, as a cultural anthropologist, she spent time with different working groups of Anonymous, it is as though she was coming across a structure of operating that had never been seen before. She describes anarchism without identifying it by that name. In a technical sense, the operational structure of Anonymous was indeed an innovation, but not at the level of system architecture. Anonymous consists of activists located all over the world who work independently of each other, in parallel, without mutual consent or even each other's knowledge, for different aims, with probably very few of them having any substantial hacker competency.[268]There is no constant membership, objective or location. The constants are the method of organization, the instruments of the attacks, a few fundamental principles, and visual communication. Anonymous practices cyber vigilantism mostly in the areas of freedom of information and the right to data protection, as a kind of unauthorized public service, or an alternative system of justice defending civil liberties.

In Coleman's understanding, the image of Anonymous is a collective identity.[269]The origin of the collective identity

267 Jordan, *Activism!*, 9.
268 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 16, 131.
269 *Ibid.*, 48.

of Anonymous may be found less in the gang names of the golden age of cracking, and more in the tradition of the neo-avant-garde. In her book *Networked Disruption*, Tatiana Bazzichelli names the Luther Blissett Project,[270] Neoism,[271] the Church of the Subgenius,[272] and the Italian Anna Adamolo movement[273] as the cultural forebears of Anonymous, in the sense that they established the tradition of grassroots collective identity . She examines them via five common traits: openness practised through media criticism, questioning the dogma of truth, rejection of authoritarianism, the collective myth, and the disruption of bureaucracy.[274]

Among those referred to above, the American art projects, as examples not only of mail art but also of shared network modality, are regarded by Bazzichelli as part of a tradition. Although they came into being out of different contexts and with different aims, what they have in common is a network structure that is organized from the bottom up.[275] Mail art, meanwhile, is identified as the first art movement that deliberately set out to avoid the institutional system of museums, whose ultimate aim was

270 Luther Blissett Project: named after a fictional folk hero, used as a pseudonym by hundreds of activists for political and art actions in Europe and America since 1994.

271 Neoism: a subcultural art network developed within the mail art movement, which mostly enacts performances and media experiments. One notable exponent is the Canadian Istvan Kantor: http://www.istvankantor.com/

272 The Church of the Subgenius: a spoof church active in the USA in the 1950s, which carried out numerous culture jamming actions. http://subgenius.com/

273 Anna Adamolo: Italian activist collective identity, created and operated by contemporary social actors, https://annaadamolo.noblogs.org/ ; http://digicult.it/digimag/issue-041/anna-adamolo-practical-critique-of-ideology/

274 Bazzichelli, op. cit., 75.

275 *Ibid.*, 18.

not to validate the posted letter as an art medium, but to build an open international network.[276] For Bazzichelli, the significance of mail art is that it played an important role in the development of new, free patterns of communication for numerous art movements, from Dadaism to Fluxus.[277]

Brian Holmes takes the notion of the liberating power of collective identities one step further: in his view, open identities like the Luther Blissett Project created the prototypes for media subversion, which at the turn of the millennium fostered the formation of activist movements that transcended the concept of the nation.[278] Holmes's observation points in the same direction as Jordan's afore-mentioned definition of turn-of-the-millennium activism.

Thanks to its consistent symbolism, Anonymous's visual image could be easily processed by the media.[279] As the media-generating members of Anonymous fully exploit their image as bandits[280] and explain their actions in an extremely simple way, by generating newsworthy media content about a successful action, they 'help' the media by saving them a lot of research and editorial work. Anonymous's media output often garners enormous media attention. This is exceptional, because this is the only movement on the contemporary activist horizon that produces its own edited media content as a way of interpreting its actions, which earns it primetime publicity for free, and what is more, it does so in addition to the extraordinary amount of attention it receives on the internet. For other activist groups, the relationship with the media poses a

276 *Ibid.*, 76–77.
277 *Ibid.*, 78.
278 Holmes, *Escape the Overcode*, 22.
279 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 14.
280 *Ibid.*, 71.

constant challenge, as does determining what and how much of their activity is reported on, and how.

The Guy Fawkes mask was first used by Anonymous in their *Code of Conduct* video, made in preparation for street demonstrations against the Church of Scientology. Fawkes, the main protagonist in the graphic novel and film entitled *V for Vendetta*, is openly anarchist, and the Hollywood production based on the graphic novel was hugely inspirational in the creation of Anonymous's present image, even without Anonymous's members declaring themselves to be anarchists. Now that the mask has become a symbol of the revolutionary spirit, the question arises of which side has appropriated this visual, material symbol, as the masks are manufactured in China, and for each one bought, royalties are paid to Time Warner, the owner of the film rights of *V for Vendetta*.[281]

The working principle of Anonymous is do-ocracy, representing a social working dynamic in which everybody literally "does" what they want, so parallel working groups arise spontaneously depending on interest and motivation, although they have no fixed boundaries, so groups constantly intertwine and individuals can move at will from group to group.[282]The main organizational interface is IRC, Internet Relay Chat. When debates arise and disagreements are voiced, the overarching aim of communication is not to reconcile the differences and find the common denominator, but to accept other people's differences of opinion. When a conflict proves irreconcilable, a given group may fragment and continue working with consensus within the new groups.[283]Their ops (operations) and actions

281 *Ibid.*, 271.
282 *Ibid.*, 49, 75.
283 *Ibid.*, 311.

simultaneously make use of legal and illegal information technologies.[284]

"There are Some Things Money Can't Buy. For Everything else, there's HTTP Error 408 Request Timeout."[285]

Anonymous was originally an alias that provided anonymity to trolls on pranking forums,[286] which sometimes featured, among other content, blatantly sexist and racist comments. This did not prevent a few members of one forum from targeting and publicly discrediting a racist reporter in 2007. In 2008, members of an online forum chose to provoke the Church of Scientology as the next target of their trolling. The prank attacking the censorship and workings of Scientology used similar methods as before, and proved just as short-lived: DDoS attack, countless phonecalls to the Scientology helpline, ordering unpaid-for prostitutes and pizzas to addresses belonging to the church, and so on.[287] It was at this time that the first online Anon video was released, featuring the now familiar visual imagery. The action inspired anti-Scientology demonstrations across the USA, which drew thousands of protestors, and the provocative pranksters of the chatrooms suddenly realized their potential power. Before long, Anonymous, who had previously focused on frivolous, humorous or crude pranks, entered the public consciousness as one of the most important actors in contemporary activism.[288]

284 *Ibid.*, 6.
285 e.g. https://twitter.com/lunaslave/status/12617657488515072 (2017. 07. 05). A parody of the Mastercard advertising slogan from a few years earlier: "There are some things money can't buy. For everything else, there is Mastercard."
286 *Ibid.*, 4.
287 *Ibid.*, 5.
288 *Ibid.*, 2.

In 2010, Anonymous launched a DDoS attack involving thousands of participants against the companies Amazon and Mastercard, which were withholding donations intended for WikiLeaks. The action was called #operationpayback.[289] By this time, Anonymous had already performed a number of actions defending civil liberties, privacy, and the free flow of information. In 2011, with the action named OpTunisia, Anonymous joined in the preparation and implementation of the Tunisian Revolution, as well as further important events of the Arab Spring. "Anonymous is not your private army," they write over and over, emphasizing that their actions are not commissioned. Activists with experience from earlier online actions work and plan together with local groups, some of which may or may not define themselves as Anon groups, and if there is agreement, the given action takes place under the aegis of Anonymous. The illegal methods deployed consist mostly of DDoS and doxing (leaking personal documents), which in general do not require substantial technical skills.

On 28 January 2011, the Egyptian government shut down the internet across the entire country. In cooperation with a local group, Anonymous provided a basic internet infrastructure for the Egyptian resistance.[290] Around the same time, as a consequence of investigations launched in connection with #operationpayback, several prominent Anons were arrested in various parts of the world. The only previous example of hackers being arrested on such a large scale had been the FBI's Operation Sundevil in 1990.[291] Shortly afterwards, in an action entitled OpHbGary, Anonymous leaked details of the FBI's current programme of

289 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 120.
290 *Ibid.*, 192.
291 *Ibid.*, 194.

bugging millions of civilians. At the same time, different groups of white hats hacked the data of Anons and passed the information on to the FBI.[292]

Not long after this, a less politicized but more aggressive group known as lulzsec (lulz= trolling, sec = security) splintered off from Anonymous, who hacked into systems mostly for fun, rather than out of any firm convictions, in actions that were less consciously planned and managed. While Anonymous was only a minor actor in the Occupy Wall Street movement of 2013, they did play an important part in the anti-SOPA campaign, which is regarded as the greatest success in the career of Aaron Swartz.

As an activist for free culture, Swartz downloaded a large quantity of academic publications via the MIT digital library, and later, when facing a disproportionately severe punishment for this action, he committed suicide. His friends and sympathizers partly blamed MIT for his death, for not standing up for Swartz during the investigations. As a result of Swartz's suicide, Anonymous hacked the MIT homepage, among other sites.[293] By this time, one of the central figures of Anonymous had long been an FBI informant, and his activity led to the arrests of several prominent Anons in 2013.

The recurring participants of Anonymous actions tend not to match the expected stereotype of white, middle-class, lonely men.[294] Among the more notorious members of the unorganized organization whose anonymity has been shattered are several South American and Middle Eastern activists who live under difficult social circumstances.

292 *Ibid.*, 9.

293 https://www.washingtonpost.com/business/technology/anonymous-hacks-mit-sites-to-post-aaron-swartz-tribute-call-to-arms/2013/01/14/ff6f706c-5e44-11e2-9940-6fc488f3fecd_story.html (2017. 07. 05)

294 Coleman, *Hacker, Hoaxer, Whistleblower, Spy*, 166.

Despite the fact that a number of its collaborators are currently serving prison sentences, Anonymous has become an important player on the political and activist scene.

Code as Speech

> The word has become a commodity [...] We must give up writing second-hand: that is, accepting words (to say nothing of sentences) that are not newly invented for our own use.[295]

In her book *Coding Freedom*, Coleman analyses the development of the legal background for Free/Libre Open Source Software. One of the novelties in her analysis is that software code, like speech, could come under the legal category of free speech, and could therefore enjoy free speech protections.[296] This notion, together with the fifth value of the hacker ethic (that computers can be used to create art and beauty), inspired the proposition that hacking could also be examined as transcending the semantic specification of a program. In order to understand this, a few technical explanations are necessary.

A programming language is an artificial electronic language with fixed rules of syntax, whose function is to convey instructions to computers. Conveying instructions takes place at several levels, the primary level of which is machine language, consisting of a series of binary information that can be directly interpreted by the machine. The program written in the assembly language is translated into machine

295 Hugo Ball, *Flight Out of Time: A Dada Diary,* New York, Viking Press, 1974, 26, 71.

296 Coleman, *Coding Freedom,* 169; Himanen, Castells, Torvalds, op. cit., 86.

code by the assembler. Every family of processors has its own assembly language (or languages). The languages commonly referred to as programming languages (BASIC, C, LISP etc.) are high-level languages, in which, with the help of a great amount of abstraction, series of instructions can be expressed using language that is closer to human logic. The programmer of a software therefore compiles a text in a high-level programming language which consists of logical operations, and this is the software's source code. This source code is translated or interpreted by the programming language as an application, converting the instructions into assembly language, and via that into machine language, which can be read by the processor on which it is running. The lexicons of the vast majority of high-level programming languages largely comprises words from the English language and the symbols used for mathematical functions.

From the above, it follows that every software is a special artificial linguistic construct, whose purpose is to facilitate human-to-machine or machine-to-machine communication. Different families of programming languages use different syntactic systems, while within each language family, the smaller units (phonemes, morphemes, lexemes) must be interpreted differently from those in human languages. In this sense, the text is the source code of the program, to which particular syntactic rules apply. The meaning of the text itself can be seen as the program generated by the source code.

Contemporary hacking subcultures prefer text-based communication over machine interfaces (GUI, graphical user interfaces), both when communicating with computers (command line, virtual terminal) and during interpersonal communication (IRC).

In relation with F/LOSS, Jordan states that the indisputable objective of the success of any program performing an individual task is whether it works,[297] that is, in our understanding, it should have meaning. The concept of hacking in its early days meant, among other things, creating high-level languages, in other words, it was fundamentally an engineering, logically inductive task.[298] The interventions of today's hacker culture operate mainly in accordance with the opposite logic to this.

