

Shifting Interfaces

An Anthology of Presence, Empathy,
and Agency in 21st-Century Media Arts

Hava Aldouby (ed.)



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and Agency in 21st-Century Media Arts

Edited by
Hava Aldouby

LEUVEN UNIVERSITY PRESS

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Natures Mortes, Live Data

The Art Object in the IoT Era

Tsila Hassine, Olga Kisseleva

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This chapter follows an exhibition project that is part research, part speculation, on the future of the art object in the era of the Internet of Things. In what follows we describe not only the exhibition itself, but the processes and sources of inspiration and research that fueled it and contributed to its inception.

Introduction

The story of mankind has been inscribed in its artifacts, long before the invention of writing and, subsequently, history. Our man-made objects have been recording and recounting the stories of culture over the centuries. How can our artefacts connect with us and recite the story of our present? McLuhan divides the evolution of communication and technology into three major periods, each defined by the impact of technology on history and culture. The first era, defined by oral communication, spans from the time humans acquired speech up until the beginning of writing, some 5,000 years later. This was followed by the age of literacy: from the invention of writing, and much later the printing press, up until the discovery of electricity and its subsequent use in long-distance communication with the first telegraph. The telegraph marks the beginning of the electric flow of information (McLuhan 1964). A hundred years after the telegraph, we have experienced several major advancements in electronic communication, the most obvious one being the Internet, and very recently the mobile phone. Nowadays, we're on the verge of another revolution (Rifkin 2015; Schwab, Davis 2016) where we go beyond human communication. We no longer use objects simply as means of communication; we actually start to communicate with the objects themselves.

Man-made objects are both historic documents and aesthetic entities. They are the physical manifestation of the thoughts and ideas of a culture. Every artefact (object

which is created, as opposed to object which is found) is an assemblage of materials, tools, knowledge, and machines (Caple 2012). Each man-made object is the convergence of cultural and economic factors as well as material properties. An object can be seen to have three forms of identity: a functional identity (the effect it has on the world), a symbolic identity (the meaning of the object and the role it has in cultural code), and a historical one (how objects encapsulate past experiences and carry ideas from the past to the present) (Caple 2006). For the purposes of this chapter we will focus on the object's symbolic identity.

The symbolic meaning of objects can be found in the way objects have been represented throughout history and across different cultures. Looking at art history, the representation of objects has come a long way since their very early depictions. Still life, one of the principal genres in Western art, is defined as a genre focusing on the depiction of inanimate objects for the sake of their qualities of form, color, texture, and composition (Encyclopaedia Britannica 2018). Still life is found across cultures that are diverse both historically and culturally. However, different periods of still life require different readings. Take for example *Xenia*, the Roman still life paintings found in the ruins of Pompeii, dated to about 500 BC. At a first glance, we see a category of still life resembling that of the later Dutch school: fruits, baskets of flowers, loaves of bread, etc. (Bryson 1990). Yet, despite the similarities in content, paintings of *Xenia* must be approached with different terms than paintings of the seventeenth century. Produced under different cultural conditions, the seemingly similar subject matter had different meanings for Roman viewers and for seventeenth-century Dutch audiences, and was encoded with different symbolic and semantic charges.

It was during the seventeenth and eighteenth centuries that representation of inanimate objects had become an autonomic genre. In Modern art, still life and the representation of objects were revisited and reinterpreted by the Impressionists, the Cubists, the Surrealists, and Pop artists, to give but a partial list. It is thus clear that the representation of objects has intrigued society across different eras. After all, objects are an inherent part of society, carrying with them the 'thoughts and ideas of a culture' (Bryson 1990, 20).

Only about 100 years after the 'electrification' of our objects (Moore and Simon 1999), and not even 30 years of Internet, our objects are about to join us on the web. In fact, after the World Wide Web and universal mobile accessibility, the Internet of Things represents the most potentially disruptive technological revolution in our lifetime. With 50 to 100 billion things expected to be connected to the Internet by 2020, we are now experiencing a paradigm shift in which everyday objects become smart and interconnected (Feki et al. 2013).

As we enter a new era of objects, old questions resurface and give rise to new ones; How would this new generation of objects represent the thoughts and ideas of the culture that created them? What symbolic and semantic identity will they have? What would be their new role in the society they are bound to transform? How would these objects be represented, or rather, since we are dealing with smart objects, would they represent themselves, and if so how? To answer these questions, we first need to understand this new transformation of objects, by indicating the cultural, social, and economic factors whose convergence allowed the rise of this new paradigm.

