# The Algorithmic Production of the Visual:Portrait Mode, Instagram and the Automation of Mobile Photography

Dzmitry Boichanka

**Abstract**
This paper examines the intersection between visual and software cultures, in which the software becomes responsible for the production of the visual content. The first part of the paper defines visual culture as a continuation of the classic capitalist mode of production which re-creates everything in terms of outputs but avoids reinvention of the means of production. The second part of the paper presents the analysis of the software culture and its ongoing trend to modify human practices with technological extensions which dramatically alters the means of production. The third part of the paper describes the consequences of the collision of the two cultures. In particular, we consider iPhone Portrait Mode as a consumer-oriented example of micro-automation which helps to valorize the mobile photography, and Instagram as a medium of the aesthetic visual communication which provides users with tools to edit photos with filters, mixture them into stories, furnish with metadata, and deploy to the global informational network.

# Introduction

The current discourse of software shifted from the analysis of how computers work and what they mean to the debates around the consequences of their implementation. There are three pressing and complementing issues: surveillance (Lyon, 2014), privacy (Andrejevic, 2007), cyber warfare (Carr, 2012) and automation (Frase, 2016). Among these issues, the latter is a subject of our investigation. In this respect academic opinions split. Some consider the increasing automaton as a significant threat (Ford, 2016), while others see it as the groundwork for future modernization (Schwab, 2017; Srnicek, Williams, 2015; Frase, 2016). In both reasonings, there is a common understanding that software is a technology with far-reaching implications. It rapidly automates human practices and threatens to dissolute the essentials of social organization workplaces. There is currently no substantial evidence that new professions will appear. However, in this context, it is necessary to the point that the phenomenon of automation is broader than just a subsequent industrial revolution and it builds on modest but significant developments. In particular, the software is responsible not only for the elimination of labor practices but also for the creation of new consumer practices. In this case, we consider mobile photography as a mode of visual culture production brought into existence thanks to algorithms.

## The micro-automation

The influence of automation on the development of mobile technologies is rarely a focal point of discussion. Instead, theorists consider the importance of mobilization as decentralization of social practices (Urry, 2013; Featherstone, 2014; Castells, 2010) either as a core process of capital production (a Marxist view on this topic). In the first case mobilization displaces and creates new practices, and in the second one, it electrifies the cyclical M-M exchange on the global scale. In those cases, mobilization is a description of the systematic relocation of given units in space and time which use technologies as carriers. However, in this analysis we need to perform what we may call 'a postmodern shift' which once turned critical theory upside down. It is about taking the repository of knowledge from the classical Marxist's socio-industrial analysis and proceeding with the analysis of the consumer sphere in which the presence of automation is less politically radiant but not less notable.

There are multiple examples of automation on the micro level, especially if one considers the sphere of consumer IT. For instance, the significant part of Apple's approach builds on the notion of automation. The motto 'It just works' presumes that a machine can handle actions independently and, therefore, is more useful. The vast amount of innovations that Apple or any other IT company present as improvements of user experience are, in fact, improvements of automation. For instance, these are spellchecking in Microsoft Word, real-time translation of PowerPoint, the ability of Siri to find appointments in letters, and every other function of voice assistants. The goal is usually to shorten the way between the initiation of the certain process and the result until it fully disappears in the 'black box' of algorithms. As we will show further, the mobile photography is the significant part of this trend. The reason for that is because the quality

of the image processing and its further life in the expanse of global networks strongly depends on the elimination of the redundant elements in this scheme.

## The structure of the paper

To approach the micro-automation of mobile photography, we need to define the intersection of cultures that make it possible. In doing so, we undertake the following approach: since the phenomenon of mobile photography includes the micro-automation of production and post-produce of photos, it is a result of the collision between the visual culture and the software culture. Consequently, the theoretical framework for the analysis should be built in the following way: after the brief description of what culture is (introduction to the Part 2), we proceed to the analysis of the essence of the visual culture and evolution of its production mechanisms (Part 2.1). Then we venture to identify of the general purpose of algorithms (Part 2.2). The third section of the paper represents the collision of the cultures: in the introduction, we describe what understanding of the algorithmic turn in the production of visual culture is available, and then we move to the particular cases of Portrait Mode and Instagram to show how they develop it further.

## Literature review: the visual and the software cultures

The visual and software cultures are two milestones in modernization that focus on the different aspects of it. Alexander Galloway described the software culture as a processual one: it is always ongoing (and frequently hidden) processes which blend user actions with automated algorithmic actions (2013: 23). On the opposite, the main innovations of the visual culture are about content. Although in this discourse we study the effects of 'the visual turn' of modernity, it is the content which makes it unique (Jay, 2002). Both cultures have a long history of development. For example, the visual one was there when a human eye captured the first information, and it was a Persian mathematician who invented the algorithm (Striphas, 2015: 403). However, their prime time took place in different historical periods: the visual culture became a revolutionary force with the appearance of TV and movies. Among other things, it retrospectively made 'invisible' aspects prominent for years. The visual culture became algorithmic with the appearance and distribution of personal computers that made Alan Turing inventions perennial and omnipresent. As both cultures show no signs of stagnation, their convergence is inevitable. Today it is not the visual culture which is novel, and it is not a standalone culture of algorithms that matters — it is the algorithmic production of the visual and the rapid convergence of two trends is what is essential.

Moreover, as the Silicon Valley aims to take on Hollywood with companies like Netflix, two cultures reinforce each other, and the boundary between them slowly disappears (Flint and Ramachandran, 2017).

## The definition of culture

One of the key definitions in both cases is culture. Here we will utilize the classic leftist definition which becomes the centerpiece of its discourse after the so-called 'cultural turn' which then serves as a construction site for the visual one and all further 'turns'.

