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Laying Out the Landscape of Interrelated Attitudes, Beliefs and Values, and How They Relate to Technology and Mourning

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Abstract

After-life affordances on mainstream platforms have made it possible to gain control over what happens to a user's account after their death. Simultaneously, start-up after-life data services (ADS) are being developed, which are online services that provide the handling of one's data after death, and sometimes add additional features based on A.I. aiming to recreate the deceased person in the form of bots that continue posting. This thesis aims to answer *how "after-life data services" might potentially change the grieving process, how the extension of life is conceptualized, provide examples of public perceptions to ADS and speculate about future developments of ADS avatar*. The selected ADS case studies are *Eter9*, *Eternime*, and *Lifenaut*, and the recent documentary *Meeting You* (2020) which showcased a combination of technologies to simulate a last goodbye from a mother to her deceased daughter. This thesis consists of a qualitative analysis of ADS, its affordances, motivations of the creators, reactions of the public, and other technological developments relevant to the future creation of *avatars*. The aim of this is to determine whether or not people will start to use these services is dependent on both the provided affordances and on people's attitude towards technology and death. Based on the findings, I argue that future use of ADS can't be estimated by simply looking at people's general attitudes towards technology or death.

Keywords:
attitudes; technology; after-life data services; mourning; death; after-life affordances; digital immortality; cyberpunk; transhumanism; consciousness

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CHAPTER 1 - AN INTRODUCTION ON THE CHANGING LANDSCAPE IN TERMS OF DEATH, MOURNING AND THE AFTER-LIFE

As the poet Francis Duggan wrote: "[d]eath the great equalizer treats everyone as the same." The phenomenon of death and mourning is widely perceived as inevitable and thus a central part of society. Many academic fields, including media studies, have been exploring thanatology, that is, the study of death and the associated practices surrounding it. Specifically, on a psychological level to death anxiety, research has shed light on the phenomenon of what impending death does to a person (Cable-Williams and Wilson 177; Neimeyer, Wittkowski and Moser 309), as well as how to cope with losing someone due to them dying (Lord, Gramling, and Auerbach 48; Feigelman 97).

Since the outbreak of COVID-19, the world has gradually needed to enter into a state of lock down. The ramifications of having to deal with an as of yet remedy-less virus has already exposed its effects on society. Funerals and burials are not allowed to continue in the way that they perhaps would have done in the pre-pandemic time: expressing grief with friends and family, and giving the deceased a proper goodbye. The maximum amount of people allowed at a funeral varies between countries. Mostly they allow a maximum of ten people, who have to sit at an appropriate distance. To allow more people the chance to 'be there,' technological solutions like live streams have been implemented to facilitate saying goodbye. For better and for worse, mourning has become dependent on technology. However, one could state that 'something' is missing. A bereaved wife has expressed she felt "hollow afterwards because [they] couldn't have a wake or anything" (Cox). A 'normal' preparation to find closure before dying, accepting death, and the process of grieving process would perhaps have provided more catharsis and a 'good death' with less "distress for family members" (Cox; Semino, Demjén, and Koller 669). In short: mourning and technology have become an ever more relevant study and concern and it is this intersection that this thesis takes as its object of study.

As media researchers Robert Neimeyer, Holly Prigerson, and Betty Davies aptly say: "human beings seek meaning in mourning" (235). The phenomenon of mourning constitutes multiple interrelated diverse aspects to having to deal with the reality of death: it is an emotional state, which can ultimately even result in sudden death (Alpert 455). In addition, it is a psychological process to overcome the initial emotional state (Stroebe and Schut 274)

and the social facilitation of the psychological process (Mitima-Verloop, Mooren, and Boelen 7). Moreover, it is connected to personal and shared rituals that vary across cultures, e.g., Palestinian (Abu-Rabia and Khalil 4), Japanese (Kim 17), or Tanzanian mourning practices (Kilonzo and Hogan 259). Mourning is an unavoidable component of life because of the inevitability of death. But what is the meaning of death? According to Ira Byock, M.D.: *"Death is central to the meaning and value of human life as experienced by individuals and by communities. Death does not give meaning to life, but does provide the backdrop against which life is lived"* (287). Mourning is a state that results from losing someone to death, and after-life data services (ADS) might change death itself in the near or far future.

While the livestream funerals I mentioned before are a new example of this, technology has, however, already affected mourning rituals in terms of public mourning. A special relevance in the field of media studies has been, for example, mass media. The emergence of mass media has afforded a global immersion into moments of mass mourning, producing a "global community" of bereaved individuals (Walter 130). Examples of a worldwide community of bereaved individuals can be seen in the phenomenon of celebrity deaths, such as the death of Princess Diana (Brown, Basil, and Bocarnea), but also through catastrophic deaths seen in events such as, for example, the victims of 9/11 (Engle 79), or more recently, the mystery of flight MH370 and the crash of flight MH17 (van den Berg 193). Princess Diana died at the peak of television broadcasting and, according to James Thomas, the inaccuracy of the "represent[ation of] mourning behaviour" has ultimately led to mass hysteria and the backlash against it (363).

The emergence of the so-called web 1.0, web 2.0, and subsequently social media platforms, has, in its turn, created even more possibilities to express grief. Not only to celebrities because of their publicness, but also friends, family members, and even strangers if they have built a presence online (Klastrup 152). Where mass media shared the mass mourning on everyone's television screen, the convergence of sociality and different platforms have resulted in new spaces coming into existence where the bereaved can mourn the dead in public and together (Brubaker, Hayes and Dourish 162).

As shown in previous conducted research, all these technological advancements have partially changed how people express grief and mourn. Researchers have analyzed these spaces, from how people use it, e.g., through a specific 'grief etiquette,' to how people have reacted to it (Gulotta et al. 736; Moyer and Enck 7; Bouc, Han, and Pennington 642). Among many others, sociologist dr. Margaret Gibson researched the blurring between the private and the public in the case of death and grief, explicitly using celebrity examples (422). Other research has shown that through the emergence of social media, new possibilities are created

to express one's real or 'parasocial grief' about the death of celebrities (Burgess, Mitchell and Münch 229), while it also revealed issues of 'disenfranchised grief' of users who do not have a place to express their grief either online or offline (Carroll and Landry 347).

A new change is on the horizon: after-life data services, also called 're-creation services' by researchers Carl Öhman and Luciano Floridi (318). Currently, existing after-life data services, such as *Eter9*, *Eternime*, and *Lifenaut*, refer to vastly different services that relate to the management of someone's private online data after the death of that person. Some are merely limited to posthumously managing the deceased's personal data by giving access to various accounts to a still-living trustee, others are more ambitious and aim to provide a continued online presence of the dead, e.g., by continuing posting under the same accounts by bots created through algorithmic analyses of grammar and interests. These bots function as an automated version of 'you' that can potentially continue to interact with still-living family and friends. The latter evokes comparisons to the *Black Mirror* episode "Be Right Back" (2013), wherein a grieving woman is shown to interact with increasingly sophisticated reconstructions of her deceased boyfriend: it starts with mere text messages, before moving to phone conversations and ending with a physical almost human reconstruction.

Another project, as of yet unavailable to the general public, is presented in the documentary *Meeting You* (2020). The documentary covers the creation of a virtual 'hologram' of a deceased girl allowing her mother to interact with it - or 'her'. The reaction of the mother upon seeing the digitally created avatar of her daughter was as if she had come back to life. Emotions, such as happiness, sadness, and mourning, were unified at this moment. The reaction of the mother is a heartbreaking one, as the documentary showed footage of the emotional response by staff and family members. As it went viral and became a trending topic online, it gathered a multi-layered response, as it did for the other after-life data services. Although these after-life data services do not present their product as a mourning tool, the possibility of talking to a chatbot that exists through the collection of a person's data could well be received as a way to have contact with the deceased and potentially change the mourning process.

Whether or not people will create such services depends on two things: attitudes and scientific reality. *Attitudes* matter, because these guide human action. Scientific reality also matters, since it determines whether the needed technology *exists* or whether it is *possible* to create such technologies. Attitudes could be perceived as emotional states that persist over longer periods of time, because they contain an evaluative component, i.e. an emotional state in response to believing certain fact-claims, to certain beliefs. Why do certain beliefs elicit certain emotions? Because they are perceived, rightly or wrongly, to interact with the values

people have. What is a value? Arguably, it is impossible to define value in a non-tautological way: values are what we find important, i.e. values are that which we value. In terms of approaching 'ADS,' it is a category of *services and products* based on various *technologies* which are created with the ultimate *intent* to, in both figurative and literal meanings, transcend death. The latter because of adherence to transhumanist ideology. Thus, attitudes and values towards both technology and the phenomenon of death are suspected to be important, and will therefore be the primary focus of this thesis. However, since this is merely intuited, the qualitative analyses done for this thesis also serves to critically examine this initial assumption.

In this thesis, I seek to critique what these proposals of emerging companies and technologies are putting forward in terms of 'digital immortality,' memorializing, and the process of grieving. Therefore, I ask *how "after-life data services" might potentially change the grieving process, how the extension of life is conceptualized, provide examples of public perceptions to ADS and speculate about future developments of ADS avatar*. Underlining this question are more critical questions about what it means to be human and to be mortal. It necessitates to take a new media perspective when researching platforms such as ADS, as they might not just change the meaning of death and mourning, but might at some point in the future even make them a thing of the past, if we are to believe its most fervent supporters. There are three main goals that will illustrate and conceptualize the components necessary to provide a comprehensive understanding. Firstly, I will identify *what* the current situation *is* by describing the case studies and related technological developments and innovations, using ADS and *Meeting You* as critical examples. Secondly, I will provide speculation as to *what might be*, by bringing forward possible consequences and identifying some technological possibilities and relevant conceptual issues. Thirdly, I aim to determine why and if people might consider using these technologies, by focusing on the nature of their attitudes.

Chapter two will provide a discussion on existing literature on attitudes and beliefs, predominantly, attitudes towards technology. This chapter will also shortly touch upon affordances, and specifically after-life affordances on mainstream platforms. Thereafter, I will discuss *how* to analyze attitudes, the use and possible oppositionality of cyberpunk and transhumanism because the latter is the ideology that motivated the development of *Eter9* and *Lifenaut*, and reactions on ADS that often connect the technologies with examples from science fiction movies. Additionally, I attempt to provide an attitude map to illustrate how different attitudes, beliefs and values interact. In chapter three I will propose my methodology, i.e. how I have gathered the material and how I apply the attitude approach on the analysis.