The Internet of Things: What Is It and What is it Good For?

The term Internet of Things (henceforth IoT) describes several technologies and research disciplines that enable the Internet to reach out into the real world of physical objects. Existing technologies like RFID (Radio Frequency Id), short-range wireless communications, real-time localization, and sensor networks are becoming increasingly pervasive, making the IoT a reality.

One definition of the IoT is: 'Things having identities and virtual personalities operating in smart spaces using intelligent interfaces to connect and communicate within social, environmental and user contexts' (Internet of Things 2020; RoadMap for the Future 2008). The term itself was originally coined in 1999 by Kevin Ashton, a manager at Procter & Gamble at the time, as the title of a PowerPoint presentation which was meant to attract the attention of business executives. In that presentation, Ashton proposed to integrate RFID chips into the inventory of a certain brand of lipstick which was perpetually out of stock due to holes in the data about that lipstick's supply chain (Cisco 2014). Kevin Ashton was then asked by MIT to start a group—the Auto-ID Center—which would research RFID technology. Since then, it has turned into a global organization.

The IoT, which originated as a solution to everyday problems of everyday objects, is bound to transform the way we think of our objects and relate to them. The advances in this field provide for increasingly active and autonomous artefacts. It will allow our everyday objects to attain agency and become relevant actors in the physical world, and thus influence everyday object-subject experience (Haiyan Jia et al. 2012). This technology will influence the very way we interact with one another and the way we relate to our environment, since these processes are very much determined by the technological resources that we have at hand.

The Current Economic and Social Context of the IoT

To understand some of the implications of connected objects, it is productive to look at the socio-economic conditions that contributed to the rise of the IoT. Although talk about the IoT has been around for a while, the actual materialization of this hyped technology has so far resulted in mostly gimmicky products: for example, a tweeting toaster that lets you roast twitter messages onto the toast's surface, or a connected oven that suggests a number of recipes or ingredients once you turn it on. Is this the disruptive cutting-edge technology that we have been anticipating?

The answer lies, in part, in the power of the network. A tweeting toaster, by itself, is not likely to change much. It becomes interesting only once it participates in a network of toasters that may actually be connected to a network of supermarkets, insurance companies, health providers, and so on. Imagine a toaster which is directly linked to your GP and your health insurer, alerting them every time you exceed your recommended daily intake of carbohydrates. This might result in an immediate increase in your health insurance payments, or even your GP remotely blocking the use of your toaster, or any other such seemingly absurd scenarios.

The concept of objects connecting through networks is not very new (Weiser 1991). For a few decades we have been surrounded by objects with computer chips embedded in them.¹ The evolution from merely embedded objects to objects that can also communicate with each other was only awaiting the right conditions. Moreover, prototypes for connected objects such as printers and coffee machines² have been around for dozens of years. Therefore, the inevitable question is why now?

A Convergence of Technological, Economic, and Social Factors

The timing of the emergence of IoT seems to stem from the convergence of several factors; The low cost of sensors and microprocessors; the growing availability of bandwidth (the abundance of communicating objects in each household requires a broad band); the availability of Wi-Fi (all these communicating objects cannot be connected online through wires); the IPv6 protocol (which assigns a specific IP address to each object individually); the cloud technology (which facilitates the online storage of data), and big data technology, to process all these data (Jankowski et al. 2014).

Still, all these technological factors need one important catalyst to make the IoT a household technology, and that is the habituated user. Most of us carry at all times the most effective extension of our central nervous system, to borrow McLuhan's terms: namely, our smartphones. The smartphone, no longer just a phone, is the hub of myr-

iad applications, all designed to achieve two objectives: constant connectivity and a constant information flow. In other words, we have grown addicted to being always connected, and to having all the information in the world at our disposal at all times (Forbes 2012). We are the catalyst, and we are ready to take the next step.