Raymond Williams highlights the absolute and processual nature of the culture:

> "We use the word culture in these two senses: to mean a whole way of life — the common meanings; to mean the arts and learning — the special processes of discovery and creative effort" (1989: 93).

Williams argues that culture is a system of both physical and symbolical production which is both daily, omnipresent, and in the process of the constant development. In sum, it is something one may call a totality (Ibid: 93). What is important for critics is the way culture comes into being. It is not merely an objective process but a subject to capital with the goal of both an intensive an extensive economic expansion (Harvey, 2000; Baudrillard, 1993). The production of a cultural totality exists within a specified timeline, which is outlined by multiple milestones of innovation. As Marx himself pointed, the mechanisms of cultural production are historical, and at the same time are involved in a continuous process of development (Marx and Engels, 1970: 100). This statement is vital to our argument here — there are specific landmarks which Michel Foucault names 'disjunctions' which alter the continuous process of cultural development (1972: 1972). Here we will focus on a 'disjunctions' of visual and software cultures.

# The visual culture: the evolution of the spectacle

Here we are going to consider visual culture as a content revolution. By it, we mean that visual culture is a continuation of pre-industrial and industrial approaches of production, and it does not presume the reinvention of human practice. The appeal of the visual culture, of course, is vast and it fundamentally changes the way we recognize and interpret the world, but it still relies on human energy and the industrial automation of the manual labor; therefore, it inherits the classic capitalist problems. Thus, authors who established 'the visual culture studies' as a full-fledged academic paradigm have been using the sources from classical Marxism and its further evolution in neo-, post-, and psycho-Marxism paradigms. The main idea here is manipulation with a visual register, the denying of the objective teleology of the visual production, and implying the web of power relations orchestrates the entire visual culture (Baudrillard, 1998), which is very similar to the problems that happened before visual media became such a phenomenon. The culture is purposefully deceiving, and the primary task of a critic is to make the hidden mechanisms of manipulation visible.

## 1. The upgrade to the level of content

Guy Debord's (2014) obsession with the visual ontology of capital was the primary source of inspiration of this paper. Debord successfully combined the classic Marx's approach with the groundwork of Marx's intellectual followers (in particular, with the concepts of post- industrialism and the consumption society) and used them to criticize visual culture. Debord pointed out that the new importance for the visual is a new foundation for capital. He proclaims that the mechanisms of economic determination slip behind the curtains of the sublime world of modernity, and make the visual representation its primary source of influence. The rise of the visual culture from the establishment of photo, TV, and cinema as the new conventional forms of art and culture impacted every

possible layer of human subjectivity through the multi- dimensional world of capitalism towards our perception of such global events as wars. What is even more critical, he mentions not only the invention of new industries but the commodification of present as such: for him, every object of daily life in a certain sense is a compromised commodity. These features extend the traditional version of pathology according to which capital uses machines to exploit and complement human labor and cannot function without those elements. The spectacle is rather a mode of representation than the mode of production. Though it is directly responsible for the production of desires and obedience, which naturalizes the embedment of the surrounding technocracy, in its essence the practice stays in the pattern of mechanical mechanisms.

Instead of upgrading labor, visual culture complements and supplements the media that appeared earlier. Mirzoeff says that visual culture is complementary to the linguistic culture which precedes it:

> "While print culture is certainly not going to disappear, the fascination with the visual and its effects that was a key feature of modernism has engendered a postmodern culture that is at its most postmodern when it is visual" (2009: 6).

He also mentions that there is an intention to visualize what previously existed in the text form. It is what Jay David Bolter and Richard Grusin called remediation: the process of convergence when new media refurbish old media (1999). In this process, established but worn institutions are trying to maintain their actuality and stay on the market by transforming themselves according to new trends. Authors give an example of print media which underwent

a traumatic process of invention and now compete with the online blog culture. Essentially Mirzoeff highlights the shift from the text (of a novel or a newspaper) to a visual culture and connects it to a transition from modernism as a primarily linguistic culture to postmodernism as the central visual culture. However, both maintain its value and build into each other, and scale up to be a more significant trend of changes which we call late modernity and globalization. Mirzoeff says that cooperation between text and the picture increases the reliability of culture, and highlights the picture is a better narrative to the disjunctions and chaos of postmodern (2009, p. 7). By saying it, he indicates the emerging of new dialectical relation, between the picture and text, and the profound cumulative effect it produces.

## 2. The transformations of the spectacle

The first trend that manifests the coming changes in the process of production is the appearance of photo and video equipment. After a few economic shifts it became a commodity and flooded not only the service sector but a consumer culture which empowered individual practices as well (Sontag, 2010). Moreover, the photo camera and then video recorders did not principally change the role of technologies as an individual stayed as an operator of the equipment. In fact, the opposite happened: these new technologies created new skills and professions. From the contemporary point of view, a photo camera is a very peculiar case of automation. The mechanism which was sensational for the majority and mystical for painters has been producing jobs not eliminating them. Technically, the marvel of the visual culture starts here. The practice that the individual never possessed, the

duplication of particular moments with photos or capturing of movements on film created a content which use-value reinvented the entertainment industry. Subsequent power manipulations were profound: from the family portraits, through the advertisement and the experiments with propaganda, we moved to the culture of home videos that later mutated into blogs and vlogs.

Considering the fact, that the discursive legitimation of the visual culture, the so-called 'visual turn' belongs to the end of the previous millennium, and at this time the one could not ignore software, digits forked the discourse of the visual culture from the very beginning. Many aspects of the visual culture, in fact, were aspects of the digital visual culture. So, Mirzoeff frequently acknowledged the presence of algorithms considering that digital modification of pictures is an important research area. Also, Mark Poster claimed that the term 'visual studies' is important and it can be used in the certain contexts, but the main definition should be 'media studies' because it is more versatile and complex. In his opinion 'visual studies' is the result of unnecessary reductionism; and it is not the exclusively visual content we study but a hybrid content in which visual can play a dominant role but still interacts with other types of information. He stated that "With digitization, multimedia becomes the norm" (2002: 69).