The fourth chapter will discuss and analyze four concrete examples of ADS; namely, *Eter9*, *Eternime*, *Lifenaut*, and *Meeting You*. As for my sources, I use documentation on each project as presented by the company itself, and additional reactions in terms of media articles, blogs, and comments on those articles. I analyze these materials through applying a close reading of texts on after-life affordances and attitudes and motivations from the spokespersons and public.

In chapter five, other technological developments that are both related and unrelated to ADS will be discussed to place the existing ADS in the current technology landscape. Some of the technologies have direct connections with the ADS products while other technologies are developed for alternative purposes. Because people often refer to science-fiction, I will refer to some works of science-fiction that resemble the discussed technologies. In this chapter I seek to unveil the enormity and complexity of all that is going on concordantly and how difficult it is to predict how seemingly small and isolated developments might impact society in the future. The last chapter will be a short synthesis of, and a final discussion of the above-mentioned qualitative content analysis on ADS. As will be shown in the theoretical framework, there remains a gap in new media studies that focuses on attitudes to technology especially in relation to affordances. Understanding if a technology might change an existing process or value, in this case, the mourning process and what it means to be human, needs an interdisciplinary approach.

CHAPTER 2 - THEORETICAL FRAMEWORK: ATTITUDES AND AFFORDANCES

2.1 What are attitudes?

Potential socio-cultural effects of ADS on mourning practices are partially mediated by attitudes towards ADS, as well as the affordances of these ADS. These attitudes will inform, and will itself be informed by other attitudes, both general and specific ones. Because attitudes never exist in isolation, not in human thought, works of art, or ideologies. The general attitudes of people towards humanity, death, and technology will increase or decrease the chance of people embracing or rejecting ADS or certain forms thereof. General attitudes of developers will also influence the affordances they create. These affordances, in its turn, decides how users are going to engage with the platform or service. This chapter explores the challenges of interpreting attitudes. The general attitudes towards technology and 'scientific progress,' towards the relationship between death and what it means to be human. It does so in order to create the theoretical framework to speculate about possible specific attitudes towards ADS, and what the consequences thereof might be.

In this chapter, I also attempt to create an 'attitude map' that shows hypothetical positions based on two dimensions: attitudes towards technology, and attitudes towards humanity. The need for a 'humanity' dimension emerged after critically engaging with the literature and press coverage of tech-related issues. The positions on both these dimensions move from 'pessimism' to 'optimism.'

After a short exploration of what seem to be opposites in pop-cultural expressions of relevant attitudes, I will also argue that 'cyberpunk' would be a suitable label for the pessimistic quadrant. This subgenre of science fiction arguably is the best example of pop-cultural expressions of pessimistic or negative attitudes towards both technology and humanity. In some sense, it could also be seen as the opposite position of transhumanism, the ideology that appears to drive the actually existing attempts to create ADS, e.g., the 'transbemans' of *Lifenaut* and the statements of the CEO of *Eter9* (see section 4.1.1 and 4.1.3). However, transhumanism cannot be used as a label for the optimistic quadrant and does represent a more specific location on this attitudinal landscape. Likewise, neither transhumanism or cyberpunk are suitable as labels for general attitudes because they represent a very specific attitude, consisting of a particular combination of general attitudes and values. Both will be explained below.

2.1.1 Attitudes

What are attitudes? In 'The Cambridge Handbook of Psychology,' attitudes are defined as "evaluations of objects [that can be] occurring in ongoing thoughts (…) or stored in memory" (Hong and Albarracin 59). They "can be influenced by and can influence beliefs, [feelings][1], and behavior in relation to the attitude object." Attitudes are "distinct from beliefs in that beliefs can be verified or falsified with objective criteria." What distinguishes attitudes from feelings is that they "entail a cognitive evaluation" (Hong and Albarracin 59). In short, attitudes are a form of evaluation that combines beliefs about, and feelings towards objects. The resulting mental states of these evaluations also include "desires, hopes, and wishes" (Mele 66).

"A belief is a proposition [or fact claim] that is regarded as true" and can either be factually correct or incorrect. A distinction can be made between explicit and implicit beliefs: the former are beliefs "for which the mind has a coherent mental representation", while the latter lack such a mental representation and thus "may be difficult to communicate" (Au and Chiu 80). Implicit beliefs are more intuitive and are products of the "capacity to understand in a holistic way without using conscious reasoning" ("intuition" 266). These intuitive beliefs show that subjective feelings also play a part in the unconscious acceptance or rejection of a fact claim, even though 'attitude' is often defined as being a combination of verifiable facts and subjective feelings towards an object. This conception of belief describes beliefs as mental states, i.e., the phenomenon of 'a person or persons believing a fact claim.' It is important to know what people think is true because that "together with other mental states" influences behavior and actions.

When discussing beliefs, one can also refer to the content of propositions themselves (Dretske 85). In other words, the subject of investigation can be *what* people think or can be whether what people think is *correct*, i.e., if the belief corresponds with the external world. The first leads to propositions about just the mental state of a person or persons. In contrast, the second leads to propositions about the mental state of a person or persons, as well as something in the external world.

1 In *The Cambridge Handbook of Psychology*, 'affect' is used instead of 'feelings' in its description of 'attitude' (Hong and Albarracin 59), but amongst definitions of 'affect' the "subjective feeling (…) of human experience or thought" is listed (20).

2.2 Attitudes towards technology and science: techno-optimism, techno-pessimism, humanism and misanthropy

2.2.1 Definitions and views on technology attitudes

The theoretical opposite positions on the attitude-towards-technology-axis consist of 'techno-pessimism' and 'techno-optimism.' The academic literature on attitudes towards technology often talks of 'technophobia' and 'technophilia' to describe negative and positive feelings or attitudes. I prefer to use 'pessimism' and 'optimism' instead of 'phobia' and 'philia,' since these terms arguably are more reflective of attitudes being a combination of both beliefs and feelings.

Social scientist Christian Kerschner and ecological and institutional economist Melf-Hinrich Ehlers note that it is "common to study attitudes towards both science and technology together" (140)." Arguably, because technology can be seen as the products of science, or maybe working in tandem, creating what sociologist Massimiano Bucchi refers to as "technical-scientific innovations" (60). Therefore, in this section, I will address general attitudes towards science and technology as interchangeable, or at least as intricately interwoven. Tech-related attitudes are described and argued for in a large variety of ways, as becomes clear when exploring the academic literature on tech-related attitudes as well as opinion pieces in the press.

Technophobia can be defined as "fear or dislike of modern technologies (…) [and] consists of two chief components: Fear of using technology and concerns regarding technology's effect on society" (Nimrod 148). This thesis will predominantly address the latter: socio-cultural effects. Technophilia, according to Kerschner & Ehlers, refers to those that are "fascinated about everything technological (especially high technology) and cannot imagine why anyone would be critical towards it" (144). Vijay Eswaran criticizes what he labels as techno-pessimism by asserting that "[p]redictions of social catastrophe accompany every period of rapid technological change. They're always wrong." Nicholas Phillips responds to this line of argument by stating that "[techno-optimists claim] that because past fears of change were unjustified, so are present fears. If the telephone and the bicycle and the novel worked out, so too will AI, driverless cars, and automation. (…) This sentiment embodies a popular kind of techno-futurist confidence that newness is progress."

Many concerns surrounding technological progress are about environmental issues, which Joanna Szurmak and Pierre Desrochers describe as "eco-pessimism." They list the main assertions and arguments of eco-pessimism; (1) "in a finite world, continued demographic and

economic expansion is impossible"; (2) it is easier to provide for fewer people, so overpopulation needs to be avoided; (3) resources aren't limitless, so over time "economic growth will become increasingly expensive and environmentally damaging"; (4) we can't "rely on human ingenuity" to solve all problems that emerge from the mentioned issues or the "risks inherent to new technologies" (Szurmak and Desrochers). Bjørn Lomborg is a critic of eco-pessimism, which he dismisses as irrational "alarmism" (39). Lomborg rejects the idea that humans will soon "bump unto the planet's physical limits" due to the adaptive power provided by "human ingenuity" (30). Incidentally, that doesn't mean that Lomborg sees no environmental risks associated with industrialization however since he does express concern about "air pollution" (35). Frances Beinecke responds to Lomborg's article that it was this very 'alarmism' that led to the enactment of environmental policies that have improved health-related issues, and this was done without hindering economic growth because these laws "sparked innovation" (163). It seems Beinecke's objections are with Lomborg's criticism of certain environmental policies and general portrayal of environmentalist rhetoric as "alarmism," but not with valuing economic growth and the accompanying technical innovation. The disagreement seems to be more about the means than the ends, and this suggests that environmental concerns can coexist with a techno-optimist attitude. In other words, this suggest that *specific* negative attitudes to specific consequences of technology doesn't necessarily indicate *general* negative attitudes towards technology.

Technology can be seen as an attempt to control nature, to control the physical world surrounding humanity. The techno-optimist might see that as a positive because this control enables us to cure "common diseases," for example. A more negative response to this control might see it as an example of human hubris, "scientists Playing God" (Hellsten and Nerlich 93). Sometimes control is valued, and it is precisely the suspicion that a technology can't be controlled that is feared, as can be detected in framings of science as "opening *Pandora's Box*, and creating *Frankenstein's monsters*" (Hellsten and Nerlich 93).

Evolutionary biologist David Krakauer rejects the choice between pessimism and optimism as a false dichotomy: "I am frightened by unconditional optimism and unconditional pessimism" ("Complexity & Stupidity"). He looks at technology and cultural implementations of technology on a case-by-case basis. For example, in Sam Harris's podcast, Krakauer discusses the effects of technology on human cognition by examining "cognitive artifacts." He argues that there is no clear distinction between knowledge and intelligence, and that internalizing information changes "the internal wiring of your brain, in a very real sense." As an example, he provides maps. Highly accurate modern maps are the product of the contribution of many people over "the course of centuries or decades or years." If one

memorizes that map, they have the knowledge that took "thousands of people thousands of years to construct." Krakauer calls this a "complementary cognitive artefact." But a technological aide such as a calculator only "augments your intelligence in the presence of the device." When the calculator is taken away, humans are back to where they were at best. Krakauer calls the latter "competitive cognitive artifacts." In contrast to the complementary type, these don't amplify our cognitive abilities but replace them. With modern smartphones, we don't even need to memorize maps to the extent to which we used to, or as Libby Emmons states: "[they] grant us access to a world of road maps and obviate the need for self-orientation." However, her objection isn't so specific as the analyses of Krakauer. It seems more of a general concern with autonomy: "with every freedom we gain through tech, we sacrifice some autonomy." This supposed tradeoff between autonomy and freedom is, in turn, questioned by Phillips: Techno-optimists "promised emancipation [but] the internet is also a highly effective system of control (…) as China is doing now through its dystopian 'social credit' system."