Connected objects are no longer simply objects designed to fulfill specific functions. The IoT transforms objects into services whose real value lies elsewhere (Kaplan 2012). Take the smart mattress, for example: this is a mattress fitted with sleep monitoring sensors (Urban Tastebud 2018), and it comes with its own designated app. Thus, the mattress is transformed into a service, providing 24/7 sleep monitoring and analysis of sleep-related data. The added value of the mattress—the sleep-related data—accumulates on some distant server, to which the user has only restricted access through the app. Another excellent example is the vacuum cleaner. From its humble beginning as an electric carpet sweeper in the nineteenth century, the early twenty-first-century vacuum cleaner has an autonomous vacuum cleaning robot. Recently, with the new addition of a web cam, it has also been turned into a home surveillance device. Thus, our relationship *to* objects is being transformed into a relationship *with* them.

This point is very well illustrated in the work of designer and researcher Simone Rebaudengo. In his video *Addictive Products* (2012), he describes a hypothetical network of seemingly ordinary toasters, connected to each other across London. They use the network to exchange personal experiences as home toasters, such as the position they occupy within their 'host' households and their relationships with their 'hosts' (note that the IoT toaster is no longer 'owned,' but 'hosted' for a duration of time dependent on both the human host and the toaster itself). This mockumentary-style video describes the IoT experience from the toaster's point of view. Rebaudengo augmented the toasters with personalities, needs, fears, goals, and even developed a toaster-adapted language to facilitate interaction with their human hosts.

Still Life and the IOT

Objects and their stories have not always been the focus of attention in the history of painting. In the history of Western art, objects began to occupy a central role relatively late.³ As noted earlier, these objects, which until the sixteenth century appeared only in the margins of most paintings, moved to the center of the canvas during the sixteenth and seventeenth centuries in the newly formed genre of still life. This shift can be explained by the increasing urbanization of European society, a society that started to turn its attention to its housing, material goods, trade, and knowledge.

Svetlana Alpers (1984) describes how Dutch art embodied a truly visual culture. Dutch visual culture served and energized a system of values in which meanings were not 'read' but 'seen' and new knowledge was visually recorded.⁴ For the Dutch, images were the arena in which they represented themselves to themselves. In Holland during that period, images proliferated everywhere, beyond the limitations of what might have been considered 'art' at that time. Images were printed in books, woven into home textiles, and printed onto tiles (Alpers 1984).

Alpers establishes a link between the technological innovations of that period, mainly in the field of optics, and the interest in representing the effect and impact of these new technologies of vision in Dutch painting of that time. She describes both the scientific and artistic interest in light reflections on everyday objects such as glasses and textiles. The dishes, fabrics, and other objects represented in these paintings are taken out of their ordinary context to be placed at the center of attention, analysis, and contemplation. To prove her point, Alpers presents the influence of contemporary seventeenth-century images on the work of Constantijn Huyghens, a seventeenth-century Dutch physicist, mathematician, astronomer, and inventor who made great contributions to the field of optics. In his account of his own scientific work, Huyghens associates images with sight and seeing, focusing on the new knowledge made available through lenses—the latest technology of that period. Seventeenth-century Dutch art provides an excellent example of the way a new technology transforms our relationship with objects, and the way it is represented in the artefacts of that period. Moreover, in seventeenth-century Holland objects had transformed beyond their original function. They acquired a meaning that bound them to the socio-economical context of that period, attesting to the wealth of their owners. The value of those objects lies in the story that they tell about their owner. In other words, their value lies in the data they convey.

Just as the Dutch were fascinated by the new understanding and representation of their daily environment through the new optical technology, so are we fascinated by the new possibilities of interaction with our communicating objects. We imagine new contexts for our objects, placing them at the center of our attention and seeing them in a new light. Furthermore, the IoT shifts the focus with regard to human presence, moving it from center stage to the background. Much as still life is characterized by its 'exclusion of the human form and its seeming assault on the value and prestige of the human subject' (Bryson 1990, 60),⁵ IoT makes human presence and actions redundant, as clearly illustrated by autonomous cars. Where once there was a human driver, her presence, or even remote control, are no longer necessary.

Conceiving the Art Object in a Data-Driven Culture

In the previous section we described the shift of attention from the human figure to objects, in the visual representations of seventeenth-century Holland. This shift can be seen as part of the changes in the symbolic and functional identity of objects at the time. As demonstrated above, a similar change is underway today. Therefore,

it would be interesting to imagine the impact of this change on the representation of objects as well as on human-object and inter-object relationships.