## The software culture: the extension of the practice

The software culture began to show the signs of active development at the beginning of the 90th when, as Manuel Castells puts it, the proliferation of capitalism powered by computers broke all possible borders, and a new globe

was in the making (2010). The computer becomes the centerpiece of a western culture after business, and corporate sector successfully implemented it. The main innovation is software, which is a sum of algorithms that operate with 'data structures' according to Lev Manovich (2014: 197). Now, it is evolving, and the 'new globe' which Castells discussed two decades ago is ready for yet another prime time. Everything from a phone to a house is becoming a computer, and algorithms are taking more and more responsibilities (Greenfield, 2018). As Manuel Castells puts it, new technologies upgraded capitalism as the mode of production with informationalism as a new mode of development – it subordinates, upgrades and navigates the processes of production (2010: 14). The quest of software companies to appear everywhere is possible. As the well-known article by Marc Andreessen states, 'software is eating the world' (Andreessen, 2011). As it happened when a picture complemented a text, the reliability of culture, in general, is improved as algorithms solve many problems with connectivity in general and education in particular (Wegerif, 2004). It is also a subsequent leap of remediation. Quoting Bolter and Grusin, Mark Deuze says that this process is still a trend, and the content of old media continuously reappears in various forms of new media (2006: 66). He highlights the productive, mediatory, and complementary character of new technologies (Ibid).

The main difference between software culture and the visual culture is when it affects everything, it mainly focuses on *processes*. As a result, finally, labor is a sphere of intense transformations. As we mentioned earlier, in the collocation 'the visual culture' we add the adjective 'visual' to mark that the importance of a symbolic status of certain products. By it,

we discover and rediscover phenomena which appearance once was to the certain extent unimportant. In a similar manner, but targeting completely different aspects, we add the adjective 'software' to highlight not an evolution of products but a substitution of practices which is responsible for the creation of products. What is essential is, while having a visual representation, algorithms do not thrive on it and stay in the background. Debord said that the deceiving amalgamation of visual entertainment shields the economic technics, and now the particular parcel of these technics is the fusion of software and hardware.

For now, even if software fully automates specific activities, it remains social as it produces and organizes society, and, therefore, it is *a human extension* as Marshall McLuhan described it before the inception of informationalism (1994). However, the process of interaction between the user and an extension is complicated, and automation is only one part of it. Here, complementing McLuhan's theory with ideas of Galloway and Manovich, we suggest that software alters human practices in three ways:

1 - First of all, software demands the new type of actions. As Galloway states, a computer is not about ontology but ethics. A computer is not just interactive, it demands user actions. It automates actions only to produce additional actions (2013: 23). Unlike television, a computer does not operate on its own, and we cannot consider it as a structured flow of information as Williams once described TV (Williams, 2017). However, like TV, a computer is still the institution in the sense that it co-constitutes the social context it inhabits.

2 - Consequently, computer reshapes practices and becomes a new outline of social activity. As Raymond Williams put it, media is an applied technology as it profoundly changes mechanisms of social development (2017: 17). The necessity to utilize not physical materials but numeric forms, and exchange them serves as a basis for the new abstract labor (Hardt and Negri, 2006: 292). For instance, Manovich describes the utilization of a graphics editor as a guiding process, in which the user only gives commands to an application and overseas its performance (2016: 125).

3 - Thirdly, as a user only executes a guiding creative function, the software also automates. McLuhan proclaimed that extension means 'self-amputation' (1994: 45). He emphasized that the function of extension is not only to augment but to take away, and, in fact, we translate ourselves into new technologies (Ibid: 57).

In the industrial and pre-industrial era, we have seen a rise of the partial automatization in the sphere of production, but the results were far from the appearance of the fully automated factories. However, as modern researchers indicate, it was not a false but untimely prognosis as now more and more practices (and entire professions) may become fully automated, and it happens primarily not in production spheres, but everywhere human being presents, or already does not (Ford, 2016). The software is still not advanced enough to entirely replace the wage worker, but its supportive functions became invasive. After all, the full replacement is an official business goal (Ibid). For example, Foxconn, the most prominent manufacturer in China, plans to

replace almost entire human force with so-called 'Foxbots' (Statt, 2014).

So, the algorithm does not only provoke actions, extends or augments them, but it also automates them, and there is a connection between the upgrade and the deskilling. Metaphorically speaking, software expansion does not only inject the virtual element to the social practices in the physical environment, but it is also built on these practices. Software increases its value by decreasing the value of specific (mostly routine) human practices. What is essential in our case is that it does so with a production of the visual culture on the individual level. To be more precise, it alters how an individual takes photos, modifies and distributes them.

## Case study: the mobile photography as the intersection of two cultures

When the two cultures collide, the general process of convergence starts. It does not mean that we witness a process of substitution, and that visual culture will eventually cease to exist. It is the opposite, as software is responsible for the automation and enchanting the production of visual culture, the visual culture is becoming even more profound as software navigates, produces, orchestrates and delivers the visual content. Of course, the story of how algorithms participate in the production of contemporary visual culture deserves an entire book, but here we will stop only one of the most representative, individual, and in the same time subtle cases: it is mobile photography. At least two significant factors construct its value. First of all, it heavily relates to the implementation of algorithms, which

makes the process of production and postproduction of photos trivial, and, therefore, the second constitutive force appeared: mobile photography becomes a tool of the multitude.