Scepticism towards language and the deconstruction of linguistic, literary and poetic norms of the avant-garde can be associated with the deconstruction or hijacking of the operation – or meaning – of programs in hacker culture. In this regard, hacks that disrupt or disable a functioning communication system through coding can clearly be regarded as linguistic interventions, but it must also be borne in mind that this intervention has to take place – it "has to work" – within the syntax of the given language. Therefore, the destructive linguistic interventions of hacker culture provide us with another parallel for the avant-garde attitude towards language. In both cases, scepticism towards the linguistic status quo is triggered by a subjugated relationship to language and to the institutional power structure.

The *DADA to DATA* manifesto, which is presented in detail below, references Kurt Schwitters, in whose view it was not Dada that produced nonsense textuality, but the reality in which Dada operated, which was controlled by authoritarian institutions and by capital. For Dadaism, it was absurd that declarations of love and declarations of war had to be made using the same linguistic tools, which

297 Jordan, *Hacking*, 42–66.
298 Levy, op. cit., ix.

also constituted, inter alia, the formal language of legislation.[299] As Bürger and Kappanyos both elucidate upon, the avant-garde's relationship with language was closely connected to its relationship with society and with the institutional system of the art world.

In a volume of essays entitled *Hackers and Painters: Big Ideas from the Computer Age*, Paul Graham, one of the former developers of Viaweb, as well as a Lisp guru and the founder of Y-combinator, the first startup incubator, outlines the programming language of his dreams, while simultaneously stating that this absolute dream language is not necessarily something he considers desirable:[300] "So it is probably all to the good that programmers live in a post-Babel world. If we were all using the same language, it would probably be the wrong one."[301]

The hacker subculture, through the use of different programming languages, forms into sub-groups, whose members often place the language they use at a professional level above all the rest, in terms of both rank and quality.[302] Beyond this, the linguistic world of hackers also has another level that deviates from natural language, which Raymond calls hacker-slang, which is characteristic of the channels of communication that hackers use for collaboration. The multi-layered geek-hacker slang is an integral part of the subculture, a threshold condition for practising it at a sophisticated level, and its markers are logical and linguistic expressions derived from programming

299 Mieke Gerritzen et al., *From DADA TO DATA*, MOTI Visual Culture Paper Special Edition 2017, 2016 MOTI, Breda, Museum of the Image, 13.

300 Paul Graham, *Hackers and Painters: Big Ideas from the Computer Age*, Sebastopol, O'Reilly, 2004, 10/8.

301 *Ibid.*

302 Coleman, *Coding Freedom*, 96.

languages, as well as the special linguistic humour that belongs to the subculture. An example of such exclusive, subcultural linguistic code systems is leet speak, or rather 1337 5p34k, 1n wh1ch c32741n v0w315 4nd c0n50n4n75 423 23p14c3d w17h num8325.

Dada to Data

More avant than any garde could imagine![303]

The most condensed and articulated form of the avant-garde spirit in hacker culture can be seen in the 2016 *DADA TO DATA* manifesto of the former MOTI (Museum of the Image) in the Netherlands.[304] The humorous, critically toned publication, authored by, among others, Mieke Gerritzen, Geert Lovink, Bruce Sterling and McKenzie Wark, proclaimed a new Dadaism for the digitally oversaturated twenty-first century, launched on the centenary of Dada. The name of the new Dadaism is Dataism. This Dataism is not to be confused with the future-oriented, speculative Dataism of Yuval Noah Harari, which is far more optimistic about the future image with regard to Big Data.[305] MOTI's Dataism calls for, among other things, a rejection of the controlled communication determined by contemporary information technologies (the Big Data embrace). The text not only raises awareness of the problem of social consensus towards the observation and control technologies of Big Data, it also criticizes maker culture for its lack of

303 Gerritzen et al., op. cit., 6.
304 *Ibid.*
305 Yuval Noah Harari, *Homo Deus. A Brief History of Tomorrow*, Harvill Secker, 2016.

criticism,[306] and expresses solidarity with the difficulties of creating artistic output.[307]

In an article written in 2015 in anticipation of Dataism, Lovink stands up for radical thinkers who question the authoritarianism in the internet world. He calls for rigour and ruthlessness in demanding avant-garde experimentation of the highest degree in order to express the spirit of the age.[308]

However enjoyable it is to read the witty, absurd and critical text of the *Dataist Manifesto* and to admire its flashy, retro-trendy visuals, the project came about with the institutional system of the art world, specifically as a publication of the Museum of the Image, of which Gerritzen was then director. This, however, enabled the concept to appear as a kind of product, available online, in the spirit of open culture.

The question arises of whether their proposition is also valid the other way round, that is: left to its own devices, could the contemporary infotech environment turn into a less aesthetic, but just as nonsensical mirror image of Dada? As such, Data would become Dada – an undefined, extra-linguistic rocking horse, meaning everything and nothing.

The Dataists advocate a new art for the twenty-first century, in which independent programmers and artist-hackers stand up and resist the powers that dominate the World Wide Web. According to Dataism, programming is the new painting and writing, which, by virtue of relying on teamwork, marks the end of the status of the author as a star or genius.[309] In the following chapter, I take a look a the kinds of artworks that meet these demands of Dataism.

306 Gerritzen et al., op. cit., 18.
307 Nadin Roestenburg = Gerritzen et al., op. cit., 17.
308 https://www.eurozine.com/from-data-to-dada/
309 Michel van Dartel, "The Cloud is full of Dada" = Gerritzen et al., op. cit., 31.

AS YET UNRESTRICTED TRESPASSINGS

According to our definition, which goes beyond that of Jordan, hacktivism creates new technological determinations in such a way that they redefine not only interactions with technology, but also human behaviour, doing so in a non-violent way, observing the values of civil equality, in opposition to power structures. Hacktivist art performs this work within or on the periphery of the institutional system of art. It produces new and unexpected technological and cultural constellations that make the most pressing contradictions of the momentary technological and cultural status quo both apparent and accessible. The following case studies were selected and processed in this spirit: I looked for works of art that operate within artistic institutions or at their boundaries, whose border-transgressing behaviour reflects on the functioning of the given medium (and its momentary context).

The aim of these short case studies is not to press for a new kind of art critique, much less for me to attempt to do so myself. This is the job of art historians, who, like Claire Bishop, Brian Holmes or Anna Dezeuze, explore the ways and means of criticizing contemporary activist art. This thematisation of hacktivist art is rather intended as a continuation of those avant-garde art manifestos which, long ahead of their time, exhorted their contemporaries to shift in the direction of social commitment. When selecting the authors to analyse, it was important not only to focus on hack-like activist works that simultaneously make use of technology (e.g. Pussy Riot, Hungarian Two-tailed Dog Party). I specifically chose works in which technology itself is the subject of examination and intervention, which open cracks in the cultural architecture of techne, and which thus clearly belong in all three fields of the Venn diagram of hacker culture, activism and art.

The analytical structure of the case studies begins with a brief description of the work, followed by its contextualization, and then an examination of its aesthetic and transgressive potential. Besides meeting the definition of hacktivism, a further selection criterion for the works was, as far as possible, for me to have had direct, first-hand experience of them.

Most of the artists featured below define themselves as conceptual or post-conceptual artists. Though the culmination of the life's works of the selected artists may not necessarily match the date when the presented works were first published, I present them in chronological order in accordance with the latter criterion, working also on the assumption that in many cases, the use of technology is governed by unwritten rules which society, tacitly and without prior agreement, borrows from offline life and applies to the digital sphere. As such, it is always the newest technology at any given moment that is the most vulnerable, and most of the works presented here exploited these vulnerabilities in the then-existing techno-cultural environment. Consequently, they can in the main only function fully precisely in or through their original contexts.

Regardless of the fact that the artefacts of the subversive use of technology were good practices at the time, after their moment has passed, they are often integrated into the logic of infocapitalism. Nevertheless, at the peak of their effect, these works are also "not restricted trespassings", to quote the title of the famous book on film theory by Yvette Bíró.[310] However, unlike the topic of Bíró's work, these artworks do not transgress permanent, strictly

310 Yvette Bíró, *Nem tiltott határátlépések [As Yet Unrestricted Trespassings],* Budapest, Osiris, 2003.

guarded borders, but operate in symbolic spheres, preceding the building of new (cultural or legal) borders. In many cases, they draw attention to invisible borders, or to the absence of them.

According to Claire Bishop's interpretation of Rancière's theory of art criticism, good art pushes art towards life, while simultaneously setting aesthetic sensoriality apart from other forms of sensory experience. The dichotomy that stems from this tension leads to both readability and unreadability.[311] In every instance, the pictures are taken from the homepages of the authors and the projects.

Female Extension

Cornelia Sollfrank, 1997

My clitoris does not have a direct line to the Matrix.[312]

Cornelia Sollfrank is a pioneering artist of cyberfeminism, a crucial figure in hacktivism also for her work organizing research and communities. She is the founder of the cyberfeminist hub, the Old Boys Network, and she has researched feminist hacker culture since the 1990s. In those times she quite literally just re-searched, in the common sense of the word. Her writings from then speak about the lack of female hackers, and occasionally they sound resigned to those sexist and essentialist narratives in which they constantly suffocate. Twenty years later, in 2018, Sollfrank was the editor of a cyberfeminist volume of essays entitled *Die schönen*

311 Bishop, op. cit., 29.

312 Sollfrank, Cornelia *Women Hackers: A Report from the Mission to Locate Subversive Women on the Net*, Rotterdam, 1999, http://hacker.textfiles.com/papers/sollfrankhackers.html

Kriegerinnen – The Beautiful Warriors,[313] the result of Decades spent on network-building. The volume was presented at the Berlin Transmediale in 2019, with a foreword by Sollfrank.

In 1997, the Hamburger Kunsthalle, the German contemporary museum that is always hungry for subversion, launched a net:art competition entitled EXTENSION. Out of the 280 entries that were received, unusually over 200 were from female applicants. The net:art works were exhibited by the museum online (doing so rather ill-advisedly on their own server, thereby ruining a large amount of the hypertextuality), and the prizes were awarded to the three works that were judged to be the best. The three prizes were all given to male contestants. Until the winners were announced, neither the curators, nor the jury, nor the general public had any idea that more than 200 entries had been submitted to the competition by Sollfrank on her own, creating a separate virtual female identity and net:art work for each of them. To generate the 200 fictive profiles and net:art works, Sollfrank automated the collection and recombination of html data fragments. She created false names, email addresses and websites for 200 non-existent female cyberartists from seven nations.

With its net:art exhibition of 1997, the museum of contemporary art housed in the former Hamburger Bahnhof sought to catch up with the latest subcultural trends in contemporary virtual art, but a single hacktivist artist managed to shoot past them and leave them far behind. The institutional failure was exacerbated by the fact that one of the jury members was none other than Valie EXPORT, an erstwhile pioneering and critical feminist performer.

313 Cornelia Sollfrank (ed), *The Beautiful Warriors: Technofeminist Praxis in the Twenty-First Century, Brooklyn, NY,* Minor Compositions, Autonomedia, 2020.

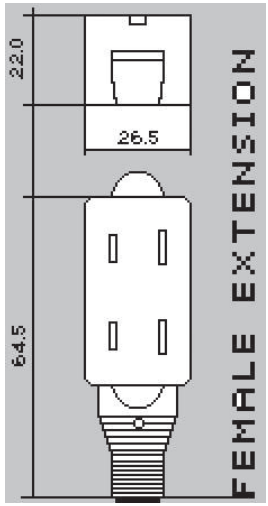


Fig. 6. Female Extension

The title of the competition expressed the museum's intention to extend its institutionalization into virtual space. The virtual space, for its part, responded by showing itself to be substantially more active and subversive than to simply accept the institution and its unilateral intent. We cannot silently pass by this unusual title and the metaphor outlined here, in which the institutional appropriation of subversion is interpreted as a kind of invasion or penetration. There are countless examples of this phenomenon, from the avant-garde to the appearance of works by the street-art superstar Banksy at the most prestigious auction houses. However, there are far fewer instances in which the artwork or the artist refused to humbly tolerate this approach and instead

decided to retaliate (Banksy is intentionally a bad example, because the gesture of automated self-destruction only enhances the value of the expensive work).[314]

If the intention of institutional extension that is also expressed in the title is interpreted as sexist rhetoric, then the title and logo of FEMALE EXTENSION may conjure up the symbolism of a sex toy created by a woman for use by women. As there are no detailed instructions, how to use it is left to the viewer's imagination. Being defined biologically as a woman enters a parallel with being excluded by social gender from cultural and material assets, while access to these assets is identified with the male sexual organ. According to this painfully humorous metaphor of classical feminist cultural criticism, in the patriarchal status quo, the male sexual organ is a "something", while the female sexual organ is the absence of this "something", which needs to be supplemented with a "something" in order to be complete and thereby elevate its wearer into the elite circle of those who possess this "something" by birthright. In respect of social gender, FEMALE EXTENSION validates the sad fact that even at the turn of the millennium, this already almost hundred-year-old feminist social criticism had not even become obsolete in institutions that wave the flag of innovation and subversiveness.