Libby Emmons connects techno-optimism to transhumanism. She defines transhumanism as "an ideology which holds that humans must harness technological advancements to take an active, intelligent role in our own evolution and the evolution of our species." She asserts that transhumanists are dualistic, and they see humans as having "a distinctly separate mind and body, and that what happens to one need not affect the other." However, she thinks that "our humanity lies not in our consciousness, but in the biological bodies from which that consciousness arises. It is our bodies [experience] sensation, and that feed our minds with data about the external world and our relationship to it."

2.2.2 When facts matter and when they don't

Communication of information and opinions is an important factor in the emergence of attitudes (Bucchi 115). Communication of science and technology often are interwoven, since, as stated above, technologies arguably are the products of science, which is why textbooks on 'science communication' are often also about technology, e.g., the *Handbook of Public Communication of Science and Technology*, edited by Massimiano Bucchi and Brian Trench. In this handbook, Bucchi argues that the traditional conception of science communication followed a 'deficit model,' where the assumption was that negative attitudes towards science and technology were the result of ignorance. However, Bucchi argues that in "general, it does not seem that the opposition of certain sectors of the general public to particular technical-

scientific innovations is due solely to the presence of an information deficit" (59-60). Indeed, the idea that attitudes are only dependent on absence or presence of knowledge is incredibly naïve, since specific technologies may be perceived to clash with more general values, such as attitudes towards the relation between humans and the environment mentioned above. The importance of both facts and values for understanding public attitudes can be seen in the form of "intractable controversies." These emerge from what policymakers refer to as "unstructured problems," i.e., the difficulty of creating policy solutions when where there is a lack of consensus on both the relevant science *and* the relevant moral values (Hisschemöller and Hoppe 44).

If one only wants to quantify the predominance of certain attitudes in society, then it is irrelevant if beliefs are factually correct or not, since the feelings elicited by the perceived clash with moral values remain roughly the same. However, depending on the context, a negative attitude may actually emerge from a 'knowledge deficit,' and thus, facts do matter for the purpose of communication and possible attitudinal changes. In other words, beliefs become consequential if one wants to not only know *what* someone's attitude is but wants to figure out *why* they have that attitude. However, after Bucchi's valid observation of deficits not being the *sole* reason for negative attitudes, his reasoning takes a wrong turn. He seems to suggest that true beliefs either don't matter or don't exist. Bucchi asserts that "knowledge [of the general public] is not an impoverished or quantitatively inferior version of expert knowledge; it is qualitatively different (…) [and facts are] only one ingredient of lay knowledge [which is interwoven] with other elements [such as] value judgements" (60). It seems as if the discussion here has moved away from one about the importance of specific beliefs, to one about value judgements on the totality of someone's beliefs—or knowledge—which in Bucchi's approach also includes values. That is a different topic entirely—regardless of the fact, I see no reason to believe that there can't be differences in the quality of total knowledge between two or more persons. If one accepts that beliefs can be true or false, then knowledge isn't just "qualitatively different," but also qualitatively better or worse. So, it is true a scientifically correct understanding of a certain technology can actually be the very reason for one's negative attitude if that technology in some way clashes with one's values. It might be used for ends one disagrees with, or if using that technology is perceived to have negative side-effects, i.e., the attitude isn't caused by a knowledge deficit but due to the knowledge itself. But this goes both ways: it might be that the use of that specific technology doesn't have those negative side-effects or can be used for other ends than the ends disagreed with. In this case, the negative attitude *is* actually caused by a knowledge deficit, and not because of one's values.

2.2.3 Misunderstanding and the importance of metaphor

Misunderstanding can lead to both positive and negative attitudes. At least two distinct sources of misunderstanding can be identified: factually incorrect understanding of technologies and misunderstanding a communication about that technology in which taking metaphorical language literally might be one of the key causes. That does not mean that the use of metaphor necessarily should, or even can be avoided. To varying degrees, we think in images, analogues, and metaphors (Lakoff and Johnson 453-454). Especially when it comes to physical processes that people can't see or abstract concepts, it is conceptualized by referring to other processes that have some similarity in how they work, in order to form some basic level of schematic understanding.

The issue is that the possibility of people taking metaphorical language literally complicates identifying the underlying causes of their attitude. Are they positive or negative towards technology because it conflicts with their values, or do they misunderstand what is being communicated? Note that this particular source of misunderstanding doesn't necessarily mean one has a factually incorrect belief about technology—although that is possible—but that one has a factually incorrect belief about what is being communicated. For example, someone has a negative attitude towards ADS because they believe that mind-uploading is impossible, which arguably is correct, and thus thinks that a company that claims to provide the service of 'digital immortality' must be either lying or delusional. For the neutral observer, this also raises the challenge of figuring out what is claimed by the creators of ADS—metaphorical language can also be used as an arguably misleading marketing tool to describe their products hyperbolically. Likewise, it doesn't mean that someone with a positive attitude towards ADS believes that literal 'digital immortality' is possible: maybe he or she just sees it as a potentially useful tool to help people through the grieving process.

2.2.5 A critical examination of an attitude category framework

Christian Kerschner and Melf-Hinrich Ehlers attempted to "address the apparent gap in empirical and theoretical research on attitudes towards technology in general" (140). Their approach consists of analyses of lectures of researchers from the field of Ecological Economics. Iteratively created attitude codes were devised in order to code isolated phrases. By doing so, they hoped to find explicitly asserted attitudes or to help interpret statements to discover implicit attitudes. They created four categories: Enthusiasm, Determinism,

Romanticism, Skepticism (143). These attitude categories consist of combinations of different values and beliefs, thus arguably creating the confusion warned against above.

The 'Enthusiasm' category is described as consisting of multiple possible elements; 'technophilia,' e.g., a positive attitude towards technology. It is also asserted that enthusiastic "attitudes can imply technocratic tendencies because specific technologies are to be implemented" even though they note that "no lecture explicitly called for rule by experts" (144). In other words, aside from some hedging, they do seem to suggest that a positive attitude towards technology is connected with certain political views and that this connection can be implicit, maybe even subconscious. Enthusiasm for the implementation of specific technologies then means that the 'goodness' of both the means and the ends is taken for granted or perceived as self-evident. This reading of technocratic tendencies somewhat resembles post-Marxist criticisms of what some may call 'neoliberalism.' For example, Chantal Mouffe argues that in contrast "to what neoliberal ideologists would like us to believe, political questions are not mere technical issues to be solved experts." The 'truly political,' zero-sum political choices are ignored this way. Or, following Hisschemöller and Hoppe's model: the technocrat only pays attention to the relevant facts but ignores the relevant values (144). It also associated with 'Cornucopianism,' the idea that what can be achieved through technology is limitless, at least in principle, and resource independently. Or, as Lomborg would say: the power of "human ingenuity."

The 'Determinism' category is described as an attitude that sees the further development of technology as inevitable, for a variety of reasons. It sees "technology as a result of evolutionary mechanisms" (144), or as the result of various social pushes. Presumably, they mean social forces such as consumer demands and technological arms races such as those between law enforcement and the criminal underworld, or between governments and protest movements. The Hong Kong riots of 2019, emerging from a still ongoing political conflict, could be seen as an example of this. It remains unclear if this implies a negative or positive attitude since this attitude towards technology could be the result of a pessimistic fatalism associated with negative feelings or a more tech-neutral or even positive stance of 'political realism.'

The category of 'Romanticism' is described as ambiguous and as existing in slightly more positive or negative expressions, referred to as "ambiguous aversion" and "ambiguous appropriation," respectively (144). It is not entirely clear how this is a helpful category, or how this can be easily distinguished from 'Determinism,' not only in practice, but also in principle: someone might see the further development of a proliferation of technology as inevitable, yet feel some aversion towards that inevitability, which would be the hypothetical

fatalistic attitude I described above. Or, as described above, someone might be ambivalent towards technology but appropriates it none the less because it serves a particular purpose, as can be seen, again, in the Hong Kong protests of 2019.

Then there is the final category: 'Skepticism.' This category is considered to include techno-pessimism, i.e. the attitudes that consider technology bad for humans, nature, or both. Or a more 'plain' form of skepticism, i.e., the attitude that technology has to be proven that a specific technology isn't harmful. It is also considered to be associated with "Malthusianism" (144), the belief that technology cannot overcome resource limits. Again, it is not entirely clear if these different attitudes and beliefs can be grouped in a discrete category. Why is 'plain skepticism' associated with Malthusianism? I see no reason to consider it impossible for someone to both believe that possible side-effects of technology have to be investigated before widespread implementation and that what can be achieved with technology is limitless—or at least far supersedes the limits we now take for granted. And why can't someone consider technology to be bad for humans and nature, while also believing its advancement to be inevitable? This would make that person a determinist skeptic. If that same person then appropriates a specific technology due to some isolated benefits, then that person would be a romantic determinist skeptic. In summary: this schema might not be very helpful in distinguishing between different attitudinal stances, either between individuals or groups.

2.2.6 How do we measure and understand attitudes?

How do we measure and understand attitudes? It seems attitudes are both *defined* by connecting them to different beliefs and attitudes and *analyzed* by searching for alleged *indirect* indicators of attitudes. This is also true for the attitudes of techno-optimism and techno-pessimism, as could be seen above. In other words, the presence of certain beliefs is presented as evidence of specific attitudes, since it is either asserted or assumed that these attitudes *must* lead to certain attitudes causally, or that these beliefs at least are strongly correlated with certain attitudes. This runs the risk of leading to circular reasoning: beliefs are identified in order to determine attitudes while assuming these beliefs are, in fact, indicative of specific attitudes. Remember that attitudes are mental states that emerge from a combination of beliefs and feelings (Hong & Albarracin 59). Thus, to determine attitudes by identifying the belief component thereof implies that the presence of certain beliefs *must* lead to certain feelings—but that does not need to be true, because a specific attitude towards a specific "attitude object" (Hong & Albarracin 59) doesn't exist in isolation. This leads to the

following question: which attitudes are being measured? This isn't easy to answer because there can be different underlying causes for similar attitudes. For example, implicit values can lead someone to have a negative attitude towards specific technologies, while having a positive attitude towards science and technology in general (Besley 16). This means that a specific response to ADS might have to do with values regarding death and mourning, for example, or the attitude might be the result of skepticism about the ADS technology's asserted functionality, i.e., disagreement about the science (Hisschemöller and Hoppe 44). Maybe an assumed connection between certain beliefs and certain feelings is supported by empirical evidence, i.e., a commonly found correlation. This arguably justifies such an assumption to make quantitative estimates of the attitudes held by the general public, but this would still make it hard to understand the why of the attitude and the underlying causalities.