## The algorithmic turn in photography

In 2011, William Uricchio introduced a collocation 'an algorithmic turn' in his eponymous article (2011). While he does not analyze mobile photography, his analysis in the article mostly refers to his experience of utilizing the camera which is enhanced by algorithms. This device was quite far from what we now call 'mobile,' but it also included everything to give an impression of what may come next. For its time, this camera represented severe technological advancements: it was digital, not analog, stored photographs on the SD card, and its functionality relied on the built-in software, which mattered for him most:

> "My argument, in a nutshell, is that over the past decade or so we have had increased access to new ways of representing and seeing the world, ways dependent on algorithmic interventions between the viewing subject and the object viewed" (Ibid, 2011: 25).

Then, he analyzed the Microsoft Photosynth which is an application for organizing photos, and it is what we can call post-production of the photography, and which of course is continuing the way algorithms determine our operations with visual content. Uricchio's description seems comprehensive and relevant, but six years since his analysis, the photography experience became even closer to a computer experience, which both means the augmentation and simplification of the technology.

In 2017, a prominent blogger within an Apple community John Gruber, commenting a John Paczkowski's piece for BuzzFeed about the camera of 2017 iPhone models, wrote:

> "As I wrote in my iPhone 8 review, in the old days, if you wanted better photos, you made better lenses and better film/sensors. With cameras small to fit in a phone, you need better software and better silicon." (2017)

It is mobile photography now, but the conceptual blueprint is the same. The particular difference here is Uricchio was concerned with an ability of algorithms to alter our understanding of a photo before and after it was taken, and today, algorithms are responsible for the way pictures are taken due to the importance of silicon which we will analyze later. While both notions are crucial, the new one seems more important: it is not pre-production or the post- production, but the situation in which software uses the power of silicon to replace physical lenses and its functions: *the production itself*. Moreover, it is a reason mobile photography becomes a number one photo practice today, and why it is so significant to study its impact. In 2011, developers used algorithms to improve the core experience of the professional cameras which were good enough even for shooting movies. At this period, we could recognize algorithms as additional selling points, the method to galvanize surplus value and boost profit margin (what analysts can identify as 'gimmick'). However, as we present further, with the rise of mobile photography the software stops to be a fashionable addition and becomes the predominant part of photography culture.

# Portrait Mode: the automation of the professional practice

The mobile photography has passed some critical milestones. The main reason of continuous advance development is a conflict between the physical capacity and the use-value: the smartphone's body is too small to carry a big camera module, which would provide a better quality of pictures, but camera quickly became the main selling point, and industry thrives for improvements. Once, the inserting of the photo-camera into a phone produced a new convergence and everyone who just wanted to make calls started to take photos, and then there was the idea to squeeze the maximum out of this innovation. Consequently, many companies struggled to reinvent mobile photography, and the idea took different shapes. For years there was an idea of 'cameraphone,' midrange of flagship device which ergonomic and design compromises we made to embed the larger camera module. Probably, the most notable case is Nokia's experiment that took place in 2013: the Finnish company released a smartphone Lumia 1020 with the 41-megapixel camera. Many IT companies used help from the professional designers of photo equipment: again, Nokia had a long-term partnership with the German company Carl Zeiss, which provided high-quality lenses for it, and Huawei has an ongoing collaboration with Leica for the same reason.

## 1. Apple's approach

In the race to fit the decent camera in a smartphone and to capitalize on the innovations of the mobile photography phenomenon, Apple introduced one of its key innovations. It is not that Apple was

solely responsible for the development of this market, but it created a blueprint for the further competition. Yet, from the very beginning, their intentions were not clear. Apple entered the smartphone game with the first model of iPhone which is equipped with, according to critics, a lackluster two-megapixel camera that was significantly worse than competitors' offerings, and it was rather a placeholder for future innovations. However, after three years of research and development, Apple made a case for the mobile photography. The first camera which signified companies' intention to reinvent mobile photography it delivered with iPhone 4 which had five-megapixel lens and flash. Since this time, the camera becomes a most recognizable feature of an Apple's phone and its promotion a significant part during annual keynotes.

What is essential in the Apples' strategy of iPhone is a pursuit of the idea that the algorithm can replace analog parts of professional DSLR devices. In this connection, the hardware specifications of iPhone camera received minor upgrades since the 2015 lineup. The only major one is an appearance of the dual camera with a 'telephoto' lens in iPhone 7 Plus model in 2016 (this title is in quotes as the representatives of the company name it this way, but experts are debating this title). However, if we take basic non-plus models, they carry almost the same 12-megapixel lenses as 6s. Meanwhile, the camera stayed in the center of Apple's marketing strategy and tests performed by third-party experts have shown a year by year increase in the quality of iPhone photos. The reason for it is that Apple delegated responsibilities for the image production to its software and hardware. First of all, they started to integrate more advanced versions of algorithms responsible for the photo processing in

each version of the iOS operating system. Secondly, the camera of the iPhone started to depend on the custom silicon: the company designed the specific chip responsible for taking photos. Apple called it Image Signal Processor (ISP), and when it first appeared with A5 chip, its function was to detect faces and tweak the white balance (Viticci, 2017). Since then, every year IPS takes more responsibilities, like noise reduction and face recognition, and companies' representatives positioned as a significant innovation. As a consequence, every new model of iPhone has a better camera performance but not a better camera lens, what, if we exclude the software from the equation, will seem like a paradox.

## 2. Portrait Mode

The example of how Apple treats and prioritizes standard lens equipment, algorithms, and its silicon is a feature named Portrait Mode. As we mentioned before, in iPhone 7 Plus Apple in addition to a standard wide-angle lens included an analog of the telephoto lens. With it, they introduced the Portrait Mode, which is, in fact, a replica of 'bokeh' effect of professional cameras. We must note that Apple does not position this mode as an alternative to 'bokeh', but these two functions are notoriously similar, which makes them identical for the majority of consumers.