The fact that Sollfrank got away with her trick unexposed meant that she herself had to reveal her hack, and how badly the institution had failed. The institutional failure was multi-faceted, concerning partly virtuality, partly machismo, but mainly the two in tandem, the exclusive boys' club character of early virtual culture. The transgression in FEMALE

314 https://www.washingtonpost.com/arts-entertainment/2018/10/06/banksy-painting-sold-auction-million-then-automatically-shredded-itself/?utm_term=.220fc5d23d51

EXTENSION can thus be observed at three levels: firstly, it not only exposes the Hamburger Kunsthalle's lack of knowledge about and true familiarity with virtual art, but also questions the prevailing authenticity and genuineness that can function in virtuality. Secondly, it lays bare the ruthless practice of institutionalized sexism, which fails at being representative on almost every level, as after all, out of the 280 entrants, more than 200 were women. It therefore reproduces or entrenches the injustice of the gender divide in the institutional system of the art scene.

Thirdly, but no less importantly, the FEMALE EXTENSION project needs to be examined not only in its temporary environment, but also within the fabric of Sollfrank's oeuvre, as the central subject of her research and creative work is the lack of female hackers. In responding to this hiatus, Sollfrank's extension puts post-human cyberfeminism into practice at a high level: she creates virtual female colleagues and imaginary women fellows for herself, who can march arm in arm to implement what has not yet been achieved in reality, namely to incorporate the female perspective into cyberculture. This kind of imaginary-fictive working method, which has now become established in cyberfeminist tradition, can also be observed, albeit in a completely different style and environment, in Afrofuturism's "Space is the Place" programme: in both instances, a group that was kept away from power by visible or invisible walls can experience fulfilment beyond the bounds of materiality.[315]

The Hamburger Kunsthalle, which at the time of writing has not ceased to present prominent contemporary art, quietly removed the net:art works of EXTENSION from its

315 Mark Dery, *Black to the Future,* http://www.detritus.net/contact/rumori/200211/0319.html

server. According to Sollfrank, the museum decided not to maintain the documentation of the experiment to expand into virtual reality.[316] With this move, a substantial part of Sollfrank's hack was deprived of publicity, which further exacerbates the ignorance on this topic betrayed by the otherwise really pioneering Hamburger Kunsthalle.

It is important to mention that Sollfrank was not left on her own to implement the project. Sympathetic members of the net art subculture who are known for their subversiveness (e.g. Heath Bunting) provided (and continue to provide to this day) email addresses and server space for FEMALE EXTENSION. If, by implementing the EXTENSION project, the intention of the Hamburger Kunsthalle was to incorporate the net:art subculture into the world of contemporary institutions, then the response of the net:art subculture to this proposition can be regarded as emphatically hostile. It responded to the challenge, technologically, culturally, and in terms of community, as a unified and independent subculture, which, while not remaining aloof to institutional support, is nevertheless still capable of viewing it critically.

BorderXing

Heath Bunting, 2000–2002

> It blooms from May to August, ranging from 1,600 to 10,000 feet. Surrounding towns are expensive and ugly.[317]

Among the artists examined here, Heath Bunting, of Bristol, is perhaps the most difficult to approach. Though he has

316 http://artwarez.org/femext/
317 BorderXing Guide

featured in landmark net:art exhibitions (e.g. documenta X, 1997) and books (e.g. Rachel Green: *Internet Art*), his activity and his criticism seems to have remained within the subcultures where he feels most at home: in the orbits of street art and net:art. In 1997, by his own admission, Bunting retreated from the threat of fame and closed himself off from the mainstream art world to avoid commercialization.[318] Despite this, in 2008 the Hartware MedienKunstVerein organized a complex exhibition of the work of the Irational net:art collective he founded, which toured Europe. The catalogue published to coincide with the exhibition is one of the few critical texts dealing with Bunting's works. The catalogue was not intended merely as art criticism: in collaboration with members of the Irational collective, the curators and critics outlined a number of possibilities for visitors to interpret the works, with the help of text cards attached to the catalogue. The structure reflects the architecture of the irational.org server. In his foreword to the catalogue, Matthew Fuller defines the Irational collective, founded by Bunting and consisting of six artists, as artists of the expressive power of insubordination.[319]

Bunting, the puritanical, sometimes ascetic[320] net:art pioneer of the 1990s, experimented with constructing open, democratic communication systems. It is important for him that the tools he uses and the works themselves should be accessible without restrictions. His most cited project is entitled *Own, Be Owned or Remain Invisible*, in which he published an excerpt of an article about him so that every

318 Tilman Baumgaertel, *Interview with Heath Bunting,* http://www.nettime.org/Lists-Archives/nettime-l-9708/msg00098.html

319 Fuller, Matthew, *The Expressiveness of Insubordination* = The Hartware Guide to IRATIONAL, Frankfurt am Main, Revolver, 2006.

320 TAZ interview with Heat Bunting on the nettime mailing list: http://www.nettime.org/Lists-Archives/nettime-l-9708/msg00098.html

word links to the domain identical to the word, thus turning the entire text into a dynamic collection of hypertext.[321] Over the years, there are changes in which domains have owners and which do not, and which can be bought. The title of the project is ambiguous due to hacker slang, for the word "own", besides meaning "possess", also refers to successfully taking control of a hacked website (as in, for instance, "you have been owned – by Anonymous").[322] The text that he uses is an article about him published in *The Telegraph*.

In general, his works are low-tech, anti-multimedia, and use a modest set of tools. Although the Situationist dérive[323] does not feature in his work with referential value, in one of the few interviews he has granted, he defines wandering around cities in an observing mood as one of his favourite creative activities. Sometimes when he goes on these wanderings, he explains with a perfect poker face, he takes a bolt-cutter with him. He makes numerous maps during his walks, not only of CCTV cameras or skateboard parks, but also of the edible, freely consumable produce that can be found in public places. The majority of his work walks across the borders of the consensual power structures between the public and the private. The gesture of walking across borders also falls into Matthew

321 http://www.irational.org/_readme.html

322 http://knowyourmeme.com/memes/owned-pwned

323 "...the *dérive* was a crucial research tool in the Situationist para-discipline of 'psychogeography', the study of the effects of a given environment on the emotions and behaviour of individuals. As a mode of increasing one's awareness of "specifically urban) surroundings, the *dérive* differed from Surrealist wandering in that it placed less emphasis on automatism and the individual unconscious. Rather than being an end in itself, the *dérive* was a form of data-gathering for Situationist 'unitary urbanism', an attempt to undo and move beyond what they saw as the disciplining, homogenising and ultimately dehumanising effect of modern forms of urban high-rise living." Bishop, op. cit., 77.

Fuller's category of expressive insubordination, and Bunting always does this with dispassionate ease combined with undiminished discipline.

One of the most emblematic realizations of this was the BorderXing of the year 2000,[324] carried out together with Kayle Brandon, during which Bunting and his companion illegally crossed the green borders of Europe for a period of seven months, sharing their experiences in the form of an on-demand online database. For every border crossed, they list the necessary tools and equipment, places for finding food and help, and any difficulties that arose.

While he generally rejects documentation as a way of commodifying an artwork,[325] for BorderXing he made a photo database available, besides the written one, as well as a pseudo-botanical handbook.[326] The non-commercial database cannot be accessed from anywhere, however, but only with an IP from outside Europe and the United States, from museums, or by special request. Access is therefore determined on the basis of the viewer's geographical position and their commitment. Like the Ostojić project described below, with this gesture, BorderXing draws attention to the injustice inherent in the privileges enjoyed by the "developed" nations, because the citizens of the EU and the USA are not typically forced to undertake illegal border crossings, unlike the larger part of the

324 http://irational.org/cgi-bin/border/route/route.pl?from=hu

325 "I suspect that 90 percent of what I have done is lost, especially things I did on the streets. Documentation is really a way to commodify your work. [...] Chalk is very cheap. A box for 40 pence can last you a week. Accessibility has always been a big issue for me." Bunting, http://www.nettime.org/Lists-Archives/nettime-l-9708/msg00098.html

326 http://duo.irational.org/borderxing_slide_show/,The Botanical Guide to BorderXing, http://duo.irational.org/botantical_guide_to_borderxing/BorderXing2.pdf

world, who are excluded from these privileges but who nevertheless have a demand for them.

The asceticism of the visual economy and tactical discipline that can be observed in the other works by Bunting is sometimes pierced in the documentation of BorderXing by a for-him uncustomary aesthetic quality: a sense of the personal. On multiple channels we can stumble upon certain comments, photos or incongruous texts that shatter the tension of the discipline and make it impossible for the individuals involved to be replaced by anyone else. As can be seen in the photo documentation, for example, Bunting leaves tags on the signposts marking the green borders. The text of the botanical handbook, detailing the edible and poisonous plants that can be found in different regions, is sometimes interrupted by a few lines that do not fit, not because of their typography but because of their meaning, such as the lines quoted at the start of this case study. It is for this reason that I added the prefix "pseudo" to the publication, because in this form, this document changes its meaning. A botanical handbook for day-trippers is primarily intended to help people identify the flora they come across during their excursion and to discuss it at leisure. In the case of BorderXing, there is something far more existential at stake in identifying the plants and the landscape, and the political statements that interrupt the botanical text have the effect of an encouraging, moral or humorous intermezzo on those who might embark on a journey with the help of Bunting's database.

In the case of a work entitled BorderXing, whose theme is crossing borders, examining the concept of transgressing borders poses a substantial linguistic challenge. First, perhaps, it is worth highlighting how the practice of guarding borders has changed in the wake of globalization and the

Fig. 7. BorderXing

information society. In the everyday reality of biometric passports, RFID chips, international highways and integrated most-wanted databases, network technology determines the methodology of digital surveillance . In this digitized network reality, simply walking across physical borders becomes a revolutionary act. Bunting and Brandon wish to play no part in building the unified databases of surveillance, but construct their own micro-database for themselves. This database does not reproduce systemic exclusion, but through its access-specificity, it does the exact opposite. Not only does it unblinkingly disregard the forcefield of twenty-first-century globalized civilization, equipped with armed forces, digital databases and real-time control systems, it makes it all look ridiculous, next to its own resourceless, barefoot, personal survival. The linguistic game in the title,

X-ing, that is cross-ing, also implies negation, for that is what X means in computer jargon. Bunting creates, and shares, a parallel existence, in which individualist, persistent and consistent insubordination is not forced into a dialogue with the network instruments of power.

Looking for a Husband with EU Passport

Tanja Ostojić, 2000–2005

> Provocation is a specialty of mine. My experience tells me that while art cannot quickly change social or political reality, it is important for art not to be apolitical.[327]

Ostojić's work is a defining piece of net:art, now seen as canonical and complete, which centres on a website that is no longer accessible at its original address. The only page of this website depicts Ostojić naked, no hair on her head or her body, its spectacle reduced to its most basic properties, as an online advertisement, in which she is searching for a husband with European Union citizenship. At the exhibition entitled *Gender Check: Femininity and Masculinity in the Art of Eastern Europe*,[328] held at MUMOK in Vienna in 2009, this image, originally made for the internet, was then blown up to the size of a poster, and beside it some of the letters, marriage proposals and comments that had been sent to the email address given on the website (hottanja@hotmail.com) were also displayed, such that in the creation of the artwork, the

327 Tanja Ostojić, http://www.van.at/see/tanja/int/angel.htm

328 *Gender Check: A Reader: Art and Theory in Eastern Europe,* ed. Bojana Pejic, MUMOK Stiftung Ludwig Wien, Köln, Verlag der Buchhandlung Walther König, 2009.

original net-based project became an element of a process that is the artwork. Other outcomes of the project were the marriage between Ostojić and the German artist she chose as her husband, the bureaucratic process of applying for citizenship and having it rejected, and the divorce, together with the performance held on that occasion in 2005.