Yet, the changes in the symbolic meaning of the object become even more complex when considering the transformation of the art object itself. Functionality in the twenty-first century is mainly based on accumulated data and reciprocal human-object and inter-object communication (Wired 2014). This makes the IoT both a conceptual and a technological innovation, conceived and designed to accommodate and enhance these communication and data-driven functionalities. At the same time, art objects do not follow these rules, since, by definition, their functionality lies in the realm of the aesthetic. So, how will these new paradigms affect our art objects? How will this novel generation of objects and the subsequent object culture affect the aesthetic function itself? How can we represent, through art objects, the culture of 'data-fied' objects? Could there be such a thing as a 'smart' art object?

These questions are at the heart of our artistic endeavor: to create a network of art objects, based on the art objects themselves. In what follows we will describe the artistic process generated by these questions.

Natures Mortes, Live Data: From Art Objects to Art Networks

Divers Faits Series

The photographic series *Divers Faits* (Kisseleva 2010) (Fig. 1) inspired by seventeenth-century Dutch art, presents a repertoire of visual allegories. Each still life photograph in the series 'conceals' a subplot, telling a story through each item. In addition, each item has its own individual narrative, emerging not only through the



Fig. 1. Olga Kisseleva, *Mathematique* (2010).
From the series *Divers Faits*. (Plate 39, p. 327)

visual composition in the image, but also through a dictionary of the symbolic significance of the different items, and a short story accompanying each image which uses references and keywords taken from that dictionary. The still life images of *Divers Faits* can be read through the many contemporary semiotic and emotional layers of meaning specific to the objects present in the composition.

The allegoric compositions in *Divers Faits* constitute networks of symbolic meanings. Therefore, it was only natural to rely on them for encoding the artworks into a larger network. Our purpose was to work with these connections, to translate and represent them in a way that reflects the culture and values of IoT, which are inter-object communication and exchange of data. We wanted to imagine a network of the series' photographs, a network which is an artwork in itself, whose implementation constitutes another work in the exhibition.

Together with an interdisciplinary team of students from the departments of art, design, and engineering at Shenkar College of Art and Design, we began by imagining scenarios of connectivity for these photographs. These scenarios reflect the semiotic, semantic, narrative, and artistic values of each photograph. We sought to create a network that would allow each photograph (or art object) to preserve its own identity and to have its own presence while interacting with other objects in the network. The network we envisioned would not only connect the artworks to each other, but it would also connect the artworks to their viewers. We wanted to make the human spectators an integral part of this network.

Challenges and Solutions

Our pursuit proved to be especially challenging: we were not only developing a new medium for artistic work, but we were working with technology still in its initial phase, its full potential not yet realized. Moreover, we had to imagine scenarios based on a technology which is all about efficiency and functionality, for art objects that are all but functional.

The challenge we faced was multi-faceted. Our aim was to connect a selection of art objects into a network of values inspired by the visual allegories in the photographs. We further wanted to explore the way art objects can be represented as data-generating objects with a participatory role in this particular network, as well as on the Internet.

Turning to the realm of implementation—the moment in the world of software code when abstract structures and algorithms become real—we wanted to figure out how art objects could interact with each other and with viewers and what kind of data they would exchange. This issue comprises two intertwined questions. The first

is the question of function or content, namely, what would the objects communicate to each other and to the viewer? The second was the question of form, or language, namely, how would the objects relay this content? These questions were followed by the technical issues of connecting the photographs to a server, and the medium that they would use to represent themselves.

To create a network and establish a dynamic relationship between all the participating images, as well as the viewers, we realized that we had to analyze and articulate the symbolic, semantic, and artistic traits of each photograph. We had to provide the images with a 'personality' so to speak.

Together with Ran Kasmy Ilan, the curator of the exhibition, we imagined potential personalities for the selected photographs. We comprised a list of qualities such as 'timid,' 'childish,' 'arrogant,' 'team player,' and 'loner.' These qualities were based on the photographs' given narratives and dictionary of allegories, and on our readings of the images. We then graded each photograph on a 1:10 scale for each quality, reflecting the relevance of that quality to a specific photograph. This rating technique yielded photographs of different 'personalities' or values: some were more inclined to share their resources ('team players'), others were shy and tended to keep to themselves. For example, the traits we attributed to the image in figure 1 were: friendly, childish, and shy. The idea was that just as in the case of all living things, where personality traits are manifest through constant interaction with members of one's network, so would the personality traits of the photographs be revealed through their interaction with each other and with the viewers. This part of the network still remained to be established.