Also, an empirical analysis of attitudes is difficult for a variety of reasons. For example, the challenge of identifying "adequate measurements for knowledge [of] science and technology" (Kerschner and Ehlers 139), which can be important since attitudes partially consist of knowledge, i.e., beliefs that are factually correct or incorrect. Also, Marcel Wissenburg states that large-scale quantitative "sample research (…) does not allow too many or too detailed questions, hence the data it generates remain open to interpretation", which he points out in the context of "green ideas" (30) but the same is arguably true for attitudes towards technology. As I will point out below, interpretation is still problematic even with qualitative analyses.

An assumed connection between certain beliefs and certain feelings may also be based on a specific theoretical expression of a philosophy, a political ideology, or an artistic movement. Such as the published work of a philosopher, or a philosophical movement; a political manifesto, or political movement; an artistic manifesto, or art-movement—possibly in a collection of works, a canon. There is the risk of assuming that all individuals that are or seem to be part of such a movement think alike. An even higher risk is to assume that the presence of one or a few of the components of a theoretical expression must be sufficient evidence of being part of some movement—be they philosophical, political, or artistic. This focus on pre-existing 'complete' theories also risks missing possible combinations of separate components (Wissenburg 30), thereby increasing the chance of tunnel vision and projection due to the circularity mentioned above.

Another example is the view that "scientists [are] playing God" (Hellsten and Nerlich 93) on the proper place of humans might lead to general technophobia, not even because of direct consequences of using technology, but because technology, or a certain level of technology, is seen as bad for the human spirit in principle. It might also be reserved to the

use of technology towards specific ends, or the perceived negative effects of using specific technologies, in which case the hubris criticism doesn't translate to general techno-pessimism, but to specific objections that may even be independent of technology.

2.3 From death affordances to after-life affordances

People that are born in this age likely will already have an online presence, e.g. through the echo pictures shared by their parents and relatives and even the moment right after being born. At the other end of the line, death awaits. In 2019, big data researchers Carl Öhman and David Watson "estimate[d] the growth of digital remains over the course of the 21st century" to be 1.4 billion *Facebook* accounts if they would not attract any new users, and 4.9 billion if growth would continue as is (n. pag). Although *Facebook* supposedly can 'predict' when someone possibly is going to die (Ellis), there is a still-unsolved problem of social media applications. Namely, they can't automatically distinguish between someone having passed away or is just being offline for a very long time. What is going to happen with all these 'dead' profiles?

To understand the workings of a platform, one needs to discuss the notion of affordances. This idea of affordances has already been researched extensively, starting from ecological psychologist James Gibson's first description that "[t]he *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill" (127). While Gibson focuses on affordances as relationships, computer scientist and experimental and mathematical psychologist Donald Norman approaches the phenomenon from a designer's perspective. Norman proposed the notion of perceived affordances, by which he means that "the art of the designer is to ensure that the desired, relevant actions are readily perceivable" (39). Another approach is from a metaphorical and technical viewpoint, as explored by William Gaver. He argued that "affordances can be both perceptible and *hidden*"[2] (Bucher & Helmond n. pag; Gaver 80). Especially in new media studies, affordances can often help researchers to "describe what material artifacts such as media technologies allow people to do" (Bucher and Helmond n. pag). Danah Boyd famously proposed four properties—*persistence*, *searchability*, *replicability*, and *invisible audience*—that "fundamentally separate unmediated publics from networked publics" (9). In terms of 'identity performance,' Boyd also

[2] The connection to metaphors is that *hidden* affordances need experimentation to make them visible, and the use of metaphors in appearance is connected to the functionality *behind* the fold. The activity triggered by lines of code is condensed into a single action, such as pressing a 'button' to activate something.

claimed that while "in some sense, people have more control online," by being able to "choose what information to put forward," digital bodies don't have the same articulation that people show through their bodies. It might be difficult to precisely understand "what someone is expressing" (12).

Before social media had implemented any affordances to change the account of the deceased into a 'memorial account,' the bereaved needed to decide if an account should remain 'as is' so people can continue to 'visit' and 'share' memories, or should be deleted altogether. In some cases, family members tried to access the account of the deceased family member, ending in court against the social media platform that stood behind their privacy policy (Connolly). Sometimes, an unpleasant surprise to a deceased person's family and friends could occur due to a glitch in the system, making it look like as if the person was still alive. Think of a 'program-generated prompt' that notifies friends and family of, e.g. a deceased person's birthday, a suggestion to 'like' something of them, or 'befriend' them. Research showed that there are difficult and awkward aspects surrounding 'death' on Facebook, e.g., misinformation, depersonalization, "pop-up" reminders, interference with grieving, witnessing grief, and the challenge to privacy (Rossetto, Lannutti, and Strauman 980). In *Virtual Afterlives: Grieving the Dead in the Twenty-First Century*, Candi Cann, associate professor of Religion, has interpreted these after-life prompts as 'internet ghosts,' as if the person was still "linger[ing] around the Internet" (113). Sociologist Debra Bassett added to this notion. Bassett sees the unintended encounter with the "re-animation and resurrection of the dead" as a 'digital zombie' (1133-1134). Bassett has connected these digital recreations, with 'digital immortality,' although she seems to use this term metaphorically, not literally (1134). Bassett's explanation is that there is the "dualism of being both dead and virtually alive; and crucially still being socially active" (1134).

Mainstream companies, e.g. *Facebook*, *Instagram*, *Twitter*, *LinkedIn*, *YouTube*, *Google*, and *Snapchat*, have in the previous years started to implement affordances that provides users with options how to manage and leave behind their profiles and data when they die. For example, *Google* offers options in its "About Inactive Account Manager" and *Facebook* explains in its article "What will happen to my Facebook account if I pass away?" what users can expect to happen to their profile. Nowadays, most of these companies provide the options to leave the account open as is or to delete it. Some of them have a memorialization option, such as *Instagram* and *Facebook*. An *Instagram* account can be memorialized only by an immediate family member who has to upload the death certificate. For a *Facebook* account, the user can appoint a 'legacy contact' to take care of the memorialized page, but if this option is left blank, the profile will be 'frozen' in time. *Google* also provides the possibility to appoint a trusted

contact who will decide what will happen to the user's data through their 'Inactive Account Manager.' In short, these platforms are continuously updating and adding after-life affordances in order to provide users with options how to deal with their data after they die.

The above-mentioned after-life affordances on mainstream media platforms present how they emphasize the end of life, either by deletion or by memorialization. However, there are also companies that focus on the *continuation* online through automizing a continuous active presence through bots or providing an interactive memorial space, as stated in chapter one. After-life data services show promise to not let one's online existence stop after dying. Specifically, in terms of ADS platforms and technologies, one could use Taina Bucher's and Anna Helmond's platform-sensitive approach to affordances. This approach looks at the platform and how that "infrastructure extends its affordances beyond" (n. pag). It looks at how "different users [are drawn] together" and "which orchestrate the relations between different platform users" (n. pag). These users, in ADS, are not merely restricted to the end-users, developers, and advertisers, but also between *preservers*, *receivers*, and *mediators*, according to Maggi Savin-Baden and David Burden (91). Also, these ADS platforms present *digital immortality* through three types: *memory*, *avatar*, and *persona creators* (91). In short, there are many more aspects to take into account when analyzing ADS platforms, as they are not merely social media sites. Pre-death affordances encompass all those mentioned above. After-life affordances go beyond the relationship between the bereaved users, deceased users, and the platform.

2.4 Pop-culture expressions of tech-attitudes: cyberpunk versus transhumanism?

Quick analysis of both pop-culture itself, and discussions thereof based on the above observations, suggest that cyberpunk and transhumanism are attitudinal opposites. Robert Geraci states that cyberpunk was a rejection of "[transhumanist] promises of 'mind-uploading' and immortality through technology" (141). Stephen Lea Sheppard shares this sentiment: "Transhumanism is about how technology will eventually help us overcome the problems that have, up until now, been endemic to human nature. Cyberpunk is about how technology won't."

2.4.1 What is cyberpunk?

Cyberpunk is often described as a pessimistic and sometimes dystopian subgenre of science fiction. It features elements such as advanced cybernetics, computer networks, and their effects on humans. It primarily deals with themes of epistemological and existential uncertainty caused by virtual reality and cyberspace and questions about what it means to be human in the face of extensive body modifications and the emergence of A.I. Stylistically it often makes use of postmodern deconstruction, e.g., deconstructing the ideas of scientific and/or societal progress as well as the utopian elements of traditional science fiction. It also derives influences from genres outside of science fiction, predominantly from hardboiled detective in cyberpunk literature and Film Noir in cyberpunk cinema. Cyberpunk stories often feature diminished power of traditional nation-states, powerful and often corrupt mega-corporations, cyborgs, powerful AI's, multi-cultural hyper-capitalist societies, extreme wealth disparities, and advanced forms of computer networks and virtual words (Cuddon 181-182).

2.4.2 What is transhumanism?

ADS services and some of their espoused goals seem to be in line with transhumanist ideals, such as the idea that through technology, humans can continuously enhance themselves, which is already happening to varying degrees (N. Lee 5). Ultimately, transhumanists believe that when technology has caught up, 'uploaded minds' can be transferred to another body, in either digital or physical form like cloned biological bodies or artificial robotic bodies (N. Lee 168; Jorge 649; *Lifenaut*). The transhumanists' penultimate goal of transcending and defying death is to be 'reborn.' The body will become merely a vehicle to carry information, and 'transferring' that information into an immortal avatar can thus be seen as the ultimate step to leave the body behind and continue with the data through intelligent machines. Transhumanists believe that singularity, at some point in the future, will be achieved. If so, transhumanists might have found a way to digital mortality if that literal continuation of living digitally is accomplished. Subsequently, the need for mourning would diminish due to merely 'downloading' the mind data to an organic or non-organic vessel.

2.4.3 Cyberpunk pessimism versus transhumanist optimism?

One can wonder if cyberpunk's pessimism is solely, or even primarily, directed at technology. Take for instance the following quote from cyberpunk author Richard K. Morgan in an interview about his novel *Altered Carbon*: "[S]ociety is, always has been and always will be a structure for the exploitation and oppression of the majority through systems of political force dictated by an elite, enforced by thugs, uniformed or not, and upheld by a willful ignorance and stupidity on the part of the very majority whom the system oppresses" (Bullock). Although this suggests that technology certainly would not help fix our problems, its pessimism seems primarily aimed at human nature and the societies humans build.