The provocative power of the work is due not only to the aesthetic quality of the picture but also its historical context, which means that the questions it raises will remain current and valid in the long term: at the time the website was published, coinciding with the "beginning of the end" of the Yugoslav Wars, Serbia was still immeasurably far from EU membership. The situation of the victims who emigrated to the EU, either to escape the war or, later, in the hope of a better future, was already, in the early 2000s, highlighting the extremely problematic nature of the European project. At the same time, online trading was growing increasingly widespread across the globe, and the companies that remained on the surface after the dot-com boom were beginning to consolidate their monopolies. Although it was not as virtualized then as it is today, online prostitution already existed, as well as various forms of buying citizenship and human trafficking. In 2019, as the work of the Mediengruppe Bitnik has also demonstrated, it could hardly be easier to obtain a false passport.

The representation of Ostojić's body stands at the centre of *Looking for a Husband with EU Passport*, as she poses neutrally, dispassionately, in front of a background that recalls a medical room. The overall impression is that we are looking at a mannequin, who is patiently waiting to be exported to Western Europe. The other association that arises may be that of the disinfectant procedures of internment camps, prisons and refugee camps. In both

cases we see a body that has been deliberately objectified, evoking pity in the viewer.

The photograph thematizes not only the EU's discriminatory policy towards people from the former Yugoslavia and the life stories of hundreds of thousands of vulnerable Eastern European women (as well as online dating, sugar daddy and other businesses of the like), but also the conventional objectification of the female body. The roles are reversed, as it is not the man with all the resources who is exploiting the woman's body, but its biological owner who is utilizing it for her own objectives. In her own way, she is practising the avant-garde programme of "dissolving the border between art and life". She simultaneously points out the very real vulnerability and makes her choice from among the applicants, with the aim of making the virtuality of the artwork reality in the immigration procedure.

An important question in the case of digital artworks always concerns the process of media preservation: the original website is no longer available, and during the project, a virus in Ostojić's computer led to the loss of numerous parts of the documentation. If we disregard this for now, it is also unusual for an original website page to consist of a single, static still image, which is not hypertext-based, not at all like a large part of net:art works. We therefore have to regard the project as something operating within or reflecting on the medium of the World Wide Web, because its hypertextuality resides in the transcending of the symbolic wall between the World Wide Web and international bureaucracy. In this sense, Ostojić found or created a breach in the relationship between the World Wide Web and global politics.

The border-transgressing character of *Looking for a Husband with EU Passport* reflects on the above-described geopolitical and economic-technological moment, in

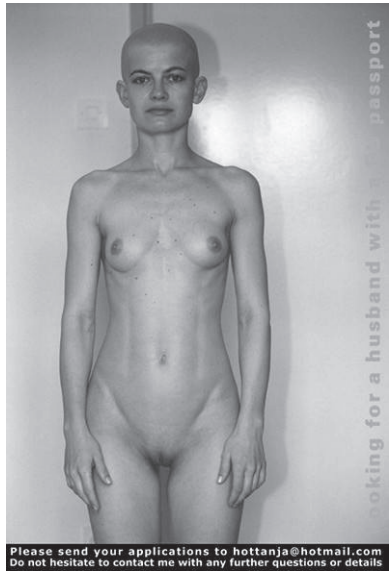


Fig. 8. Looking for a Husband with EU Passport

particular on the East-West caesura in Europe, and on the perennial (and in this context exacerbated) nature of the female body as a commodity. As posited by the project, and ultimately confirmed by it as well, the owner of the latter female body, as both an Eastern European and a woman, classifies as a person with multiple disadvantages. Nevertheless, this is the body, or the online representation of the body, which, for want of anything better, is being used – to mix our metaphors – as a hammer to help Ostojić break through the glass ceiling. The tragedy of this fact is what brings tension to the project, which not only ignores,

but also publicizes and virtualizes the hitherto imaginary border between life and art: it presents a complete process, from the advertisement that constitutes the basis of the artwork, to the rejection of the application for citizenship.

As an almost insignificant but nevertheless symbolic footnote to the project, according to eBay, the printed poster version of the full-length photo that formed the basis of the project, with its original signature, changed hands between two art-loving users for the price of 50 euros. Thus, despite the work's nature (and intent) as net:art, it could not avoid becoming a static art object. A fact of greater significance is that, among other things, Ostojić put together a book from this project, which she sells online; the price for women purchasers is 30% cheaper than the price for non-women purchasers.

Face to Facebook

Paolo Cirio and Alessandro Ludovico, 2011

> We're still not sure what happened to the pirate flag that once flew over Apple Computer's headquarters.[329]

Paolo Cirio is an Italian hacktivist artist, who, with his provocative works, examines and diverts the cultural and economic monopolies of tech giants (Google, Facebook, Amazon, PayPal). In 2001, Cirio and Alessandro Ludovico copied one million Facebook profiles (profile pictures, names, locations), and then, with the help of an algorithm, by selecting and categorizing a quarter of a million identities with smiling profile pictures, they created a dating site. The publication of what they called lovelyfaces.com was

329 Jordan, Taylor, op. cit., 23.

followed by enormous media coverage and civil outrage, which Cirio and Ludovico documented with satisfaction as a Global Mass Media Performance.[330] Within five days, over a thousand articles and reports about it were published.

In every interview they gave, the artists consistently defined the work as appropriation and awareness-raising. By appropriation, they meant the scraping of the public profile data, while the awareness-raising was intended in two ways: they wanted to raise awareness about the vulnerability of the online identity of users who share their data publicly on Facebook, and about the practice of Facebook, which makes this vulnerability possible. The outrage of the users, however, was not directed against these facts, but against the actions of the artists who had brought these contradictions out into the open. The legal team of the social media megacorporation could find no conflict between the work of art and the terms of use that they could use to sue the artists. Cirio and Ludovico, meanwhile, constantly pointed out when being interviewed that the tech giant of today had started out in a similar way, using a university database (yearbook) as a dating site, without the consent of the people featured.[331] After presenting their project, Cirio and Ludovico received thirteen proposals from potential business partners, including offers from the owners of actual dating apps.

Face to Facebook is today part of the permanent collection of the Ars Electronica Center in Linz. The exhibits, as a whole, are reproducible, but their originality lies in the digital process, which is presented in the exhibition. Nevertheless, the method of installation has a fundamental effect on the meaning. Though the composition of the elements

330 http://www.face-to-facebook.net/press-coverage.php
331 https://gizmodo.com/dating-site-copied-250-000-facebook-profiles-without-5751340

is different in every gallery and museum, the main visual component is always an enormous tableau showing a large quantity of appropriated profile photos, each measuring 4×4 cm. In general, the tableau consists of at least 20×60 (1200) photos, every one of which depicts a smiling face. While this represents less than 5% of the total number of profiles used, the effect is still that of a huge crowd. In a version in Prague, a much larger tableau covers the entire wall of the gallery, 2m in height and over 6m in length. The viewer comes face to face with a legion of smiling faces of strangers, which is a replication of the representation of reality that has been constructed, selected and manipulated several times over.

The overwhelming nature of the experience is the background knowledge that this is just a tiny set (5–10%) of the entirety of the copied data, which in turn was just an infinitesimal data set (0.4%) processed out of all the existing profiles on Facebook. As of December 2018, Facebook had 2.3 billion users who were active at least once a month, so the faces on the tableau represent around two ten-thousandths (0.0002%) of this total. If two ten-thousandths can be shown on an area covering 10 square metres, the entire current database of profile pictures would occupy five million square metres, that is, five square kilometres, which is the size of New York's Central Park one and a half times, far exceeding a scale that can be comprehended by the human senses. This allows the viewer to gain some kind of impression of the imperceptibility of the virtual and real dimensions of the world, while simultaneously forcing the viewer to grasp the fact that, unlike the viewer, commercial global technology can operate successfully within this imperceptibility.

Face to Facebook is a participatory work with multiple layers: the media presenting the project and the tech giant

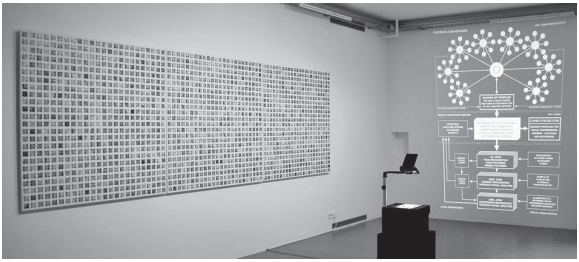


Fig. 9. Face to Facebook

that responds to it are participants with at least as much importance as the online identities whose owners form part of the artwork without their consent – it makes no difference that they ought to have known that all the information they post about themselves on online community platforms is public. Their smiles, beaming back at us from the pictures, not only aim to please and construct an identity, but also polemicizes that kind of unthinking naivety that society shows towards certain technological phenomena.

As with the other works examined here, we cannot avoid the question of where the work begins and where it ends. The original intervention, carefully planned by the artists, provokes the media response, which is likewise carefully documented by the artists. The artists thus coerce the public into a kind of dialogue, whose topic they themselves determine, and they then go on to document both sides, maintaining control over the agenda and turning it to their own (professional) benefit.

In a sense, *Face to Facebook* is not just hacktivist art, but also a classical hacker intervention: it calls attention to a vulnerability, to a 0-day, without damaging the technological

system in which this vulnerability was found. Instead, it warns those responsible for the system about its potential exposure to harm. This assumes, of course, that we do not include in Facebook's technological system its fluctuating stock market value and the trust its users place in it (that is, its consumers and its commodities), because in this case what we are seeing is a not entirely innocent white-hat attitude. The attitude of the attacked institution was as hostile as that of the Hamburger Kunsthalle: they chose to fight back against those who had brought about this uncomfortable exposé, rather than gratefully setting about rectifying the revealed vulnerability. And yet the intervention of the artist duo is identical to Facebook's business model, turning voluntarily and publicly shared user data to their own advantage. *Face to Facebook* leaves open the question of who has the legitimate right to exploit the data of others.

Sterile Field

Critical Arts Ensemble, 2013

> ...molecular interventions and semiotic shocks [...] collectively could diminish the rising intensity of authoritarian culture.[332]

The original promulgators of the term "tactical media" in the United States did not understand the expression in exactly the same way as the Institute of Network Cultures in Amsterdam. For the Critical Arts Ensemble, established in 1987 and undertaking pioneering work in the field of hacktivism, tactical media means radical micro-interventions.

332 https://web.archive.org/web/20100711073811/http://critical-art.net/TacticalMedia.html

The members of the ensemble have backgrounds in graphic and web design, video and performance art, and their works are location-specific, ephemeral, and often self-destructing. The six book-format publications of the CAE are pieced together from the works of others, consisting of declaration-like texts that sound good but are not logically coherent.

One of these books is entitled *Electronic Civil Disobedience: And Other Unpopular Ideas*.[333] The writing, whose tone is anti-mainstream media, defines art as cultural activism, whose task is "to create disturbances", a task that is not made any easier by the indefinability of the medium in which the disturbances ought to be created.[334] The work of Duchamp, the Cabaret Voltaire and the Berlin Dada are regarded as revolutionary forces, and as one part of the text explains, "the gamble of these forerunners of disturbance reinjected the dream of autonomy with the amphetamine of hope that gives contemporary cultural producers and activists the energy to step up to the electronic gaming table to roll the dice again."[335] In the same volume, it is argued that a truly border-transgressing work sets conditions for its participants, in which they can reject closed, authoritarian, impersonal systems, so that in the ecstasy of the moment of autonomy, they can open themselves up to social interactions that lie beyond the realm of conventional order. This is the moment, they contend, when true dialogue can come about, and this dialogue is the key to change.[336]

333 Critical Arts Ensemble: *Electronic Civil Disobedience: And Other Unpopular Ideas,* https://monoskop.org/images/d/df/Critical_Art_Ensemble_Electronic_Civil_Disobedience_and_Other_Unpopular_Ideas.pdf

334 Critical Arts Ensemble: *The Electronic Disturbance*, 1994, Autonomedia and Critical Art Ensemble, Brooklyn, NY

335 *Ibid.,* 14.