In Japanese, 'bokeh' is 'blur', but the meaning of this word in a western culture is slightly different. By the word 'bokeh' photographers refer to *the quality of blurred background* which the photographer can achieve utilizing analog lens creates utilizing the fast lens and the large sensor. To achieve this effect, it is necessary to perform the sequence of the following

actions: (1) the photographer puts the object far from the background, (2) the photographer stays close to the object and points the camera on it, which puts the object into focus (to the depth of field), (3) photographer opens aperture, which allows more light to enter the objective. Usually, the open aperture will increase brightness, but as the photographer is close, it starts to modify background: it causes the interplay of light and objects which are out of the depth of field. This interplay we usually call blur, which qualitative characteristic is 'bokeh'. The quality of the blur, in this case, is a smoothness of blurred objects, the artful flashing out of the background which many end- users find fashionable.

However, in the case of Apple camera, it is not the result of a natural processing of lenses but *an 'effect.'* For this reason, various photo blogs quickly entitled this feature as 'fake bokeh'. The sequence of events is different: (1) the user puts an object in front of the camera, (2) the user selects the Portrait Mode in its camera application and then touches the button on the screen to take a photo, (2) each camera takes a photo, and as cameras stand close to each other, we get pictures from the slightly different angles, (3) using the difference between these photos the algorithm outlines borders of an object and its distance from the background, (4) the algorithm generates blur around the object. iPhone even saves two versions of a photo, with blur or without it. The effect is very similar to 'bokeh' but as the close examination shows, it is different.

However, for a general customer, the difference between an analog processing and the software effect is too narrow or merely absent, and for them, Portrait Mode is an innovation that will alter the way they think about selfies. In this case, algorithms help to simplify and commoditize the analog impact, which both makes the physical equipment and the practice of its utilization obsolete and reduces the necessity to use the service of professional photographers in the number of cases.

What is peculiar, since the Apple initiative did not stay unnoticed, other companies studied how to make 'blur' without the additional lens. In 2017, Google released a Pixel 2 phone which had only one camera but could imitate the same effect using only algorithms. Google took Apple's approach and pushed it even further. Now there is no sentiment for a professional photo world, just alienated and hooded actions of software. As analytics put it, Google replicated the analog effect in 'a fundamentally Google's way': it built algorithms with the help of its Big Data powerhouse. Unlike Apple, which strategy is to reduce the data operations in favor of security and privacy, Google heavily relies on the collecting and processing of harvested information, and actively studies the photos of its users what helps them to build more advanced algorithms (along with maintaining of their business model, of course). Google also included released Pixel Visual Core chip which is responsible for photo processing but avoided the addition of the second lens, making the function of the software-hardware unity even more crucial. As a consequence, in 2018 Apple additionally to the phones with two lenses, Apple released iPhone XR with one lens, which simulates the functions of the second lens with algorithms. In fact, in this case, Apple uses Google's modification of its strategy. Which approach will win in the end is unclear, but the question itself is not whether we will or will not use algorithms but whether we will or will not use additional lenses that supplement algorithms. What Apple and Google do is

the continuation of their strategy to take functions from institutions and give them to individuals, only in this case it wants to assure its users that some professional skills are redundant and it is time to take them for granted.

It is important to note that neither Apple iPhone nor Google Pixel capture better photos than professional DSLR or mirrorless cameras, and every professional test can prove it. However, it should not be a central point of discussion as the debates around quality, in this case, are misleading. There is a famous world in the IT discourse 'reinvention,' and it is precisely what IT giants are doing in this case: *they alter the photo culture by remaking or recreating it but with an aim to a simpler utilization which can appeal to a broader audience and help to sustain the profit growth.* In this case, the effect of Portrait Mode is similar to Uber or Airbnb disruptions: it is a decent but not perfect counterpart of what came before, but it is winning due to its convenient design, relatively low price, and practically absent learning curve. It is highly possible that the entire evolution of mobile photography in this sense is pretty straightforward and even primitive: IT companies may produce sensations by staying on the path of remaking professional practices into the automatic out-of-the-box features and relocating them into the smartphones, which are the most popular computation devices on the planet. 'Bokeh' effect takes place in the 'Camera' application where the buttons for general photography and panorama use to be for a while. This strategy will set new goals for companies, partially deskill professional photographers, and alter the way customers use their phones. In the end, we will end up in a culture where consumers will have access to more automated photographic skills than ever and will become a new norm. What is

for sure is not happening is a return of the giant cameras as the most popular photography devices.

What is also crucial, Apple intentionally conceals details of the 'bokeh' effect: the interface limits the user interference as possible allowing only to implement minor changes into the process of the photo capturing, and engineers do not comment on technical details. It happens both due to the habit of Apple not to detail its products' functionality (which as commonly believed improves the marketability of its products), and to keep its market secrets away from competitors. After the function dissolves in the interrelations between silicon and algorithms, the knowledge of how 'blur' comes into stopping being common, visible, and, what is possible in the not so distant future, even teachable. This closure highlights the critical notion about the power distribution in the age of algorithmically based spectacle. We can describe contemporary media as spreadable which means that they can be tools for users (Jenkins, Ford, Green, 2018). But the Cathedral model of development which successfully decreased the value of open computing (Raymond, 2010) still does not allow the user to take full control over the means of productions. The new stage of commodification produces extensions which can contribute to the development of the external mechanisms of transparency, but it stays an unfathomable object of consumption.

# Instagram: the automation of the postproduction of photos

After algorithms co-create a photo, the photo is modified and distributed with algorithms through networks. As Castells says, the network is the primary social logic of informationalism, the social structure that was going before and along with it, and then became a perfect social foundation when computers became its principal communication means (2010: 13). Therefore, the fact that object becomes a subject to the Xerox and Infinity in the oversaturated world of hyperreality (Baudrillard, 1993: 52), and then dives even deeper by going through the process of dematerialization and creation of digital doubles of everything physical, is only a part of the new narrative of it (Andrejevic, 2007: 308). The second one is a rapid creation and destruction of its symbolical value not thought the mass networking. In particular, the example of Instagram looks very important as this social network once promoted the photography as a primary type of content, meaning that the place of the photo is not on the heterogenous newsfeed of Facebook, where it competes with the text and stickers, but it can be the medium of communication. Unlike Pinterest, where any picture can become a message, the Instagram creators stated from the beginning that it is a social network that aims to fasten the production of photos, and what is even more critical, it thrives for algorithmic photo modifications.