In contrast to the pessimism of cyberpunk, there is the optimism of traditional science fiction that, according to Miriyam Glazer, glorifies technology and science, and is Utopian (156). *Star Trek: The Original Series* (1966) and *Star Trek: The Next Generation* (1987) are arguably the most famous examples of such optimistic science fiction. These series are optimistic about both technological and social progress: it believes technical problems can be overcome through human ingenuity and rationality, and it believes societal problems can be overcome through human reason and empathy. It depicts that many would arguably consider to be utopian: hunger, disease, and other technical day-to-day problems have been radically reduced. Social problems such as war, racism, sexism, and economic inequality have been 'solved,' or at least significantly reduced (compared to the then-current norms at least).

However, this doesn't mean that *Star Trek* is necessarily transhumanist. For example, in a video of the *YouTube* channel 'Wisecrack' it is argued that Star Trek shows the value of technology for society in specific forms of support ("Will Wall-E Come True?"). Still, it simultaneously warns against a total fusion of humanity with machines. The results of such a singularity is depicted in the form of the alien species the Borg, who assimilate humanoid species into a beehive-like society devoid of human emotion and individuality.

2.5 Proposed Attitude Quadrant: techno-pessimism versus techno-optimism, positive versus negative towards human nature

The literature review in this chapter was meant to explore attitudes towards technology with the aim of identifying universal indicators that could be used when analyzing the ADS case studies. Instead, I found that the literature on tech-attitudes often fails to clearly distinguish these attitudes from a multitude of other attitudes. What is also often ignored, is that the *why* of attitudes cannot truly be explained without knowing more about the values of a person, because it are precisely these values that trigger either positive or negative emotions when a fact-claim is believed to be true. Instead, researchers tend to assume that the presence of certain attitudes suggests the presence of certain values.

For example, to identify pessimism about human nature often is difficult: if someone seems cynical about society as it is, does that emerge from a lack of faith in human's capability of making better societies, or does it emerge from a dislike and opposition to the current social, cultural, and/or political status quo? In the latter case, it arguably is not so much a negative attitude towards humanity itself, but to certain forces that affect humanity but are outside of it, or at least perceived to be. In other words, if power corrupts, does it do so because humans are easily corrupted or because the corrupting power is so strong and malevolent?

The map below is not intended for direct use in the analysis, but instead it is meant to illustrate that attitudes exist on a continuum, and that even just combining two possible attitudes towards general attitude-objects result in a vast landscape of possible positions. The map shows possible combinations of more or less positive or negative attitudes towards technology and human nature, i.e. two distinct forms of optimism and pessimism. As mentioned, these attitudes do not need to be absolute, and probably rarely are. This means that someone with both a general positive attitude towards both human nature and technology doesn't need to agree with the entirety of the transhumanist project. The attitude of *Star Trek* for example would fall firmly in upper right quadrant, as would the attitude of transhumanism, even though *Star Trek*, as argued above, does not align with the transhumanist ideology.

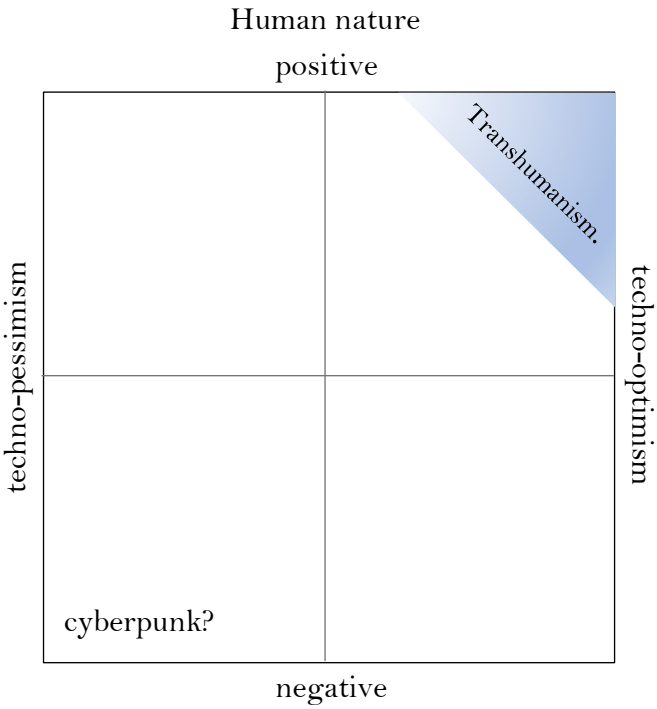

Figure 1 Attitude Quadrant: negative human nature versus positive human nature, technophobia versus technophilia

CHAPTER 3 - METHODOLOGY: AFTER-LIFE DATA SERVICES, AFFORDANCES AND ATTITUDES

The previous chapter included a discussion on attitudes, science communication, knowledge, metaphors and misunderstandings, and after-life affordances. Furthermore, I also presented a discussion on *how* to analyze attitudes. As attitude analysis has not often been applied to new media studies, I will present in this chapter how I intend to use this framework and how I have gathered information on the objects, motivations and responses.

The objects of study are both the ADS platforms, *Eter9* (eter9.com), *Eternime* (eterni.me) and *Lifenaut* (lifenaut.com), and, the videos of the platforms and presentations or interviews of the CEO's. All of these platforms are accessible in English, however, during this research, the website of *Eter9* was taken down due to 'construction' work and accessed through the WayBack Machine. For the fourth case study, *Meeting You*, a shorter compilation of the documentary on *YouTube* with added English subtitles is used, as the original version is inaccessible behind a region-restricted Korean website. And even if it was available, the audio on the original streaming website is in Korean without English subtitles. Additionally, articles and interviews from the CEO's or creators of the above-mentioned case studies, and external blogs, press and available comments about them were either in English or automatically translated within the page itself. For example, *YouTube* provides an automated translator subtitles function, although the context of the original message might get lost in translation. In general, English articles were used as they were widely available and accessible. Next to the *Google* main search engine, the 'news' search engine was used to find more responses, as well as performing the 'snowball' technique through using hyperlinks to other articles and blogs, and reactions thereof. The mentioned ADS launched many years ago, which means that the blogs and press are sometimes outdated. However, due to current trends surrounding A.I. and death, they are now mentioned again in tandem with newer technology, for example in recent articles on *Meeting You*. As additional content to the analysis, a written chapter in the *Transhumanism Handbook* of CEO Henrique Jorge, and interviews with him through *YouTube* and online articles are used in regards to *Eter9*. In case of all case studies, written and video interviews with the related spokespersons have also helped gaining insight into their ideas and services, and their motivations to create it and their perceptions.

In the upcoming chapter, I performed a qualitative analysis and close reading of the contents on the platform and services itself, taking into account the complexity of those

services. What do the current existing after-life data services or projects encompass? Moreover, how are they being used at the moment, and specifically, what do they afford through intentional and unintentional mourning features? Due to limited access to the ADS, this analysis will predominantly focus on the marketing of these services on the platform or through spokespersons, specifically on used language to describe their product. This chapter will also provide an analysis and examination of the selected blogs and press that have reacted to these services, including comments on those articles by the public. Additionally, the attitudes as proposed in the theoretical framework will be taken into account to specify someone's attitude towards the technology and development, provided there is enough context to extract from the text. A question, for example, is if the attitudes are formed due to a lack of information, some form of misunderstanding or due to different values. The goal is to understand the attitudes of both creators and commenters, and to extrapolate these into a speculation of acceptance in the future, which will be discussed in chapter five.

CHAPTER 4 - AFTER-LIFE DATA SERVICES AND *MEETING YOU*: AFFORDANCES, MOTIVATIONS AND PUBLIC PERCEPTIONS

This chapter will discuss ADS and *Meeting You*, from the perception of the website itself, the motivations from the creators and public perceptions found on the internet in articles, blogs and comments. The goal of this chapter is, by a close-reading of the ADS, *Meeting You*, to identify what the service encompasses, how the creators present it and what their motivations are. Furthermore, I will attempt to elaborate on how these services might be perceived as a mourning tool. All three ADS seem to play into the concept of continuing to be active after death, but what does it mean for mourning if there still is an active counterpart of a person roaming around a social media platform? Or if there is a digital avatar or even a mind clone with a body? Is communicating with the digital immortal - in other words, a remnant that is imitating the original person - a way to mourn or to avoid mourning? To seek an answer to these questions, selected public perceptions to ADS and *Meeting You* will be discussed, respectively.

4.1 An Analysis of ADS

4.1.1 Eter9: a continuous active presence

Is it possible to continue an active online presence after you die? According to CEO Henrique Jorge, this is possible through their social media platform: *Eter9*. Currently claiming to have more than 63.000 subscribers (Keach), *Eter9* resembles the social media platform of *Facebook* with added 'digital persistence' features that imply digital immortality through a continuous active presence. On *Eter9*, the user, through his or her so-called 'counterpart,' will keep on interacting with others even if the user is offline or dead (as seen in figure two). Having active bots and counterparts (which are also claimed to be A.I. bots) on the platform, interaction is possible between *all* users, e.g. 'organic' and 'artificial' users (*Eter9*). In other words, interaction is between the physical users behind the avatar, but also between the counterparts, generic bots, and the intermingling between organic and artificial users. Jorge states that the

platform relies on an "AI system that continuously learns from its users inside" (Jorge 646). Creating an account will create the user's 'counterpart,' which is explained as its digital other half, an assistant. By interacting and engaging with other organic and artificial users on the platform, the user provides the platform with data. This data is used to create a counterpart that can continue interacting with others while the user is offline. According to Jorge, users "can choose to allow their Counterpart to remain active after they are not physically present anymore" by activating the eternity setting (647; as seen in figure three). "Not physically present anymore," being either a euphemism for death or meant to suggest that someone is still actually present—just not in a physical form. As stated above, the distinction between being offline or being dead is something that still cannot be identified by any platform, unless the appointed trusted contact has uploaded a death certificate (Sinders). Nevertheless, Jorge claims that "users can differentiate a digital-self of someone (…) offline from someone that is not physically present anymore" (647), but how this is managed, is not made clear.