336 *Ibid.*, 52.

In recent years, the group has primarily dealt with the dangers of biotechnology and the protection of ecological systems. In 2013, they presented the Sterile Field installation at Halle 14 in Leipzig. Halle 14 is part of the Spinnerei arts complex, which once functioned as a cotton mill. The complex now serves to nurture the contemporary continuation of Leipzig's traditional heritage as a commercial centre for painting and printmaking. Halle 14 is the only gallery in this post-industrial cultural institution that exhibits interactive and installation media art. The CAE installation here began with laying down a large quantity of soil in the main hall of the Halle 14 factory building. The soil was all treated with legally commercially available "plant protective substances". Visitors were invited to try and grow any type of plant in the soil. After numerous experiments by committed visitors, the soil remained lifeless for the whole duration of the exhibition.

The aesthetic value of the installation can be examined from two aspects, as the work unifies the static spectacle with the participatory process. The former exaggerates the familiar post-industrial aesthetic, presenting us with an expanse of soil the size of a playing field, inside the vast empty remains of a reinforced concrete former factory. However, it is not customary for natural materials to be present in unoccupied factory buildings with this kind of artificial geometry, or at least, this is not what we learnt from the culture of techno-apocalyptic films and video games. In cyberpunk tradition, it is far more common for the posthuman cooperation between the built space and nature to be characterized by an entropic-organic presence. In Sterile Field we see a human-created constellation, which is accordingly geometrically straight and regular. In the middle of the factory space, a stage-like pulpit of soil is set up so that its outlines are parallel with the factory walls. The most important organizational element of this

composition is absence – the absence of disorder, colours, shapes, contrast and change; put briefly: the absence of life.

The pesticide used by the CAE, named Roundup, was developed by the American company Monsanto, and only sterile seeds created through genetic manipulation by the same company, marketed as Roundup Ready, are resistant to this chemical. As the seeds are sterile, the crop does not produce new seeds, so for every new crop, the consumer has to buy new Roundup Ready seeds from Monsanto. This practice is unfamiliar to European exhibition-goers, who naively try to cultivate the sterilized field like a community garden. The field, of course, will never germinate into life no matter how well it is tended, so absence is also materialized in the process. The temporally extended variant of the three-dimensional absence can perhaps best be described as deafness or paralysis. This visualized paralysis overwhelms the life-, motion-, intention- and individuality-filled naivety of the visitors to the exhibition. The artwork does not offer a playful, diversionary, or any other kind of alternative: all that is left behind is the triumph of emptiness.

In 2013-2014, the TTIP and CETA trade agreements between the European Union, the United States and Canada[337] threatened to bypass the ban on GMO (genetically modified organisms) foods that was in force in the EU, which provoked outrage across Europe. Under the terms of the TTIP and CETA initiatives, GMO food products imported into the EU from the USA and Canada would no longer have required labels identifying them as GMO products. In 2016, due to civil pressure, the EU rejected these agreements, but despite this victory, the threat is far from over,[338] especially as in 2018,

337 EU–US Transatlantic Trade and Investment Partnership (TTIP) and EU–Canada Comprehensive Economic and Trade Agreement (CETA)

338 https://theecologist.org/2016/oct/18/canada-eu-ttip-trade-deal-ceta-

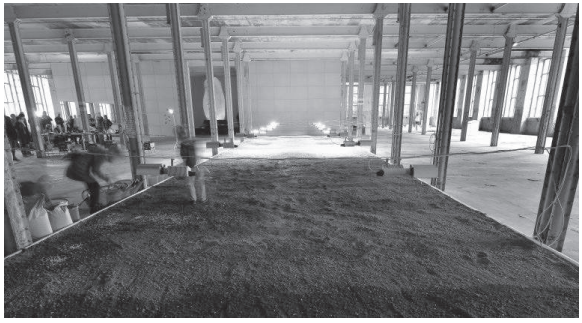


Fig. 10. Sterile Field

the German pharmaceutical concern Bayer acquired 100% ownership of the previously American-owned Monsanto.[339] These processes turned Sterile Field from a merely symbolic piece into a work of menacingly topical value.

Random Darknet Shopper

!Mediengruppe Bitnik, 2016

Humour is no joking matter.
Frigyes Karinthy

The Swiss collective !Mediengruppe Bitnik (M. B.) produce hacktivist works of art. They define themselves as post-conceptual artists who work in and with the internet, in both digital and physical spaces. One of their best-known

down-not-out
339 https://media.bayer.com/baynews/baynews.nsf/id/Bayer-closes-Monsanto-acquisition

works is Delivery for Mr. Assange, in which a live-streamed camera fitted into a posted package documents its own journey from Zurich to the Ecuadorean Embassy in London, more precisely, to the leader of WikiLeaks residing there. The artist duo have become famous in the last ten years, and they openly declare that their work not only reflects on net:art and mail art, but also on the avant-garde tradition, for example in their work titled *Same-Same*, in which the original Dada pictures on the Cabaret Voltaire homepage were replaced with algorithmically similar images. Their hacking gestures are always unexpected and simple, sometimes classic exploits with a little cultural twist. One example of this is Surveillance Chess, a work in which security cameras observing the underground system were hijacked and turned into live chess game consoles, while the security guards watching the monitors were invited over the loudspeaker to play a game of chess.[340]

Their work reflects on the latest technological-cultural environment, while the physical implementation is secondary to the digital concept, and serves mainly to share and document their work. This was the situation with the work entitled *Random Darknet Shopper*, when an online algorithm created by the artists purchased articles at random on the darknet, with a limited budget of a hundred dollars per week. The process of exhibiting the objects or sets of objects acquired by the program was also automated: every day, the workers at the gallery placed the new purchases in a specially designated, previously empty display case. Among the packages received were counterfeit branded goods, a Hungarian passport, some cigarettes, a set of skeleton keys, a credit card and ecstasy tabs.

340 *Surveillance Chess,* http://chess.bitnik.org/about.html

The latter consignment was subsequently confiscated from the gallery by the Swiss authorities, who then tried to bring the buyer to justice. That was by no means easy, as the goods had been purchased neither by the gallery employees nor by the artists – left with no other choice, the Swiss authorities arrested the Random Darknet Shopper (RDS) algorithm. The imprisoned code was released two months after the 2015 exhibition in St. Gallen closed, so it could carry on its worthy work: later in 2015 it was active in a London gallery, and in 2016 it carried on in a gallery in Ljubljana. This raises the following question: if the exhibition can be reproduced in variations, then is this a quasi-living artwork that is capable of reproducing itself? According to the artist duo, the Random Darknet Shopper is a work of mail art, which explores the darknet through the goods it buys there at random. As with their other works, this one is also a declaration of their living connection to the legacy of the (neo-)avant-garde.

However surprising the assertion may be to the police, the border transgression of the RDS lies not in its purchasing illegal goods, but simply in its function: despite the fact that artificial intelligence and robot research and development have been around for more than half a century, for the average citizen it is still extremely alien and bizarre to have an autonomous robot doing things. The shock is not attenuated but perhaps even accentuated by the fact that the robot does not decide by itself, but makes its purchases based on the results of a random number generator, for after all, it does so in an environment that is in itself unusual and scary. The randomness of its behaviour is uncannily reminiscent of my own first experience of browsing the darknet. For a user on the darknet who is not acting consciously, the unpredictability itself poses untold

risks, not so much in connection with the legal or illegal product acquired at any specific marketplace by the RDS, but rather because of the commercialized concentration of human evil that exists uninhibited on the darknet. The Random Darknet Shopper therefore evokes a double sense of the uncanny in the viewer: it is impossible to decide which is more bizarre: a script making purchases at random, or the environment in which it moves around without any human emotions? One of the most surprising facts about the project is that after almost every purchase, the selected goods arrived safely – the transactional protocol therefore worked reliably where all three players were concerned: the algorithm, the traders, and the postal service.

In hacker jargon, an *easter egg* is an innocent surprise that is encoded into a given program to appear unexpectedly while the program is in use. It is an undocumented, entertaining diversion, reproducible if you are in possession of the code, and it does not interfere with the main narrative – an example is a picture that pops up during a computer game, which has nothing to do with the gameplay. In the case of the Random Darknet Shopper, every new package is a new easter egg.

The series of questions that the artists leave the viewer to ponder on goes: what is the artwork in this process? The creation of the concept and the algorithm? Is the algorithm, as the intellectual product of the artists, art or an artist? Is it rather a product or a tool? Beyond the fact that they could be bought for money, what kind of goods are bought by the algorithm? Particularly with regard to the hacking manuals (Ljubljana edition), the false identity and the counterfeiting accessories. In these cases, what is the product? Is it a version of Castells's definition of identity impersonally turned into a commodity? Where is an algorithm when it has been

arrested? Is it destroyed? Is it copied? Does the original have to be stored in a locked container, sealed with the same kind of label of authenticity as that product bought 500 of? What does the darknet tell us about the information society, when the majority of goods on sale there question the social consensus on authenticity and legitimacy?

Some of the concepts of !Mediengruppe Bitnik can be described in a single sentence. They appear, without exception, to be simple and general, but the elements, processes and consequences that interact in them offer a glimpse into the darkest, strangest corners of technoculture – in both the literal and the symbolic sense. When the majority of their works are published, they are still open processes, conjectures, which are made complete by automation, chance, and the surrounding environment. In one of their presentations, they describe their most important working method as the intentional loss of control over the process of creating the artwork. In several of their early works, the artist duo referenced the Situationists – their more mature projects give the impression that they are attempting to work as the heirs of Situationism, wandering around the digital agora. The Random Darknet Shopper can also be regarded as a kind of *dérive* automaton.

In addition to this, there is also a kind of unique lightness that radiates from M. B.'s work and image: in every sense they are true digital nomadic world citizens of the globalized information society, who skip across Europe from gallery to gallery, in the way dreamed about by the techno-utopian generation before them. It is noteworthy that as digital artists, they are not affected by the outdated model of the art trade – apparently they only work from the

Fig. 11. Random Darknet Shopper

budgets of projects that are specifically earmarked by the cultural institutions for the elite of digital art.

The study of hacker culture from an artistic perspective opens up an immeasurably rich technocultural horizon, where countless projects and groups are actively at work, and where technological innovation is too agile and diverse for the authorities or academia to keep up with. Non-conformist information technologies constitute what is perhaps the most intriguingly study-worthy layer of our culture today, and it has a far greater influence on shaping our culture than may be imagined at first sight. In these stories, it is possible to find the kind of immediacy, innovative attitude, subversive thinking and operational strategy that have the serious potential to renew, or rather, to bring up to date the way in which the institutional system of contemporary art functions.

SUMMARY: CRACKS IN THE CYBERNETIC CONDITION

> The question is how you rearrange the stars above your head, to open up unexpected paths on the ground beneath your feet.[341]

In 2017 the first prison sentence was imposed in the United States in which the likelihood of a repeat offence was calculated by software. It is extraordinarily problematic that the company providing the software to the justice system did not make the source code or the software's functional algorithm public, due to the proprietary nature of the code. Peter Sunde, one of the founders of Pirate Bay and a member of the Finnish Pirate Party sees a dark future for open culture and warns us that the rights we believed were guaranteed cannot be taken for granted at all. In an extremely closed and unequal, aggressive capitalist system, the internet is the mirror of society, and therefore the mere existence of the internet and its apparent freedom do not provide a solution to anything.[342]

On 21 May 2017, LGBTQI, a queer activist group made up of refugees, stole an artwork by Roger Bernat from the documenta 14 exhibition in Athens. The plastic and fibreglass composition, measuring around 1x1x4 metres and weighing 50 kg, was originally intended to be carried around by different groups to museums, schools, embassies and other venues in the Greek capital. The artwork was designed to symbolise the Greek oath stone.[343] One of the groups commissioned by the artist, in exchange for a fee, to take the work

341 Holmes, *Escape the Overcode*, 264.
342 https://motherboard.vice.com/en_us/article/pirate-bay-founder-peter-sunde-i-have-given-up
343 Members of the Senate in Ancient Athens swore their oath of office on the original oath stone.

around unexpectedly ran off with the piece, as an expression of their rejection of documenta 14's practice of instrumentalizing refugees. According to their video manifesto, they should not be represented indirectly by any person, and certainly not by a stone, and they had no intention of returning the artwork. The artist – fortunately? – had made two spare replicas of the work, in case something like this happened.[344]

This story is a spectacular illustration of the extreme conflicts at play between the institutional system, the artist and the activist: the truly subversive act and the posing of real questions come not from the artist, but from the activist. The artist, who enjoys the material and legal protection of the institutional system, is forced to confront the truth that, due to the extreme vulnerability of the concept, if the meaning of his artwork is lost, the work is effectively destroyed and then reborn in a far more vital, genuine and direct environment, without the participation of its now-alienated artist. The artist's credibility could only have been saved if he had been aware of the planned appropriation and had consented to it. The fact that he had made two (!) back-ups of the work, however, proves the opposite was true.