## 1. Filters

Manovich says that Instagram is meant for "aesthetic visual communication" (Manovich, 2017: 11). By that, he means that the main content in Instagram is an altered photo which appearance recognized as a certain value for its recipients. First of all, it is an automated alteration of photography which makes Instagram such a phenomenon. From the beginning, one of the significant features of Instagram which contributed to the establishment of its aesthetic status and

became an industry standard due to its duplication by competitors, was an ability to modify photos with sample filters. The filter is a diversified amount of alterations which change the features of photography. Co-founder and CEO of Instagram, Kevin Systrom explains the functionality of filter the following way: "Our filters are a combination of effects – curve profiles, blending modes, color hues, etc. In fact, I usually create them in Photoshop before creating the algorithms to do them on the phone" (2011). Algorithms here help to automate alterations of photos and therefore allow them to become a more diversified form of content.

In this context, Manovich asks a very timely question: do the tools of Instagram reduce the individuality of photo (Manovich, 2017: 20)? As the filter performs color correction, it is unclear how many real-world colors can Instagram timeline reflect, and do not they endorse Instagram algorithms more than reflecting human experience as such? Doubtfully, these questions can have easy answers as in most cases the filter only complements but does not replace the original appearance. It also turns a photo into the brand signifier, making the original signified subtle, and putting the picture into the flow of now very similar artifacts. If Nike once conquered every frontier of branding and went as far as its clients started to voluntarily make a new habitat for 'swoosh' logos out of their bodies (Klein, 2000: 56), Instagram took into its possession the color mixing schemes. Instagram's success is hard to deny as it successfully increased the jargon: even if it is filters of competitors, users usually eagerly admit that it is an Instagram filters meaning not a particular company but a principle of algorithmic modification.



## 2. Mobile networking

For the purpose of making this color masquerade popular, it was necessary to develop Instagram for the devices that would facilitate the quick growth of the platform. The Instagram's success is *a result of the mobile platform capitalism of Apple and Google.* Therefore, changes were applied not only to the colors but the aspect ratio of a photo and utilization of data. First of all, it had to look natural on the vertically oriented screens which aspect ratio is from 2:3 (as it was on early iPhone models on which Instagram appeared first) to 18:9 (which is a trend since 2017). For this reason, Instagram's photo is square by default (but can be altered to vertical with portrait 4:5 aspect ratio, and horizontal 1.91:1) that allows users to see not only the photo itself but information about it and supportive elements as hashtags and description. Those are social ties which make a node out of a picture, that helps it to achieve what economists call *'a network effect':* to

receive likes and comments which may graduate both the photo and its author from the node to the center. Utilization of metadata also plays a huge role in the economic foundation of Instagram, its data-driven economy, which builds on the processing and selling of when-and-how of the photos, and, therefore, by commoditizing every user's input helps to keep the service free what, in its turn, attract even more free workers. We must note that mobile focus is so important that up to this day the functionality of a browser app that users supposed to use on laptops and desktops, is so limited that users cannot even upload photos with it.

### 3. Stories

As it usually happens at first modest ambitions that bring only limited functionality, Instagram evolved: they slowly extended its photo-filter fundament and became a setting for much complex social interactions. Developers enchanted Instagram experience further, organizing new activities around the main timeline of square modified photos conceptually and visually. Now, the service allows to share multiple images at the same time and share non-square photos. Then, they added the ability to stream live videos, and by it made the apparent fact that from the photo-first network they want Instagram to grow into the visual-first network. One of the last additions is Superzoom, the feature that captures selfies and then quickly resizing it by zooming on a user's face. However, the chief advancement is something they call 'stories' (and it is something they borrowed from Snapchat): a combination of pictures, photos, and graphic elements (both stories and live videos appear on a new horizontal bar on the top of the main timeline). With it, they introduced short loop video clips which allowed users to highlight specific actions and perform casual video editing.

We should pay attention to stories here as this feature widens our understanding

of the algorithmic production of the visual culture. In fact, it is Instagram's take on *editing:* it both concerns the structure of a photo itself, the plain or looped videos and its combinations with various symbols. What Instagram allows to do is to sequence modified photos and collages into the narratives. The key is still a square photo in the center of everything, but it now has an orchestration: it is now a foundation for a different form of expression that not only spatial but also temporal (which is similar to the way real photos once became for an annotated and decorated photo albums or movies). Developers are trying to recontextualize the photography and explore its potential roles further in a more diversified and hybridized forms. However, it still heavily relies on algorithms as it is mobile-first and aims to become as trivial as it can to achieve a high peak of a consumer market. As Apple Clips, it tries to put video editing process to a more straightforward interface and capitalize on the cool factor. Moreover, as in the case of mobile photography in general, what cannot fit the smartphone screen adequately either automated or severed.

### 4. Commoditization

If we take Instagram as an element of the human extension or as an extension itself, it does the same three things we mentioned in a previous section. First of all, Instagram creates new practices by provoking users to socialize more via modified photos and take a lot more pictures then they thought is necessary. Then, it also reshapes our understanding of what photo production is.