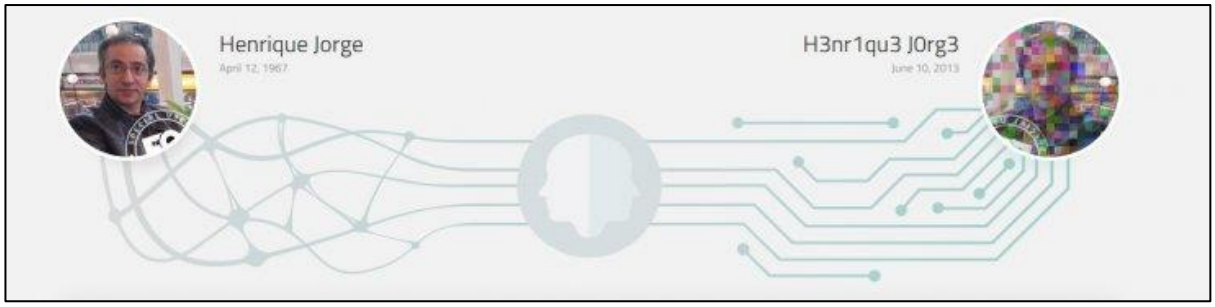

Figure 2 The 'organic' user versus the artificial counterpart. On the left is the profile of ETER9 CEO Henrique Jorge, showing in the bottom right corner the stamp indicating a 'verified user' (Cuthbertson)

Figure 3 The option to activate a user's eternity, allowing the counterpart to post forever (Jorge 647)

The choice of futuristic words on the website, e.g. counterpart, eternizing, become eternal, suggests a form of digital immortality. However, Jorge explains the concept of having a 'counterpart' as the possible answer to societal expectations of having to be available 24/7 and instead "[allow] the user to spend more time outside the network, and that a virtual counterpart of the user interacted inside the network on his behalf" (The Real Tocha). According to Jorge, *Eter9* is the solution for people that seek to continue "to do business through their *Counterpart*, either making job interviews or finding the best commercial deal,

for instance" (647). This suggests that the current primary purpose of the service is a form of time management tool: a platform that affords the user to delegate certain mundane tasks to an automated process to help combine the desire for more leisure or family time with conformity to dominant values of 'professionalism.' The use of futuristic words might indicate a secondary purpose, or maybe the ultimate primary purpose that as of yet is not technologically possible but reflects Jorge's actual ambitions. It might also just be that words are chosen merely for marketing reasons.

Next to being intended as a platform for businesses solutions, *Eter9* also seeks to provide a 'library' of people. Jorge stated in a presentation at Robotex in 2018 that 'counterparts' are not a replacement of the organic user. He explains that immortality is in the interactivity of the medium: "our grandchildren can have an interactive memory of us." A purpose derived from this could be that it is a modern way of memorizing the dead, possibly with a grieving element. Interactivity, being an upgrade of a picture, arguably might incentivize unhealthy behaviors, such as choosing continued interaction with a deceased loved one instead of making new connections with real people, as seen in *Black Mirror's* "Be Right Back."

Even after the user has died, creating a platform with the possibility of continuing engagement could also be seen as an alternative way to digital immortality. However, in an interview by YouTuber The Real Tocha, in the beginning, Jorge admitted that he did not expect people to become interested in the immortality part. Jorge explained that he was experiencing difficulty in approaching these questions of life after death, "[and] I didn't want this to be seen as our goal [, b]ut the reality is that this subject attracts many people." This reaction could be due to Jorge's belief on what the public wants, and coincidently, the public interest connects with his own beliefs and values which are rooted in transhumanism. Jorge expressed his transhumanist views in a chapter in the *Transhumanism Handbook*, in which he defends the transhumanist ideas: "[the] human era will not end; instead, it will be reborn or, if you want, REINVENTED!" and "[p]ost-human minds will lead to a different future (…) [and] humans will be able to upload their entire minds to 'The Living Cyberspace' and… BECOME IMMORTAL" (649). However, even though his views are apparent in this text, the choice to motivate users to join *Eter9* due to its possible 'business' solution element, could again be chosen as a way to market this platform, perhaps because Jorge didn't think so many people were interested in the digital immortality part. However, Eter9 advertises as well for users to become a verified or 'special' user of *Eter9*, which is only granted if the user is "helping to 'Evangelize' [by] telling or teaching others about or helping other users with ETER9"

(Fennell). Evangelizing might be meant in a cynical or literal sense, spreading the word about *Eter9* and subsequently for the transhumanist ideology.

4.1.2 Eternime: a library of humans as a legacy

Eternime, in one sentence, is a data-collecting app, by harvesting through other social media platforms and by a chatbot, that aims to produce an avatar for the user's family, friends, or others when technology has advanced sufficiently in a hypothetical future. Currently, *Eternime* is still in its 'private Alpha' phase, with only 40 people using it as a test case, although they have a waiting list of 46.811 users that want to start using it. However, according to Umberto Bacchi's article, *Eternime* "is currently on hold due to lack of funding."

On their website, *Eternime* seems to focus on the idea of a digital legacy, another memorializing tool, by preserving "your most important thoughts, stories, and memories for eternity." The language on the website varies from merely preserving one's data to the metaphorical 'keep their stories alive' through the preservation of them. Like *Eter9*, however more prominent, they also lean on the idea of providing a 'library' that future generations can access which possibly could be used as a grieving tool too. *Eternime* also seeks to provide the possibility to "live on forever as a digital avatar" where "people in the future could interact with your memories, stories and ideas, almost as if they were talking to you," suggesting a non-literal immortality again. *Eternime's* product could be viewed as their proposed solution to forgetting, which is emphasized on their website as well. The website's language shows that it is important to preserve one's data for posterity: people will remember you, even a long time from now. Arguably, *Eternime* seeks to serve two kinds of users: the user that wished to be *preserved* and the user that seeks to *interact* with preserved users. These users are what Savin-Baden and Burden called *preservers* and *receivers* (91).

Eternime has uploaded three videos on *Vimeo*, each showcasing the different phases and the elements of the application. These videos, together with the description on the website, indirectly show the components and affordances of their application, as it isn't accessible as of yet. The first video showcases *Eternime's* first version, "Alpha One," a platform where the user can save memories by answering various survey-like questions, either in writing or video form (as seen in figure four). The user can also choose to skip certain questions, thus selecting what to share. In "Alpha Two," the second video, *Eternime* presents a chatbot that interacts with the user, asking for memories to save. This video shows how someone else could interact with the chatbot, asking it questions about past events (as seen in figure five). In return, a digital avatar will speak with a computerized voice and limited facial expressions through simple animation of the mouth and eyes (as seen in figure six). The

third video, “Alpha Three,” encompasses two features: automatically gathering data from one’s smartphone through API (Application Programming Interface) requests to other applications that show what the user is doing, where the user is, and whom the user meets. If the user connects with another user via social media, the chatbot will ask the user to write down how they met (as seen in figure seven).

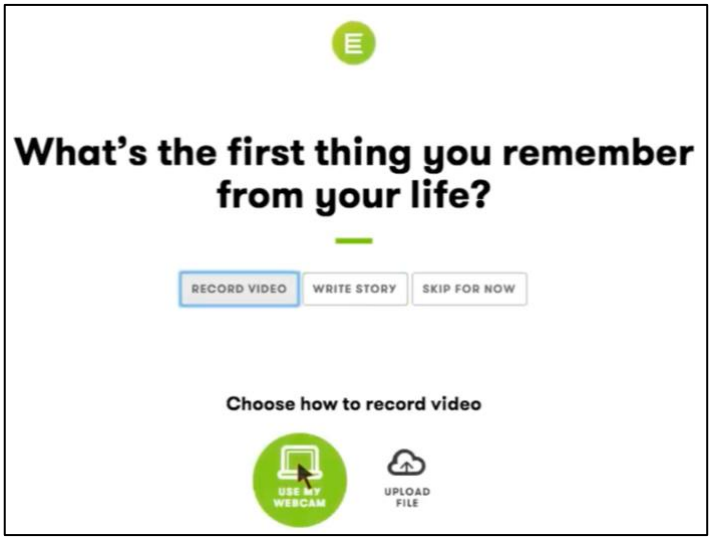

Figure 4 Screenshot of Eternime's "Alpha One": version where the user can record, write or skip personal questions (Vimeo)

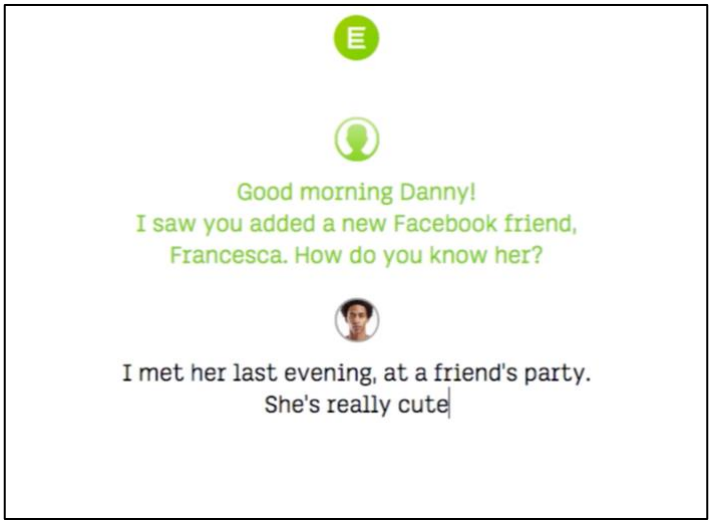

Figure 5 Screenshot of survey on Eternime's "Alpha Two" (Vimeo)

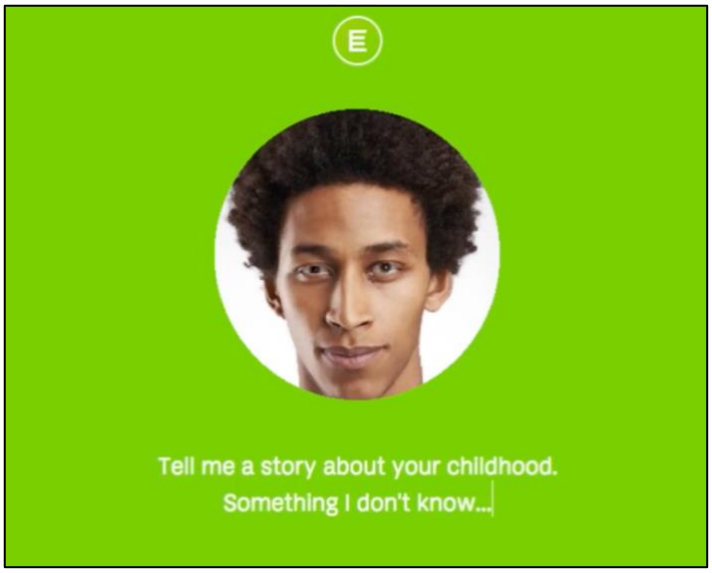

Figure 6 Screenshot of Eternime's "Alpha Two": animated avatar (Vimeo)