As early as 2002, in his book on internet criticism, Geert Lovink pointed out that the prevailing ideological structures were already encoded in the information society at both the software and hardware levels.[345] The cultural Zeitgeist is perhaps most articulately described by Brian Holmes in his volume entitled *Escape the Overcode*, in which, with the help of the rhetoric of Deleuze and Guattari, he links the cybernetic experiments undertaken by social scientists in the 1960s to our contemporary tech-dependent culture.

344 https://hyperallergic.com/382407/lgbtq-refugee-rights-group-steals-artwork-from-documenta-in-athens/

345 Lovink, op. cit., 262.

Deleuze and Guattari coined the term 'overcode' in their jointly written work, *A Thousand Plateaus: Capitalism and Schizophrenia*.[346] The overcode is what Holmes, Deleuze and Guattari call the linguistic-cultural code system of the social order of global capitalism. The overcode is an invisible, ubiquitously operating structure that serves as the model of authority, determining human roles, communications, tasks and behaviours, the use of devices, interactions, and the built environment. [347]

In a strange way, our overcoded contemporary world is the implementation of the earlier cybernetic form of systemic control, only it is not centralized, but operates in a far more sophisticated and concealed way. Overcoding is the institution of social constraint, and it conveys the language of power.[348] In *Escape the Overcode*, Holmes explores possible ways of decoding, recoding or creating new microcodes in an overcoded society that is bound up in synchronized, integrated databases at the molecular level.[349] In his view, this is why hacker culture is of crucial importance: it confronts the constraints of the overcode by working inside the machine itself.[350]The essence of contemporary subversion, in Holmes's interpretation, is the free movement and the hybridization of inherited forms of solidarity and struggle put into practice in the process of recognizing and appropriating new toolsets, conceptual frameworks and space concepts.[351] It is my hope that this book will contribute to the initiation, maintenance and understanding of subversions of this kind.

346 Gilles Deleuze, Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia,* Minneapolis, University of Minnesota Press, 1987.
347 Holmes, *Escape the Overcode,* 262, 300.
348 *Ibid.*, 24.
349 *Ibid.*, 63.
350 *Ibid.,* 300.
351 *Ibid.*, 21.

BIBLIOGRAPHY

Autistici/Inventati, *+KAOS. Ten Years of Hacking and Media Activism,* Amsterdam, Institute of Network Cultures, 2017.

!Mediengruppe Bitnik, https://wwwwwwwwwwwwwwwwwwwwwwww.bitnik.org (2020.11.12)

Barbrook, Richard, Cameron, Andy, The Californian Ideology, in *The Internet Revolution: From Dot-com Capitalism to Cybernetic Communism,* Network Notebook #10, Institute of Network Cultures, Amsterdam, NL, October 2015.

Baumgaertel, Tilman, *Interview with Heath Bunting,* [August 1997], https://www.nettime.org/Lists-Archives/nettime-l-9708/msg00098.html (2020. 11. 12.)

Baybrooke, Kat, *She-Hackers: Millennials and Gender in European F/LOSS Subcultures,* conference presentation, Chaos Communication Camp, Finowfurt (DE), 2011, https://media.ccc.de/v/cccamp11-4487-she_hackers-en (2020. 11. 12.)

Bazzichelli, Tatiana, *Networked Disruption: Rethinking Oppositions in Art, Hacktivism and the Business of Social Networking,* PhD Dissertation, Aarhus University, 2011.

Bishop, Claire, *Artificial Hells: Participatory Art and the Politics of Spectatorship,* London, Verso, 2012.

Bürger, Peter, *Theory of the Avant-Garde,* Translated by Michael Shaw, Theory and History of Literature, vol. 4, Manchester University Press, University of Minnesota Press, Minneapolis, 1984

Castells, Manuel, *The Information Age I–III,* London, Blackwell, 1996,2000.

Castells, Manuel, *Preface* = Manuel Castells, *The Networks of Outrage And Hope, Social Movements in the Internet Age,* Cambridge, Polity, 2015.

Chomsky, Noam, *On Anarchism,* New York, The New Press, 2013.

Cirio, Paolo, *Face to Facebook, Hacking Monopolism Trilogy,* https://paolocirio.net/work/face-to-facebook/ (2020. 11. 12.)

Cirio, Paolo, Networked Reality Flow Hacks = *Culture Jamming: Activism and the Art of Cultural Resistance,* eds. Marilyn DeLaure, Moritz Fink, New York, New York University Press, 2017.

Coleman, E. Gabriella, *Coding Freedom: The Ethics and Aesthetics of Hacking,* Princeton, NJ, Princeton University Press, 2013.

Coleman, E. Gabriella, *Hacker, Hoaxer, Whistleblower, Spy: The Many Faces of Anonymous,* New York, NY, Verso, 2014.

Coleman, E. Gabriella, Hacker = *Digital Keywords: A Vocabulary of Information Society and Culture,* ed. B. Peters, Princeton (NJ), Princeton University Press, 2015.

CrimethInc. ex-Workers' Collective: *Expect Resistance,* Salem, OR, CrimethInc. Skeleton Crew, 2007.

Critical Arts Ensemble, *The Electronic Disturbance,* Autonomedia and Critical Art Ensemble, Brooklyn, NY, 1994, https://monoskop.org/images/d/df/Critical_Art_Ensemble_Electronic_Civil_Disobedience_and_Other_ Unpopular_Ideas.pdf (2020. 11. 20.)

Critical Arts Ensemble: *The Electronic Disturbance*, Brooklyn, Ny, Autonomedia and Critical Art Ensemble, 1994, http://critical-art.net/books/ted/

Dammbeck, Lutz, *Das Netz,* documentary film, producer: Lutz Dammbeck, 2003.

DC Radical Tech Collective, *An Anarchist's Guide to Free Software,* 2009 https://we.riseup.net/rtc/an-anarchist-s-guide-to-free-software+34940 (2020. 11. 20.)

Debord, Guy, *The Society of the Spectacle,* translation by Ken Knabb, February 2009, at theanarchistlibrary.org http://theanarchistlibrary.org/library/guy-debord-the-society-of-the-spectacle (2020. 11. 20.)

Erić, Zoran, *Personal Space – Public Body,* http://artefact.mi2.hr/_a01/lang_en/art_ostojic_en.htm (2020. 11. 12.)

Farr, Roger, Poetic License: Hugo Ball, the Anarchist Avant-garde, and Us = *A Creative Passion: Anarchism and Culture,* ed. Jeff Shantz, Cambridge, Cambridge Scholars Publishing, 2010.

Fuller, Matthew, The Expressiveness of Insubordination = *The Hartware Guide to IRATIONAL,* Frankfurt am Main, Revolver, 2006.

Gerritzen, Mieke et al., *From DADA TO DATA,* Breda, MOTI, Museum of the Image (MOTI Visual Culture Paper Special Edition), 2016/2017. https://miekegerritzen.com/from-dada-to-data/ (2021.02.13)

Gleisner, Jacquelyn, *Paolo Cirio's Lovely Faces,* https://magazine.art21.org/2013/08/12/new-kids-on-the-block-paolo-cirios-lovely-faces/ (2020. 11. 20.)

Graham, Paul, *Hackers and Painters: Big Ideas from the Computer Age,* Sebastopol, CA, O'Reilly, 2004.

Hagen, Wolfgang, The Style of Sources: Remarks on the Theory and History of Programming Languages = *New Media, Old Media: A History and Theory Reader,* eds. Wendy Hui Kyong Chun, Thomas Keenan, New York, NY, Routledge, 2006.

Haiven, Max, *Crises of Imagination, Crises of Power: Capitalism, Creativity and the Commons,* London, Zed Books, 2014.

Hamilton, Andrew: *Brains that Click, Popular Mechanics,* March 1949, https://archive.org/details/PopularMechanics1949/Popular_Mechanics_03_1949/page/n91/mode/2up (2020.11.12)

Haraway, Donna J, The Cyborg Manifesto = *The Cybercultures Reader,* eds. David Bell, Barbara M. Kennedy, London, Routledge, 2000.

Himanen, Pekka, Castells, Manuel, Torvalds, Linus, *The Hacker Ethic, and the Spirit of the Information Age,* New York, NY, Random House Trade Paperbacks, 2001.

Holmes, Brian, *The Flexible Personality: for a New Cultural Critique,* Nettime Mailing List, January 2002, http://amsterdam.nettime.org/Lists-Archives/nettime-l-0201/msg00013.html

Holmes, Brian, *Escape the Overcode: Activist Art in the Control Society,* Paris, Van Abbemuseum, Public Research vol. 2, 2009.

Jones, Bryan L., The Punks of Pirate Bay: An Anarcho-Analysis of File-sharing Websites = *A Creative Passion: Anarchism and Culture,* ed. Jeff Shantz, Cambridge, Cambridge Scholars Publishing, 2010.

Jordan, Tim, Taylor, Paul A., *A sociology of hackers*, The Sociological Review, vol. 46, no. 4, 1998, 757-780.

Jordan, Tim, Taylor, Paul A., *Hacktivism and Cyberwars: Rebels with a Cause?,* London, Routledge, 2004.

Jordan, Tim, *Activism! Direct Action, Hacktivism, and the Future of Society,* London, Reaktion books, 2002.

Jordan, Tim, *Hacking: Digital Media and Technological Determinism,* Cambridge, Polity, 2008.

Kaczynski, Theodore John, AKA Unabomber, *Industrial Society and Its Future*, manifesto, newspaper article in *The New York Times and The Washington Post,* 1995, https://archive.nytimes.com/www.nytimes.com/library/national/unabom-manifesto-1.html, (2021.02.13)

Kappanyos, András, *Tánc az élen. Ötletek az avantgárdról* [Dancing on the Cutting Edge: Ideas on the Avant-Garde], Budapest, Balassi, 2008.

Kirkpatrick, Graeme, *Critical Technology: A Social Theory of Personal Computing,* Farnham, Ashgate Publishing, 2004.

Kluitenberg, Erik, *Legacies of Tactical Media, The Tactics of Occupation: From Tompkins Square to Tahrir,* Amsterdam, Institute of Network Cultures, 2011, (Network Notebooks 5), https://issuu.com/instituteofnetworkcultures/docs/legacies.

Krauss, Rosalind, *The Originality of the Avant-Garde and Other Modern Myths,* Cambridge, MA, MIT Press, 1986.

Lapsley, Phil, Wozniak, Steve, *Exploding the Phone: The Untold Story of the Teenagers and Outlaws Who Hacked Ma Bell,* New York (NY), Grove Press, 2013.

Leighten, Patricia, *The Liberation of Painting: Modernism and Anarchism in Avant-Guerre Paris,* Chicago, IL, University of Chicago Press, 2013.

Levy, Steven, *Hackers, Heroes of the Computer Revolution* – 25th Anniversary Edition, Sebastopol, CA, O'Reilly, 2010.

Licklider, J. C. R. IRE, *Man-Computer Symbiosis*, Transactions on Human Factors in Electronics, HFE-1:4–11, March 1960.

Lovink, Geert, *Dark Fiber: Tracking Critical Internet Culture,* Cambridge, London, MIT Press, 2002.