The Network-As-Artwork

While our first step was to give the art objects virtual representations and to transform them into virtual entities, we now had to come full circle and finish this process by giving the virtual entity, namely our interactive network-as-artwork, a visual,



Fig. 2. Installation view: *Still Life, Live Data*, Tsila Hassine, Olga Kisseleva, Artists' Residence, Herzliya. (Plate 40, p. 327)

physical, and concrete representation in the space of the exhibition. For although the Internet of art objects is in itself a virtual, digital entity, it still addressed a 'real' physical audience, experiencing the installation in a 'real' physical space. Thus, the interactive art network became an in-situ installation, adapted to the special conditions and the context of the gallery.⁶

To better understand the type of interaction we wanted to establish as part of the artwork, we first had to analyze the real-life encounter between spectator and artwork, while respecting the intimate space created between them. Our strategy was to measure, as discretely as possible, the amount of time spectators spent in front of each artwork. The rationale was obvious: the time a spectator spends in front of an artwork can serve as a quantitative indicator for her engagement with the work and could be interpreted as the extent of participation in the network. We wanted to use this rationale to bring the artwork to life through the spectator's gaze. Our aim was to give a visible representation to this engagement, and to ultimately extrapolate it from the intimate space between an artwork and its audience.

To assess viewers' engagement with the artworks, we placed cameras above each photograph (Fig. 2), measuring the time viewers spent in front of it. This input provided us with an insight into the unmediated interaction between viewer and artwork. While these data allowed us to integrate the spectator into the network, we still had to figure out a way for the artworks themselves to acknowledge the spectators and react to them.

Realizing that an exhibition space has two major categories of resources, physical structure (walls, ceiling) and technical infrastructure (light, electricity), we were curious which of these resources would be best suited as a medium for physically encoding the interactive activity of the network, i.e., the reactions of the artworks themselves. We finally chose light—inherently the basis for today's communication technology⁷—as the medium through which the artworks would engage with the viewers in this exhibition. Thus, the lighting system in the gallery was designed to illuminate each artwork by a wi-fi-controlled light bulb (Philips HUE), with an intensity varying between 5 and 100%. The intensity of light illuminating each artwork could vary depending on different parameters.

Once the lighting system was set up, we started to experiment with the interactive environment. Our first experiment with basic interaction between viewer and photograph was to correlate each photograph's 'popularity'—measured by the accumulated observation times—with the intensity in which it was being illuminated. This way, the spectator and her spectatorship became technically integrated into the network installed in the gallery. Yet, this integration did not provide a two-way correspondence between viewers and artworks.

The final step was to integrate spectator and spectatorship into a dynamic relationship with the participating images (as described in 3.2). Based on the set of traits we defined for each photograph, we articulated its interactive behavior to reflect its 'personality'. The point of departure was the direct relationship between the accumulated viewership of each photograph and amount of light the photograph receives. But since different personalities may react differently to being in the limelight, we wished to incorporate these differences into the equation, and allow them to affect the illuminating pattern of the different photographs.

To illustrate how this actually worked, let's take for example a photograph that we defined as 'friendly' and 'sharing'. Once at the center of attention (i.e., once a viewer was standing in front of it), it would share its amount of light or illumination time with other photographs, which were defined as its 'friends' (in effect, upon viewing this 'friendly' photograph, not only would its lighting increase but also the lighting of a few other photographs, which were predefined as its 'friends'). Or take an 'arrogant' photograph: once in front of an audience its lighting would increase very quickly to reach full luminosity and then return to darkness as if by a switch. A timid photograph, on the other hand, upon encounter with a viewer, would be lit very slowly, never reaching maximum luminosity, only to return to darkness swiftly and discretely. Thus, a whole language of light was created for the use of this network of art objects and their audience.