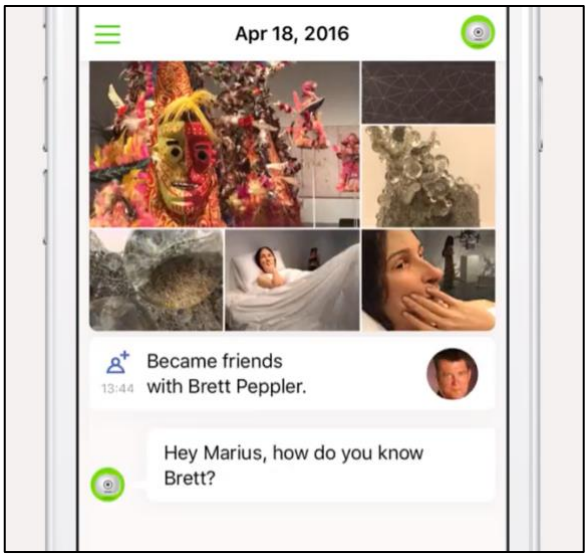

Figure 7 Automatic data-collection and chatbot interaction on Eternime's "Alpha Three" (Vimeo)

Like Jorge, CEO Marius Ursache also gives interviews and presentations to promote his product. In one of these interviews, Ursache explains that in the very beginning, the group of entrepreneurs he worked with to start this company, thought of their users as people that resemble themselves (MIT 15.390X). Only after researching, they found out that the group that needs an app like *Eternime* the most are people that are terminally ill or dealing with a memory condition such as Alzheimer's or dementia. In another presentation on *YouTube*, "A.I. and Afterlife," Ursache uses a personal experience of losing a friend as a motivation to continue developing *Eternime*. Ursache, who experienced the sudden loss of a friend, sees *Eternime* as a way to do something meaningful, even after dying ("A.I. and Afterlife"). He asks

for a solution for all who die while their loved ones are not prepared, especially with all the technology we are surrounded by ("A.I. and Afterlife"), which arguably could also be understood as a way to transcend death or to provide a mourning tool. However, unlike Jorge's underlying transhumanist view, it isn't clear what Ursache's ultimate goal is with the copying of humans and his idea what it means to be human. Furthermore, from the interviews it is almost clear that Ursache handled from an entrepreneurial perspective, finding a solution for a problem he encountered, and, subsequently learning from public input into changing this product into something more valuable.

4.1.3 Lifenaut: mind-uploading and the hope for future technology to be revived

Lifenaut encompasses a data-collecting database for 'mind files,' 'bio files,' and an interactive avatar. The creators hope that in the future, the files could be used "to explore the transfer of human consciousness to computers, robots and beyond" (*Lifenaut*). These (although basic) mind-uploading features and their belief that future technology will ultimately provide revival, connects to transhumanism ideas. *Lifenaut* is part of The Terasem Movement Foundation, which focuses on investigating the Terasem Hypothesis. This hypothesis consists of two parts: the possibility of 'saving' the human consciousness through a person's data and the 'transferring' of this data into another body, biological or 'nanotechnological' (*Terasem Movement Foundation*). What a possible transferred mind file into a new biological or non-biological body is going to look like is visualized in Terasem's science-fiction film *2B* (2009). The copied humans in this movie are called 'transbemans.' It is claimed that the transbeman will "[transcend] above biology and electronics but still is human" and that they *should* have equal rights with humans (*2B*). This call for equal rights is in the line with the political side of the transhumanist movement, some of whom have proposed a 'Transhumanist Bill of Rights,' "to help guide and enact sensible policies" in the case of the future creation of "advanced sapient and sentient life" (N. Lee 19).

Like *Eternime*, *Lifenaut* also relies on the database concept. The mind file on *Lifenaut* can be filled up with videos, images, audio, and documents about the user that can be accessed, searched, and shared. The platform offers a computer-based avatar as well, based on existing chatbot software that has natural language processing[3], that learns things about the user in

[3] As of 2012, The Terasem Movement Foundation has used Jabberwacky chatbot software from Rollo Carpenter (*Jabberwacky*)

order to become more like the user (Rothblatt 147). An additional feature *Lifenaut* offers is storing a 'bio file' made from gargled mouthwash that needs to be sent in. Next to the Mind File, Bio File, and the computer-based avatar, *Lifenaut* gives the user the possibility to 'space beam' their data into space. *Lifenaut* is officially a free accessed platform, though they do suggest donating an amount of $399 for the Bio File due to the storage costs if the user can afford it. The Mind File (including the 'space beam' feature) is free, but they do not guarantee that possible premium features in the future will be created. In this way, they want to keep the platform and facilities accessible to everyone.

Bruce Duncan, Managing Director of the Terasem Movement Foundation, has been traveling around last decade to present the *Lifenaut* platform and to argue for the possible future creation of a digital 'clone.' Duncan has been bringing along Bina48—the appointed ambassador of Terasem—a humanoid robot modeled after Bina Rothblatt, the wife of founder Martine Rothblatt. On *Lifenaut's* website, Bina48 is described as "an early illustration of part one of the Terasem Hypothesis," as mentioned above. Given that Bina48 is merely a standalone example from the Terasem movement, their creators seek to prove the feasibility of one part of the hypothesis, although not yet on a large scale. A noteworthy element is the motivation of Rothblatt to model a humanoid robot after her wife because she did not want to live in a world without Bina ("Martine Rothblatt: My daughter"). However, Rothblatt said she "believe[s] our mind clones, these digital versions of ourselves, will ultimately be our best friends" ("Martine Rothblatt: My daughter"). To some degree, it seems that Rothblatt does distinguish between the real person and the preserved person, since she explicitly acknowledges the possibility of coexistence as independent entities.

4.1.4 (Un)intentional mourning features and after-life affordances

While each of these websites don't explicitly describe their services as mourning solutions, it is interesting to note that all of their spokespersons are using the experience of, or fear for a personal loss as one of the motivations to create their platforms. However, *Eter9's* CEO tries to emphasize that its platform's goals are to relieve the pressure of a 24/7 society as a business solution, and to provide an 'interactive memory' that current and future generations can consult. The affordances are comparable to the traditional *Facebook* affordances, comparable to Boyd's proposed properties "[t]he potential audience is affected by [… and that] separate unmediated publics from networked publics" (n. pag). *Eter9* encompasses the property of persistence, "record[ing communications] for posterity," the property of searchability,

replicability and invisible audiences (n. pag). Furthermore, there are certain *shareability* affordances in place, by aiming to enable the possibility to connect to other platforms such as *Facebook*. Still, by using words such as 'eternizing' and the option to activate the eternity setting, unlike *Facebook*, *Eter9* draws on the notion of being active even after someone has died and the possibility for others to engage with 'you.' Moreover, the user can choose how active his or her counterpart they want it to be.

Similar to *Eter9*, *Eternime* also does not aim to emphasize on the mourning aspect, while its descriptions and images do suggest family bonds. The pain of not leaving a mark on this world, and to a person's relatives, is used to motivate users to feed enough data to provide an interactive avatar for future generations to access. *Eternime's* CEO did elaborate that a recent loss of a good friend had sparked to do something 'good' with his death and that technology could be the answer to the problem that nobody is ever prepared to lose someone close. Regarding *Eternime's* after-life affordances, it is limited because the preserved stories are merely being retold through a chatbot and simplistic animated avatar, while it does not seem to continue to create new content inspired by the original user.

Like *Eternime*, *Lifenaut's* platform allows the user to add a variety of data, from photos, videos, music and other documents for posterity. It offers the user to organize this information "through geo mapping, timelines, and tagging" and to connect with other 'lifenauts' through a networking platform (*Lifenaut*). However, unlike *Eter9* and *Eternime*, *Lifenaut* adds the transhumanist view by envisioning a future where copies of people can be realized through data *and* biological samples. The creation of a new humanoid robot that is modeled after a real person is not a coincidence; it was the founder of Terasem that could not imagine a world without her wife. She wants their 'love story' to continue in eternity and thus, decided to research the possibility of creating such 'copies.'

4.2 *Meeting You:* the intentional mourning tool

Recently, a documentary of a virtual reality program became a trending topic online. The *YouTube* compilation of the *Meeting You* documentary, posted by *MBClife*, has been viewed more than 21 million times and gathered countless articles, comments and blogs. This object differs from ADS in two ways: it is not a platform but a combination of different technologies, and it is *intended* to be a mourning tool. The story of *Meeting You* contains multiple storylines. The main story deals with how the project created a virtual reality application for a bereaved

mother that gets to reconnect with her child that died years ago. Additionally, there is the story of the bereaved mother that takes place in the virtual reality world, placing the viewer in the role of viewing the outer and inner virtual world the mother is experiencing when she is meeting her child.

This project can be seen as one of the continuing steps towards creating new modes of dealing with mourning and the after-life. While the example of *Meeting You* is still out of reach for the general public, steps towards accessible versions of what might be called 'digital immortality' have already been made, as mentioned in the previous discussed case studies. *Eter9*, *Eternime*, and *Lifenaut* are platform-based applications with 2D virtual avatars if provided. In contrast, in *Meeting You*, a VR-based environment is offered to give a simulated 3D experience to the virtual avatar using haptic gloves that simulates the sensation of touch. The synthesis of various technologies behind re-creating a dead person and virtual reality with kinesthetic communication can be seen as the step towards even more realistic recreations.

While the full documentary is currently only available in South-Korea without English subtitles, the short version on *YouTube* and interviews with the makers and the bereaved mother, unveil some of the mysteries and goals surrounding this project. In *the Korea Times*, Lee Gyu-lee interviewed Stanley Kim, the CEO of the company in charge of the virtual avatar, Lee Hyun-suk, the director of the company, and Kim Jong-woo, the producer. Kim wants to distinguish his VR company from entertainment and gaming purposes by "connect[ing it] with humans or their feelings" and believes that "the VR-based reunion could help heal grieving people especially when used in conjunction with psychiatrists or clinical psychologists," and perhaps even mental illnesses can be treated through VR simulation. Kim also mentions the historical potential of VR-simulation in which "great figures in history can [also be] brought back to share meaningful messages." However, Kim still acknowledges the entertainment aspect by referring to the reviving of celebrities (E. Park).