Matić, Veran, Civil Networking in a Hostile Environment: Experiences in the Former Yugoslavia = *Shaping the Network Society: The New Role of Civil Society in Cyberspace,* eds. Douglas Schuler, Peter Day, Cambridge, MA, MIT Press, 2004.

Maxigas, Hacklabs and hackerspaces: Tracing two Genealogies, *Journal of Peer Production,* http://peerproduction.net/issues/issue-2/peer-reviewed-papers/hacklabs-and-hackerspaces/ (2020. 11. 12.)

Maxigas, *This is r0ket Science! Modernity, Capitalism and Liberalism in Hacker Culture,* MA dissertation, Central European University, Budapest, 2012.

Maxigas, *Writing Against the Grain: Keep Empirical Political,* lecture at the Hackademia, Lüneburg Summer School For Digital Cultures, Leuphana Universität of Lüneburg, Lüneburg, 2016.

Mediengruppe Bitnik, *Ecstasy 10x yellow Twitter 120mg Mdma, Shipped from Germany for 0.1412554 Bitcoins.* conference presentation, Chaos Communication Congress 34C3, Leipzig (DE), December 2017 https://media.ccc.de/v/34c3-9278-ecstasy_10x_yellow_twitter_120mg_mdma (2020. 11. 12.)

Mediengruppe Bitnik, *Hacking as Artistic Practice,* conference presentation, Chaos Communication Congress 30C3, https://media.ccc.de/v/30C3_-_5425_-_en_-_saal_6_-_201312281900_-_hacking_as_artistic_practice_-_mediengruppe_bitnik_-_mediengruppe_bitnik (2020. 11. 12.)

Mitnick, Kevin, Simon, William L., *The Art of Intrusion: The Real Stories Behind the Intruders and Deceivers,* London, Wiley, 2005.

Molesworth, Helen, *From Dada to Neo-Dada and Back Again*, October, no. 105, 2003, https://www.mitpressjournals.org/toc/octo/-/105 (2020. 11. 12.)

Moody, Glyn, *Rebel Code: Linux and the Open Source Revolution,* Cambridge, MA, Perseus Publishing, 2001.

Nakamura, Lisa, *Indigenous Circuits*, American Quarterly, Vol. 66, No 4, December 2014.

Oliver, Julian, Savičić, Gordan, Vasiliev, Danja, *The Critical Engineering Manifesto,* http://criticalengineering.org, Berlin, 2011. (2020. 11. 12.)

Ostojić, Tanja, *Integration Impossible? The Politics of Migration in the Artwork of Tanja Ostojić,* https://tanjaostojicshop.wordpress.com/2015/06/24/integration-impossible-the-politics-of-migration-in-the-artwork-of-tanja-ostojic/ (2020. 11. 12.)

Plant, Sadie, *Zeros + Ones: Digital Women and the New Technoculture,* London, Fourth Estate, 1998.

Popescu, Xandra, *Interview: Tanja Ostojić: The Eurosceptic,* Berlin Art Link. http://www.berlinartlink.com/2013/12/10/interview-tanja-ostojic-the-eurosceptic/ (2020. 11. 12.)

Raymond, Eric S. (ed.), *The Jargon File The New Hacker's Dictionary,* third edition, Cambridge, MA, MIT Press, 1996. http://www.catb.org/jargon/html/ (2020. 11. 12.)

Raymond, Erik S., *A Brief History of Hackerdom,* 2000, http://www.catb.org/esr/writings/homesteading/hacker-history/ (2020. 11. 12.)

Raymond, Eric S. : *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*, Sebastopol, CA, O'Reilly Media, 2001.

Samuel, Alexandra Whitney, *Hacktivism and the Future of Political Participation,* PhD dissertation, Harvard University, Cambridge, MA, 2004.

Schneider, Florian, *Reverse Authentification,* http://www2.tate.org.uk/intermediaart/entry15468.shtm (2020. 11. 12.)

Schulte-Sasse, Jochen, Foreword = Peter Bürger, *The Theory of the Avant-Garde,* transl. Michael Shaw, Minneapolis, Manchester University Press, University of Minnesota Press, 1984 (Theory and History of Literature, vol. 4).

Sípos, Regina, *The Critical Making Movement,* presentation at the 2018 Chaos Communication Congress, Leipzig, December 2018, https://media.ccc.de/v/35c3-9971-the_critical_making_movement

Sollfrank, Cornelia, *Female Extension,* ArtWarez, https://artwarez.org/femext/content/femextEN.html (2020. 11. 12.)

Sollfrank, Cornelia, (ed), *The Beautiful Warriors: Technofeminist Praxis in the Twenty-First Century*, Brooklyn, NY Minor Compositions, Autonomedia, 2020.

Sollfrank, Cornelia, *Women Hackers: A Report from the Mission to Locate Subversive Women on the Net,* Rotterdam, 1999 http://hacker.textfiles.com/papers/sollfrankhackers.html

Stallman, Richard, *On Hacking,* https://stallman.org/articles/on-hacking.html (2020. 11. 12.)

Sterling, Bruce, *The Hacker Crackdown, Law and Disorder on the Electronic Frontier,* digital edition, 1992, https://www.mit.edu/hacker/hacker.html. (2020. 11. 12.)

Szegedy-Maszák, Zoltán, dr., *Művészet mint kutatás: Experimentalizmus a médiaművészetben* [Art as Research: Experimentalism in Media Art], Budapest, MKE/MTA/C3, 2006 (művészet mint kutatás).

Taylor, Paul A., *Hackers: Crime in the Digital Sublime,* London, Routledge, 1999.

Turner, Fred, *Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism,* Chicago, IL, The University of Chicago Press, 2006.

Wark, McKenzie, *A Hacker Manifesto,* Cambridge, MA, Harvard University Press, 2004.

Wasiak, Patryk, *'Illegal Guys': A History of Digital Subcultures in Europe during the 1980s,* Zeithistorische Forschungen / Studies in Contemporary History, 2012, vol. 9, http://www.zeithistorische-forschungen.de/2-2012/id=4746 (2020. 11. 12.)

Zandbergen, Dorien, *New Edge: Technology and Spirituality in the San Francisco Bay Area,* PhD dissertation, Leiden, University of Leiden, 2011.

Juli Laczkó

WEBMACHINE

My dissertation briefly touches upon the problem of gender stereotypes in the history of computing and in hacker culture in the sub-chapter entitled *The Boys and their Toys*. In her book *Zeros + Ones*[352], Sadie Plant describes how the underpaid, monotonous work of computing is carried out by women, in the same way as happened historically in the weaving industry. Lev Manovich, meanwhile, in the book entitled *What is New Media*[353], associates the birth of new media with the intertwining of two previously separate threads of history: Jacquard's loom and Babbage's analytical engine. These, in Manovich's work, are defined as the two most important inventions of industrialization, the former in the category of the 'media machine', the latter in that of the 'calculating machine'. He dates the birth of new media to when the two types of machine were merged together, which represented the birth of digital computers capable of calculating images.

The traditionally underpaid and undervalued work of women has made, and continues to make, an enduring contribution to the development and operation of digital technology. Weaving, which is one of the most ancient forms of the cultural coding of images, also hands down a cultural legacy in its production methodology, as well as in its visual appearance. The case with computers is similar, as stereotypes are encoded in the methodology of creating and operating them. The aim of Webmachine is to unravel and rethread these stereotypes that are recreated by means of coding, by taking apart the interface and reassembling it in a new way, thereby raising the possibility of a potential parallel machine architecture.

352 Sadie Plant, *Zeros + Ones: Digital Women and the New Technoculture,* London, Fourth Estate, 1998.

353 Lev Manovich, What is New Media? = *The Language of New Media*. Cambridge, MA, MIT Press, 2002.

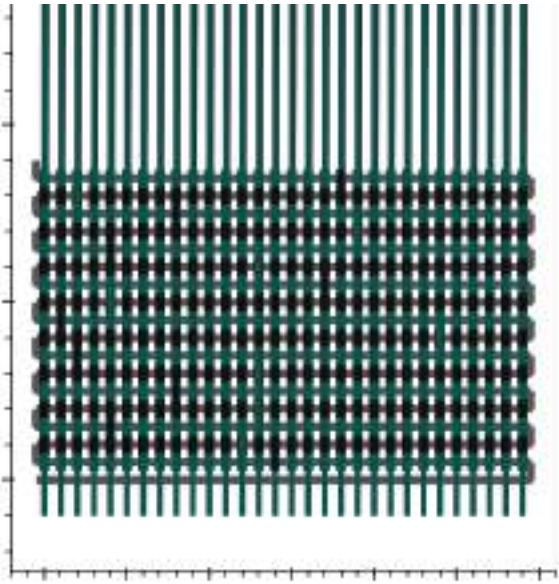
The Webmachine is an imaginary, digital, new media contraption, which translates binary code into visual code, following the logic of Jacquard's loom. How would things have turned out if computers had not only been operated by women, but also invented by them? What kind of interfaces would we be using in the twenty-first century if not men, but women, had been in the decisive majority of decision-making positions when designing the architecture and protocols of computers?

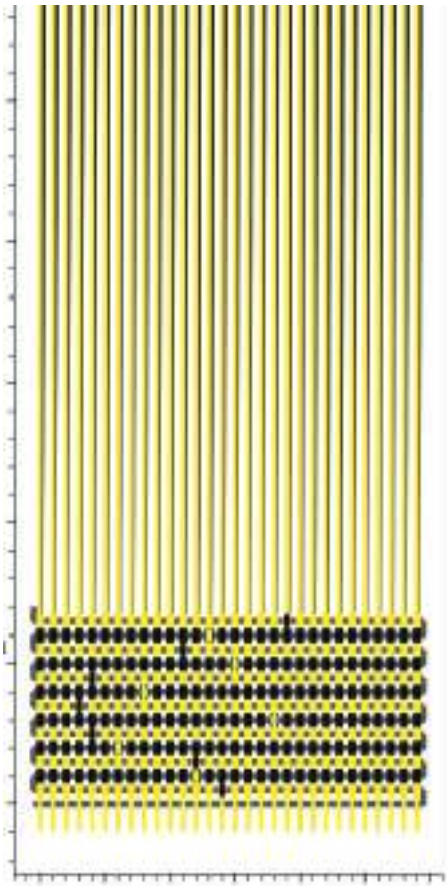
First of all, I produced a simulation of a simple tabletop loom in the bokeh library of the python programming language, for which I then devised an encoder based on a logic similar to that of Jacquard's punched cards, which builds the twenty-six letters of the English alphabet, and the space, into the pattern of the weaving. Just as in a real Jacquard fabric, here too, the pattern is generated by controlling the upper and lower position of the warp threads. Whenever a character is entered, a new row of the weaving is created – recalling the function of each punched card in an industrial loom. Visitors to the web-based project can interact with it via their keyboard, and the application codes the typed text into weaving. The ensuing text-weaving can be saved by the user as an image. The python application runs on a raspberry server in Calafou, Catalonia, and connects to the World Wide Web with the help of a pagekite host.

Webmachine was published as part of the 2020 exhibition *Digital Power: Activism, Advocacy and the Influence of Women Online*. Digital Power is traditionally an online exhibition, held annually under the auspices of the Siggraph conference in Washington.