Light in the Tradition of Interactive Exhibition Spaces

Our choice of light as a medium of communication is not rooted only in the history of communication technology, but also in art history. In the history of interactive spaces in particular, light has been extensively used as a medium for interaction between visitor, space, and artwork.⁸ Experiments with interactive spaces, where users become part of the artwork and the exhibition space, started in the 1960s. A noted example is Robert Rauschenberg's *soundings* (1968). In this work, Rauschenberg, together with a team of engineers, installed a 36-foot-long sculpture made of three layers of Plexiglas. The front layer was partially mirrored, and behind it were two more layers of Plexiglas with images of wooden chairs on them. Lights of different intensities were placed behind the Plexiglas screens, so that, when illuminated, the images became visible through the mirror. Each light reacted to a different sound level, such that children's high-pitched voices triggered different lights than lower pitched voices of adults.

Another prominent example of interactive installation employing light as part of the interaction is Rafael Lozano Hemmer's *Pulse Room* (2006). In this installation, Lozano-

Hemmer used about 100 light bulbs (the exact number varies between installations), uniformly hung from the ceiling and completely filling the space. A hands-on interface in the room detected the pulse of those visitors who chose to hold its handles. Once the visitor released the handles, all the lights were briefly turned off and a lightbulb started flashing with the newly recorded heart rate. At any given time, the installation showed the recordings of the most recent participants (Lozano-Hemmer 2006).

Yet, *Natures Mortes, Live Data* (2017) differs from these examples in several ways. It departs from Rauschenberg's installation, where at a given time a single object responds to a single viewer, as it induces interaction between objects and spectators in a connected network. And, while in Lozano-Hemmer's *Pulse Room* the interaction is single-channeled—the visitor's pulse affecting a single lightbulb—in *Natures Mortes, Live Data* the visitor is fully integrated into the space. Her interaction with the exhibition is monitored and stored in the database in terms of the amount of time and attention that she has spent on the different photographs. This, in turn, affects the lighting scheme of the space, thus affecting the exhibition in its entirety.

Ultimately, in *Natures Mortes, Live Data* the artworks acquire a certain agency, by responding to the choices the visitors make in the space. By endowing the art object with agency, albeit limited, this installation provides a preliminary answer to the question raised earlier in this chapter, namely what would the art object *do* at the IoT era? In this work, our answer is pretty straightforward: At the era of IoT art objects will be looking at us looking at them. While the genre of still life painting is about new technologies of looking, *Natures Mortes, Live Data* is about new technologies perceiving us while we are looking at art objects.

Notes

1. Examining our daily routine, we find about 130 embedded objects we encounter on a daily basis, which range from sliding doors and ATM machines to coffee makers.
2. The first coffee machine to be connected to the internet was named 'The Trojan room coffee machine'. A video camera, connected to the internet, was placed in front of a coffee machine, and uploaded its images about three times a minute to a custom-created web page online. The image was grayscale, and so was the coffee. Thus, Cambridge computer lab researchers could track the progress of the coffee in the pot and come down for coffee only once the camera showed that the pot contained enough coffee (Cambridge Computer Lab, 1995).
3. Apart from the Roman 'Xenia' paintings, that had a rather ceremonial meaning (Bryson 1990).
4. This may be best understood in comparison with Italian renaissance painting of that period. Whereas Italian painters gave shape to some grand narratives, rife with textual

- interpretation, the Dutch painted 'descriptions,' unrelated to any grand narratives. The Dutch present their pictures as describing the world seen, rather than as imitations of significant human actions (Alpers 1984).
5. In some cases, the human form, although absent from the painting, is present through hints embedded in the represented objects.
 6. It would be incorrect to think that conventional art exhibitions are not interactive. Every experience consisting of an encounter between two different entities is in itself an interaction (as defined in Oxford Dictionaries Online 2018) In fact, there are three principal elements that establish interaction when looking at a painting: the spectator, the space of viewing, and the object that is viewed. Meaning is located where these three dynamic elements intersect (Helmets 2008).
 7. Today's fast broadband internet infrastructures are based on optic fiber cables (FastMetrics 2018).
 8. Since the 1930s artists have been exploring the different phenomenological, interactive, and performative qualities of light spaces. In 1930, László Moholy-Nagy created the *Light-Space- Modulator*, which is a kinetic sculpture that explores the phenomena of light and movement (Arozqueta 2014).