Thirdly, it, of course, automates, and, therefore, obsoletes many aspects of practices which were here before Instagram. It makes post-production of

photography algorithmic, individual, and commoditizing. The latter one is even more profound if we recognize the fact that Instagram's ecosystem closely integrated with brands which represent themselves in it, buying its data, and put on 3D-masks that allow users to impersonate famous characters. This way, it is the *new lifestyle politics* which paired with deskilling (which arguably is a dark side of what Mirzoeff named, 'comprehensible, quicker and more effective') and make us look at the production of visual culture in a new way. Of course, the strength of the word 'politics' here depends on the fact whether you want to recognize brand-powered activism as possible or valid or not.

## Conclusions

In this paper, we describe one of the many relations between the visual and software culture — the algorithmic enhancements to the mobile photography. The content-oriented approach to the expansion of visual culture finds in software culture an ally which provides enhancements to the process of production. The production of photos now utilized the power of hardware and software, which partially replaces the functions of lenses. Then there is software post-production, the template for which is Instagram, that automizes the editing process, an allows the photo to become a part of 'story' sequences. Visual social networks convert images into the centerpieces of networked social relationships which algorithms are attaching to the Big Data massive. In case of Portrait Mode, it is a transformation of professional practices into the consumer habits, which with certain quality compromises (which stay unknown to consumers) helps to significantly shorten the process of production and significantly valorize the output of production.

One of the most obvious conclusions from the elaborations we made here is a devaluation of a photo as a cultural object. We can limit ourselves by discussing exclusively the loss of 'aura' and initiation of the new stage of image commodification performed not by companies but by users themselves on behalf of companies, and by these means we enter the area of Walter Benjamin and Theodor W. Adorno (2001). This approach is justifiable in the following way. It is becoming even more challenging to cultivate photography culture when everyone can make, modify and share photos - something which is a global phenomenon can hardly be authentic - than what it used to be after Polaroid's approach. However, it is a point of discussion launched by Benjamin under his belief that the decline of authenticity is a positive trend. He proclaimed the devaluation of the image as a democratization of culture and said that by devaluing the uniqueness, we achieve the egalitarianism (Benjamin, 2008). This dualistic approach is appropriate one more time, as our situation is mostly a remake of the contradiction that Benjamin articulated but the sphere of application is a dividing photo culture, in which the old automation makes the new one looks false. We can interpret the algorithmic influence both as a mass-destruction of the analog value and a resurgence of the digital one. However, there is more to the photo after algorithmic production started to infiltrate the consumer area.

Either it is a death of photography or an endless afterlife, while we still remember that there was the world without Portrait Mode and Instagram, its status is now the reminiscence to the aliens' activity in 'Body Snatchers' or 'The Things' movies. A photo itself looks the same as it used to, but now it is a sum of digits which lives a circumvent life, where it continually moves through the cascades of algorithms, creates new connections and recruits new users for the social network of its origins. The same concerns the process of photo production but in this case, the visual representation of it is notably different, and we instead have a deal with what Paul Virilio entitled as an aesthetic of disappearance (2009) as once visible functions slip behind the curtain. The consumer photo now starts from the fact that algorithm hijacks the process of picture production and then follows it on the journey through networks of informational glocalization.

The central point here is a production which is born by the undeniable use-value of visual artifacts, and the vastly transforming machinery of automation is now banal: unlike a macro scale of automation which is growing global problem, micro-automation comes under the moniker "new features." As a result, such trends as visualization and ubiquitous implementation of software collide in a daily routine of culture. The algorithmic production and networking, which lead to a further trivialization of photography, are the main nexuses of the way visual culture comes into being and exists now. Due to the appearance of Big Data, they never cease to exist. In this current context, we lose the ability (or need) to handcraft by giving a particular parcel of our practices to machines which, if we get back to a classic Marxist definition, is a new foundation of a 'base.' Like Yochai Benkler says, users now have direct access to means of production which is not necessarily mediated by corporate power (2006: 14). Meanwhile, here is more: as new algorithms frequently stay incognito for general users, it is an automated and concealed background which actively complements the non-automated parts of the visual production.

# References

ADORNO, T. W., BENJAMIN, W. (2001). The complete correspondence, 1928-1940. Cambridge, MA: Harvard University Press.

ADORNO, T., & HORKHEIMER, M. (1997). Dialectic of Enlightenment. New York: Continuum International Publishing Group.

ANDREESSEN, M. (2011, August 20). Why Software Is Eating The World. The Wall Street Journal. Retrieved July 20, 2018, from https://www.wsj.com/articles/ SB10001424053111 903480904576512250915629460

ANDREJEVIC, M. (2007). Surveillance in the Digital Enclosure. The Communication Review, 10(4), 295-317.

BAUDRILLARD, J. (1993). Symbolic Exchange and Death (1st ed.). United Kingdom: SAGE Publications.

BAUDRILLARD, J. (1993). The transparency of evil: essays on extreme phenomena. New York: Analytical Psychology Club of San Francisco.

BAUDRILLARD, J. (1998). The consumer society: myths and structures. London: Sage Publications.

BENKLER, Y. (2006). The wealth of networks how social production transforms markets and freedom. New Haven: Yale University Press.

BENJAMIN, W. (2008). The Work of Art in the Age of Mechanical Reproduction. London: Penguin Books.

BOLTER, J., & GRUSIN, R. (1999). Remediation: Understanding new media. Cambridge, MA: MIT Press.

CASTELLS, M. (2010). The information age. Oxford, England: Wiley-Blackwell.

CARR, J. (2012). Inside Cyber Warfare: Mapping the Cyber Underworld. Beijing: OReilly.

DEBORD, G. 2014). Society of the spectacle. Berkley: Bureau Of Public Secrets.

DEUZE, M. (2006). Participation, Remediation, Bricolage: Considering Principal Components of a Digital Culture. The Information Society, 22(2), 63-75.

FEATHERSTONE, M. (2004). Automobilities. Theory, Culture & Society, 21(4-5), 1-24.

FRASE, P. (2016). Four futures: Life after capitalism. London: Verso.