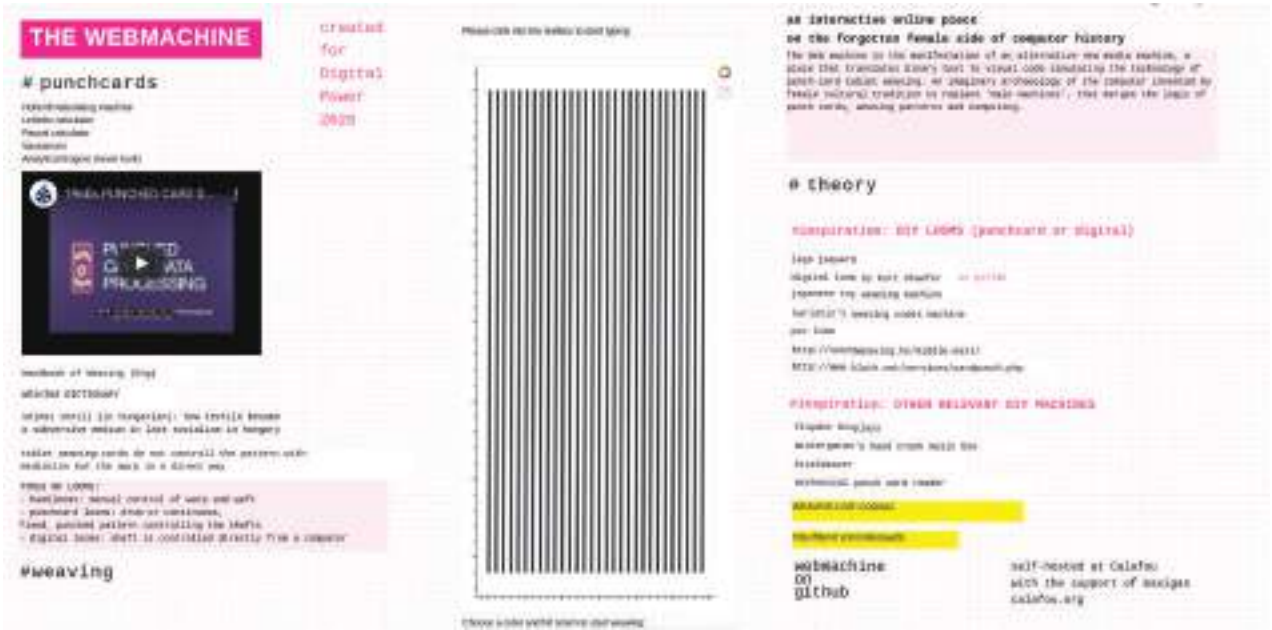
The 2020 Digital Power homepage:
https://digital-power.siggraph.org/
The Webmachine homepage:
https://julila.hotglue.me/webmachine/

Images of the application





Images of the website in which the application is embedded, where I collected similar analogue and digital initiatives and the most important literature



'The computer was always a simulation of weaving; threads of ones and zeros riding the carpets and simulating silk screens in the perpetual motions of cyberspace. It joins women on and as the interface between man and matter, identity and difference, zee and zero, the actual and the virtual. An interface which is taking off on its own: no longer the void, the gap, or the absence, the veils are already cybernetic.'

SADIE PLANT: WOMEN AND CYBERNETICS

Recognising the structural similarities between writing and weaving, it translates from the visual to the textual by utilising syntactic and grammatical rules. Verbs are likened to woven structures, nouns and adjectives to wires, prepositions to interlinking threads and other qualities of language into respective aspects of textiles. Capone examines the poetics of weaving traditions through historical research as well as contemporary practices. Attempting to dismantle and rebuild commonplace understandings of the history of writing, weaving language focuses on fiber-based forms as a long-standing but often overlooked medium for record keeping, storytelling, and poetry.

'New media represents a convergence of two separate historical trajectories: computing and media technologies. (…) The synthesis of these two historical 'the translation of all existing media into numerical data accessible through computers. The result is new media – graphics, moving images, sounds, shapes, spaces, and texts that have become computable. That is, they comprise simply another set of computer data. (…) Interestingly, Babbage borrowed the idea of using punch cards to store information from an earlier programmable machine. Around 1800, J. M. Jacquard invented a loom that was automatically controlled by punched paper cards. The loom was used to weave intricate figurative images, including Jacquard's portrait. This specialized graphics computer, so to speak, inspired Babbage in his work on the Analytical Engine, a general computer for numerical calculations. As ada augusta, Babbage's supporter and the first computer programmer, put it, 'The Analytical Engine weaves algebraical patterns just as the Jacquard loom weaves flowers and leaves.'

Manovich: The Language of New Media, Introduction

'The Web Machine' investigates cultural structures, such as understandings of computing whose importance is underrated. From scientists and programmers to indigenous communities, female contributions to the formation of the technologies of the information society remain largely unheard. In the process of researching hacker cultures relating to new media, I have noticed a 'pattern' in a pattern of a male academic praising a male inventor, thanks to my own personal experience of mother-to-daughter knowledge transfer!

Lev Manovich's concept of new media traces the trajectories of computing machines and media machines merging into a single multipurpose binary system in this process. He fails to mention a 'media machine' much prior to Jacquard's loom, noting the same operational method: tablet weaving, a nomadic, sand-loom technique known since 4th century BC in the region what Europe is today. Tablet weaving does operate with punch cards to define patterns. I began to have learned this technique and the related binary pattern design process as a kid.

The Web Machine is the concept of an interactive new media machine, a piece that translates binary text to visual code using the technology of punch-card tablet weaving, an imaginary archaeology of the computer informed by female cultural tradition to replace 'male machines', that merges the logic of punch cards, weaving patterns and computing. In order to create the artwork, I will use a table loom as a starting point, and modify its production method. I plan to work with a micro-controller and use the free audiovisual interaction software pure data to complete the work.

Part of my inspiration to create the Web Machine piece is a continued interest in media archaeology: another part is feminist, dedicated to voice her-stories. Two another one is technological: is it possible to build a mechanical-electric media machine with the help of all new media available? How does media translate to binary when simplified to the minimal, to the physical?

Once we acknowledge that weaving and programming are part of the same technological timeline, we can begin to look at the history of weaving as a eight thousand year long tale of human relationship with digital technologies — and use this long view to research new approaches to software engineering, a field with a much less developed history and many interesting problems to solve.

http://www.sheful.org/docs/blog/tag/tablet-weaving/

The application code (Prior to comments #)

https://github.com/JulianaRW/webmachine/blob/master/webmachine.py

```
from typing import Optional, Any
import numpy as np
from bokeh.plotting import figure, curdoc
from bokeh.layouts import column
from bokeh.models import TextInput, ColorPicker, Text


# set a stage and general properties
p = figure(plot_width=400, plot_height=800, tools='save')
linewidth=3.5 # warp and weft properties
a = 0 # top position warpA
b = 1 # top left position warpB
b2 = -1 # top right position warpB
color_picker = ColorPicker(color="#f666f0", title="Choose a color and hit return to start weaving:", width=400)
black= "#000000"
warpdefault0 = -2 # warp position on y axis, low end
warpdefault1 = 60 # warp position on y axis, high end
Y0A = -1.5 # the number of lines already woven
Y1A =Y0A + 1.5 # pattern position
Y0B = -2.5 # pattern position
Y1B =Y0B + 1.5 # pattern position
weft1=-2
weft2=118
n=1 # n should be the number of times that weft y has changed
zen=1
p.xgrid.grid_line_color = None
p.ygrid.grid_line_color = None
p.yaxis.major_label_text_color = None
p.xaxis.major_label_text_color = None


def setcolor(attr, old, new): # initial color setting
    color_picker.visible = False
    warpA = p.segment(x0=range(0, 120, 4), y0=[warpdefault0] * 60, x1=range(a, (a + 120), 4), y1=[warpdefault1] * 60,
                      color=color_picker.color, line_width=linewidth)


color_picker.on_change('color', setcolor) # trigger initial color setting
```

```
# MAIN WARPS normal and alternating position + tiny lower warp part visible
warpB = p.segment(x0=range(0, 120, 4), y0=[warpdefault0] * 60, x1=range(b, (b + 120), 4), y1=[warpdefault1] * 60, color=black, line_width=linewidth)
warpB2 = p.segment(x0=range(0, 120, 4), y0=[warpdefault0] * 60, x1=range(b2, (b2 + 120), 4), y1=[warpdefault1] * 60, color=black, line_width=linewidth)
WARPA = p.segment(x0=range(0, 120, 4), y0=[warpdefault0] * 60, x1=range(a, (a + 120), 4), y1=[warpdefault1] * 60, color=color_picker.color, line_width=linewidth)
warpB.visible =True
warpB2.visible = False
WARPA.visible = False


# colored lines already woven
def weave_pink(attr, old, new):
    global Y0A
    if Y0A < 56:
        Y0A += 2
        Y1A = Y0A + 1
        p.segment(x0=range(0, 120, 4), y0=[Y0A] * 60, x1=range(a, (a + 120), 4), y1=[Y1A] * 60, color=color_picker.color,
                  line_width=linewidth * 1.8)
    if n >= 56:
        return


# black lines already woven
def weave_black(attr, old, new):
    global Y0B
    global textbox
    if Y0B < 56:
        Y0B += 2
        Y1B =Y0B + 1
        if Y0B != -0.5:
            p.segment(x0=range(0, 120, 4), y0=[Y0B] * 60, x1=range(a, (a + 120), 4), y1=[Y1B] * 60, color=black,
                      line_width=linewidth * 1.8)
    if Y0B >= 56:
        textbox.title ='Your text_ile is done. Please save it with the floppy icon to your desktop'
        return


textbox =TextInput(value="", title='Please click into the textbox to start typing') # text input glyph


def weave(attr, old, new):
# black warps exchange visibility, weft moves up, weaving is created
    if warpB.visible:
        warpB.visible = False
        warpB2.visible =True
```

```
        weftmove2(attr, old, new)
        weave_black(attr, old, new)
        patterncolor(attr, old, new)
    else:
        warpB.visible = True
        warpB2.visible = False
        weftmove1(attr, old, new)
        weave_pink(attr, old, new)
        patternblack(attr, old, new)


def weftmove1(attr, old, new): # weft grows one line to the left
    global n
    if n < 60:
        n += 1
        p.step([weft2, weft1] * n, range((n-2), n), line_width=linewidth * 1.5, mode="after", color='#545454')
    if n >= 60:
        return


def weftmove2(attr, old, new): # weft grows one line to the right
    global n
    if n < 60:
        n += 1
        p.step([weft1, weft2] * n, range((n-2), n), line_width=linewidth * 1.5, mode="after", color='#545454')
    if n == 2:
        p.segment(x0=range(0, 120, 4), y0=[warpdefault0] * 60, x1=range(a, (a + 120), 4), y1=0.008 * 60, color=color_picker.color,
                  line_width=linewidth)
    if n >= 60:
        return


zeny = -1 # pattern parameter
zenx = 4 # pattern parameter


def update(attr, old, new):
# update weaving, pattern, limit input char range and initialize colored warp
    for char in textbox.value_input:
        print(ord(char))
    if ord(char) > 97 and ord(char) < 122 or ord(char) >= 44 and ord(char) <= 46:
        if WARPA.visible == False:
            WARPA.visible = True
            color_picker.visible = False
```

```
        thetrick(attr, old, new)
        weave(attr, old, new)
    else:
        return


def thetrick(attr, old, new): # create pattern according to char input
    for char in textbox.value_input:
        global zenx
        if char == ' ': zenx = 108
        elif char == '?': zenx = 112
        elif char == '.': zenx = 116
        elif char == ',': zenx = 0
        else: zenx = (ord(char)-97) * 4
        print(zenx)


def patterncolor(attr, old, new): # create pattern color
    global zeny
    global zenx
    if zeny < 56:
        zeny += 1
    p.oval(x=zenx, y=zeny, width=2, height=1, angle=0, color=color_picker.color)
    if n >= 56:
        return


def patternblack(attr, old, new): # create pattern black
    global zeny
    global zenx
    if zeny < 56:
        zeny += 1
    p.oval(x=zenx, y=zeny, width=2, height=1, angle=0, color=black)
    if n >= 56:
        return


textbox.on_change('value_input', update)
# each time a character hit, update is executed

curdoc().add_root(column(textbox, p, color_picker)) # Document setup

# Run it like this: bokeh serve --show webmachine.py OR on server: bokeh serve webmachine
```

Art as research

Publisher
The Hungarian University of Fine Arts
(1062 Budapest, Andrássy út 69–71.),
Balatonfüred Városért Közalapítvány
(8230 Balatonfüred, Szent István tér 1.)

Managing Publishers
Eszter Radák, Judit Molnár

Series Editor
Zoltán Szegedy-Maszák, Balázs Kicsiny

Editor
Zoltán Szegedy-Maszák

Design
Imre Lepsényi

Manuscript preparation and text management
Patrícia Kármen Burza (Seleris Project Bt.)

Translator
Steve Kane

English Proofreading:
Cc and Victoria Neumann

Pre-press
Krisztián Tóbiás (Seleris Project Bt.)

Printing
EPC Press, Budapest

ISBN 978-963-9990-95-1

HUNGARIAN UNIVERSITY OF FINE ARTS
DOCTORAL SCHOOL

Tempevölgy