References

- Alpers, Svetlana. 1983. *The Art of Describing Dutch Art in the Seventeenth Century*. London: Murray.
- Arozqueta, Claudia. 2014. "Connecting Realities: Rafael Lozano-Hemmer's Pulse-based Works." *CITAR Journal of Science and Technology of the Arts* 6 (December): 21–28.
- Bryson, Norman. 1990. *Looking at the Overlooked: Four Essays on Still Life Painting*. London: Reaktion.
- Caple, Chris. 2006a. *Conservation skills: judgement, method, and decision making*. London: Routledge.
- . 2006b. *Objects: Reluctant Witnesses to the Past*. New York: Routledge.
- . 2012. *Preventive Conservation*. New York: Routledge.
- Cisco's Technology News Site. 2014. "Kevin Ashton, Father of the Internet of Things & Network Trailblazer." <https://newsroom.cisco.com/feature-content?type=webcontent&articleId=1558161>.
- Encyclopedia Britannica Online*. n.d. "still life painting." <https://www.britannica.com/art/still-life-painting>.
- European Union, Information Society & Media, European Platform on Smart Systems Integration (EPoSS). 2008. *Internet of Things in 2020: Roadmap for the Future*. <https://docbox.etsi>.

- org/erm/Open/CERP%2020080609-10/Internet-of-Things_in_2020_EC-EPoSS_Workshop_Report_2008_v1-1.pdf
- Feki, M.A., F. Kawsar, M. Boussard, and L. Trappeniers. 2013. "The Internet of Things: The Next Technological Revolution," *Computer* 46: 24–25. doi:10.1109/MC.2013.63.
- Helmets, Marguerite. 2008. "Framing the Fine arts Through Rhetoric", in *Defining Visual Rhetorics* edited by A.C. Hill and M. Helms. London: Lawrence Erlbaum Associates.
- Lozano-Hemmer, Rafael. 2006. *Pulse Room*. http://www.lozano-hemmer.com/pulse_room.php.
- Jankowski, Simona, James Covello, Heather Bellini, Joe Ritchie, and Daniela Costa. 2014. "IoT Primer: The Internet of Things: Making Sense of the Next Mega-Trend." Goldman Sachs, Equity Research. <https://www.goldmansachs.com/insights/pages/internet-of-things/iot-report.pdf>.
- Jia, Haiyan, Mu Wu, Eunhwa Jung, Alice Shapiro, and S. Shyam Sundar. 2012. "Balancing Human Agency and Object Agency: An End-User Interview Study of the Internet of Things." *Proceedings of the 2012 ACM Conference on Ubiquitous Computing*:1185–88. DOI=<http://dx.doi.org/10.1145/2370216.2370470>.
- Kaplan, Frédéric. 2012. *La métamorphose des objets*. Nouvelle édition. Limoges: Fyp Editions.
- Kisseleva, Olga. 2010. *Divers faits*. <https://www.digitalartarchive.at/database/general/work/divers-faits.htm>.
- McLuhan, Marshall. [1964] 1967. *Understanding Media: The Extensions of Man*. London: Sphere Books.
- Moore, Stephen and Julian L. Simon. 1999. *The Greatest Century That Ever Was 25 Miraculous Trends of the Past 100 Years, Executive Summary*. Washington DC: Cato Institute. <http://bib-purl.oclc.org/web/43117/pa364.pdf>.
- Oxford Dictionaries Online, n.d. "Interaction." <https://en.oxforddictionaries.com/definition/interaction>.
- Rifkin, Jeremy. 2015. *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism*. New York: Palgrave Macmillan.
- Rebaudengo, Simone. 2012. "Addictive Products: The Story of Brad the Toaster." Vimeo video. <https://vimeo.com/41363473>.
- Schwab, Klaus and Davis, Nicholas. 2017. *Shaping the Fourth Industrial Revolution*, with a foreword by Satya Nadella. New York: Penguin Random House.
- "10 Key Benefits of Fiber Optic Internet Service." 2018. *FastMetrics*. <https://www.fastmetrics.com/blog/tech/10-benefits-fiber-optic-internet/>.
- Toonders, Joris. 2014. "Data Is the New Oil of the Digital Economy." *Wired*. <https://www.wired.com/insights/2014/07/data-new-oil-digital-economy/> 2014.
- Urban Tastebud. 2018. "5 Best Smart Mattresses – Buyer's Guide and Reviews." <https://urban-tastebud.com/best-smart-mattresses/>.
- Weiser, Mark. 1991. "The Computer for the 21st Century." *Scientific American* 265: 94–95, 98–102, 104.