FLINT, J., & RAMACHANDRAN, S. (2017, March 24). Netflix: The Monster That's Eating Hollywood. The Wall Street Journal. Retrieved July 20, 2018, from https://www.wsj.com/articles/netflix-the-monster-thats-eating-hollywood- 1490370059

FORD, M. (2016). Rise of the robots: Technology and the threat of a jobless future. New York: Basic Books.

FOUCAULT, M. (1972). The Archaeology of Knowledge. New York: Routledge. Galloway, A. (2007). Gaming. Essays on Algorithmic Culture. Minneapolis, Minn: University of Minnesota Press.

GALLOWAY, A. (2013). The interface effect. Cambridge, UK: Polity Press.

GREENFIELD, A. (2018). Radical technologies: The design of everyday life. London: Verso.

GRUBER, J. (2017, September 22). Behind the iPhone 8 and iPhone X Cameras. [Blog post]. Retrieved July 20, 2018, from https://daringfireball.net/linked/2017/09/22/behind-the- iphone-8-and-iphone-x- cameras

HARVEY, D. (2000). The condition of postmodernity. Cambridge, MA: Blackwell.

HARDT, M., & NEGRI, A. (2006). Empire. Cambridge, Mass.: Harvard University Press.

HORKHEIMER, M., ADORNO, T. (2002). Dialectic of Enlightenment (pp. 94-136). Stanford, Calif.: Stanford Univ. Press.

JAY, M. (2002). Cultural relativism and the visual turn. Journal Of Visual Culture, 1(3), 267-278.

JAY, M. (2002). That Visual Turn: The Advent of Visual Culture. Journal of Visual Culture,1(1), 87-92.

JENKINS, H., FORD, S., & GREEN, J. (2018). Spreadable media: Creating value and meaning in a networked culture. New York: New York University Press.

KLEIN, N. (2000). No logo: No space, no choice, no jobs. London: Flamingo. Lyon, D. (2014). Surveillance, Snowden, and Big Data: Capacities, consequences, critique. Big Data & Society, 1(2).

MANOVICH, L. (1997). Software takes command. New York: Bloomsbury.

MANOVICH, L. (2016). The Science of Culture? Social Computing, Digital Humanities, and Cultural Analytics. Journal Of Cultural Analytics. http://dx.doi.org/10.22148/16.004

MANOVICH, L. (2017). Instagram and Contemporary Image (1st ed.). Retrieved from http:// manovich.net/index.php/projects/instagram-and-contemporary-image.

MARX, K., & ENGELS, F. (1970). The German ideology. New York: International Publishers.

MCLUHAN, M. (1994). Understanding media. Cambridge: The MIT Press.

MIRZOEFF, N. (2009). An introduction to visual culture (2nd ed.). New York: Routledge.

POSTER, M. (2002). Visual studies as media studies. Journal Of Visual Culture, 1(1), 67- 70. http://dx.doi.org/10.1177/147041290200100106

SCHWAB, K. (2017). The fourth industrial revolution. New York: Crown Business.

SONTAG, S. (2010). On photography. New York: Picador.

SRNICEK, N., & Williams, A. (2015). Inventing the future: Folk politics and the left. London: Verso.

STATT, N. (2016, December 30). iPhone manufacturer Foxconn plans to replace almost every human worker with robots. The Verge. Retrieved July 20, 2018, from https:// www.theverge.com/2016/12/30/14128870/foxconn-robots-automation-apple- iphone-china- manufacturing

STRIPHAS, T. (2015). Algorithmic culture. European Journal Of Cultural Studies, 18(4-5), 395-412. http://dx.doi.org/10.1177/1367549415577392

SYSTROM, K. (2018, January 4). Our filters are a combination of effects – curve profiles, blending modes, color hues, etc. In fact, I usually create them in photoshop before creating the algorithms to do them on the phone. Quora. Reply. Retrieved August 31, 2018, from https://www.quora.com/What-do-the- different-image-filters-on-Path-Instagram-Oink-etc- actually-do

The Verge (2017, December 20). Camera shootout: iPhone X vs. Pixel 2 vs. Note 8 [Video file]. Retrieved July 21, 2018, from https://www.youtube.com/watch?v=RZBlqFOzzlw

URICCHIO, W. (2011). The algorithmic turn: Photosynth, augmented reality and the changing implications of the image. Visual Studies, 26(1), 25-35. http://dx.doi.org/10.1080/1472586x. 2011.548486

URRY, J. (2013). Mobilities. Cambridge: Polity Press.

VIRILIO, P. (2009). The Aesthetics of Disappearance. Cambridge; London: Zone Books.

VITICCI, F. (2017). Apple Announces iPhone 4S: A5, 8 MP Camera, 1080p Video Recording – Available October 14th. MacStories. Retrieved from https://www.macstories.net/news/ apple-announces-iphone-4s-a5-faster-graphics- same-iphone-4-design/

WEGERIF, R. (2004). The role of educational software as a support for teaching and learning conversations. Computers & Education, 43(1-2), 179-191.

WILLIAMS, R. (1989). Resources of Hope: Culture, Democracy, Socialism (1st ed., pp. 3-14). London: Verso.

WILLIAMS, R. (2002). Television: Technology and Cultural Form. London: Routledge.

WILLIAMS, R. (2017). Culture is ordinary. In A. Gray & J. McGuigan, Studying Culture. London: Hodder Arnold Publication.

## About the Author

**Prof. Dizmitry Boichanka**
(Europen Humanities University)

Dizmitry Boichanka teaching practices and writing outputs contribute to software studies. In his interpretation, it builds on the concepts of late Marxism. He analyzes trends of informational capitalism, which include but is not limited to contemporary practices of surveillance, the critic of neoliberalism, transformations of IT companies, and growing inequality in the global system.

**ORCID ID:** https://orcid.org/0000-0002-2048-2954