Kim Jong-woo, the documentary's producer, sees VR technology as a way to remember, as pictures and videos do (Gyu-lee). However, while Jong-woo says he wanted to lay the focus on remembering instead of recreating, he did want the family "[to] feel as if her daughter has lived on" (M. Park). Jang Ji-sung, the mother, did react positively to her experience within the VR world. As there was only one week between the diagnosis and the death of her daughter, she expressed that the opportunity to see her daughter for one more time made her realize that she "should love her more than miss her and feel sick so that [she] can be confident when [she] meet[s] her later" (Chang-won). She went on to say that she was between the thoughts if it was 'real' or just a 'dream': "maybe it's a real paradise [...] I

think I've had the dream I've always wanted" (Chang-won). The mother also said in an interview that her decision to participate in this project is "to help other people who have lost a brother, parent, or child" (Ferdinand). In conclusion, this technology was by both the creators and the mother perceived as a mourning tool.

4.3 Public perceptions to ADS and *Meeting You*

4.3.1 Responses to ADS

All ADS platforms have features that overlap or are close to each other. Thus, it is no coincidence that *Eternime* and *Lifenaut* are often referred together as they both offer a virtual avatar chatbot that is learning from input from the user on the platform via question forms and stores other digital files, either digitalized or from social media. In general, when a new ADS platform rises, connections to previous ADS websites and science-fiction examples are given in order to provide context, speculation, and opinions.

Notably, many negative and critical reactions to ADS can be found. Many of these reactions seemingly make no distinction between these services and the pop-cultural representations found in (cyberpunk) science-fiction such as *Black Mirror* episodes "Be Right Back" and "San Junipero", the novel *Neuromancer* by William Gibson, and the television series *Westworld* (2016), and *Altered Carbon (2018)*. Thus, it is no surprise that the services are called 'creepy' (Bearne; Danes; Finley; Hopkins), 'unsettling' (Bonasio), 'unlikely' (Gravis Zero), a "wild story pitch" (Greene), possibly a "step too far" (Bearne), and potentially 'harmful' (Finley) to the mourning progress because "[a] well working AI will also catch the bad sides of someone[s] personality" (Clark; manu0601). According to Gravis Zero, "even if they manage to be a proper representation of a person in time that never advances, well, it won't progress with society and may actually hold back social progress if it's unclear if it's an avatar speaking." This possible specific technological pessimism is also seen in other reactions that generally state that the copies provided by ADS cannot be true copies, instead they are false copies due to the data selection process (carcharoth; Parkin; Zuin). These copies also are not seen as 'real' immortality as it merely mimics "your online behavior" (Danes), being 'frozen' in time instead of allowing you to continue living as a 'real' person (Bonasio; Gravis Zero; Pickford). Others even claim that 'real' immortality will not be possible and that current ADS "may ultimately disappoint consumers" (Meese et al.) and question whether or not AI could ever get advanced enough to achieve the stated goals (Clark).

According to some, this will ultimately be nothing more than a gadget and a curiosity (Finley; Timmer), while others, like commenter gmerrick, see these services through pop-culture references. Some commenters express their fear that through the commodification of digital immortality and mourning, revenue will be made through scamming the 'gullible' (Holliday) and will ultimately create a more massive divide between rich and poor in the future (jappleng). Commenter manu0601 explains his worries of the exploitative nature of these services that they will take money from dying people and if the bereaved want to stop the messages from a deceased user, will have to pay too. The issue of control is mentioned concerning the aforementioned 'selective process,' but also how the website of Eternime "plays on the fear of [dying, being mortal, and not being in] control [of] your identity after you're gone (Clark).

Furthermore, if one takes the idea of digital immortality literally, to be immortal does not imply invulnerability (Greene). For example, what happens to the uploaded data in the system in case the service shuts down due to financial problems or due to broken equipment? This will result in a 'second death' (Parkin).

However, not all reactions are entirely negative or unambiguously techno-pessimistic. Some merely quote the creators of these ADS that these services are just a modern way to remember lost loved ones, defending the creators' promise to stay away from the 'creepiness' as portrayed in Black Mirror (Clark). Another writer sees the potential in technology to solve problems of, for example, fixing the details of someone's memory (Parkin), gender, and ageism (skicow). Commenter skicow writes that it is not the outside that defines human beings, but the mind, and, if that is uploaded to another 'vessel,' it will be *you*.

Moreover, despite warnings about privacy, "some people might find comfort in the idea of living on digitally after they die" (Bacchi). Through the experience of losing someone herself, Alicia Bonasio states the digital legacy "as something worth preserving," for which she went through a thought process and wrote the first steps on how to go about preservation. Alternatively, while expressing his concerns, Jan Mabry was accidentally lured into using the service during the process of writing about it, while first expressing his concerns. Perhaps Mabry wanted to demonstrate how it won't be difficult for new technology to convince us to take a peek and start using it. Even though the concepts are not fully functional yet, the developments in technology are seen by Lidia Zuin, who describes herself as a "cyberpunk enthusiast," as a 'thrill' for what the future may hold. Another view is that the progress of technology is unstoppable anyways (O'Hare and Gray) And that it is needed to challenge current concepts and ideas regarding what it means to be a person, who owns the data and how this could potentially have ethical conundrums (Bacchi; Greene; Lincez; Meese et al.).

4.3.2 Responses on Meeting You: intrigues and ethical concerns

Predominantly, it seems there are mainly neutral and positive reactions on *Meeting You*, although some underlying critical questions and ethical concerns by academics and experts. Some specifically pose adverse reactions as well, mainly in personal opinion blogs, articles, or in the comment section below. The same ethical concerns are expressed in various articles and comments, for example, that this VR technology facilitates unhealthy avoidance behavior (Adnan; Froolyks; Hayden; Nicholson and Evans). A replier on an imageboard wrote: "That's pretty sick. I wouldn't want to see a facsimile of my dead child, ever. That can only retard healing, imo" (Anonymous). Others are concerned that the company is *commodifying* grief and *exploiting* the bereaved mother (Adnan; Froolyks; Greystoke; Hayden; JamesTheRationalist; Sylvz Fz) and that it could potentially have (dangerous) psychological effects like re-traumatization and addiction (Adnan; DeMarche; Hayden).

Some see a virtual re-created dead person as a *false* and *unnatural* copy since humans are unique because of soul, identity, and authenticity and thus cannot be redesigned (Nicholson and Evans; O'Neill). However, others see this technology as a mere possible *modern approach* to offer comfort to the bereaved and to remember lost loved ones (Davenport; Field; Hayden; Nicholson and Evans; "Virtual reality reunites"), even though the virtual avatar might be perceived as 'cold' (Nicholson and Evans). Dr. Sarah Jones told the *Daily Mail* that "[j]ust because it is possible to use technology to virtually bring people back to life to meet with those grieving, it doesn't mean we should" (Libertore and Curtis). However, technology is fast-forwarding, and according to Scott Hayden, at some point in the future, it will be possible to reanimate a person through available data.

In terms of the exploitation of the mother, in the *YouTube* comments on the clip of the documentary, currently viewed more than 19 million times, one user explained a possible misunderstanding of (South-)Korean culture that is possibly lost in translation. In Korea, there is a belief in the traditional religion that means that the soul of a deceased person will "[stand] trial for 49 or 3 years" and after "can appear in the dream of the living family." However, when a person is under ten years old, the "child's soul is immediately [led] to (..) heaven" which means the family cannot "dream and say goodbye" (혼자걸어요). This cultural background sheds light on why the mother has reacted positively, as she described the VR-experience as a dream in which she got to say goodbye after all.

Conclusion

This chapter showed the overlapping and different aspects between the ADS and *Meeting You*. Specifically, it shed light on motivations of the creators and if applicable, what ideology was connected, specifically transhumanism. In some cases, it also showed the motivational drive of these entrepreneurs due to personal experience of loss or the fear of losing someone close.

In terms of affordances, ADS has added after-life affordances on their platforms that mainstream social media platforms only do so to a certain extent. These affordances consist of either actions that will let the user continue posting content into eternity by being offline or dead (*Eter9's* 'eternity' setting) or by providing an A.I. chatbot (*Eternime* and *Lifenaut*). At the same time, these services promise that the users' data will be preserved for posterity, or even, as *Lifenaut* offers, beamed into space.

In terms of attitudes extracted from the public reactions, the difficulty of labeling negative reactions as full pessimistic to technology needs to be mentioned. For example, Lidia Zuin identified herself as a 'cyberpunk enthusiast,' while cyberpunk often is associated with a negative view on humanity and society. The reactions show a complex interplay between different values towards different aspects towards general, and specific attitude towards technology and death. The reactions on ADS contained questions and mainly worries on death anxiety, legacy, ethics, the possible exploitative element, commodification, digital invulnerability and potential harm to the mourning process. Positive reactions were also found, specifically on how technology could provide modern solutions to remembering, memory in general, gender and ageism. One reaction even claimed that it is the mind that defines who we are, regardless what 'vessel' that mind is in.

The public perception on *Meeting You* also showed positive and negative reactions. The reactions on *Meeting You* are almost identical to the ones on ADS. An added element was the missing of the cultural context that caused misinterpretation, which is why the bereaved mother probably reacted positively. This missing piece of information is most probably the cause why so many people had adverse reactions to the documentary. As a consequence, one's attitude to specific technology is also influenced by the person's own idea of what is right and wrong.

In general, most of the reactions or articles don't see the digital copy as a true copy nor as a continuation. Some see ADS and *Meeting You* as a new way of mourning, while others stress on the potential exploitative or commodifying usage, and the potential psychological

damage, e.g. the aforementioned unhealthy avoidance behavior, re-traumatization and addiction. In other words, they do not trust that the people in charge will strive to be a good human being and will succumb to capitalism. If the technology is developed into more believable copied humans, then one could state that it might become a new way of mourning and even result into the avoidance of mourning due to the ability to immerse oneself into the application. However, the current state of ADS, being either unavailable or not yet developed enough, will not be the answer to the question if it will change mourning.

CHAPTER 5 - CURRENT DEVELOPMENTS IN TECHNOLOGY AND FUTURE AVATARS

This chapter will discuss some of the relevant scientific facts that need to be understood in order to meaningfully speculate about possible future developments of ADS. Both what the facts are, and what people believe the facts are, is important. As stated in previous chapters, attitudes are a type of 'long-term' emotions that emerge from a perceived intersection of facts (i.e. beliefs) with values. These attitudes influence both user engagement and the desire of developers to create specific services. Intentions to develop certain services and technologies emerge from attitudes and values, such as those of transhumanism. It is beyond the scope of this thesis to address the philosophical discussion whether or not values can be judged objectively. However, even disregarding values that still leaves the possibility that people for some reason are mistaken about the facts, leading to arguably unjustified attitudes towards ADS, since the perceived positive or negative effects don't exist, and possibly cannot even exist in principle. In other words, intentions and ambitions aren't enough to create certain technologies: reality matters since it limits what is *physically possible* and even if something is physically possible you need the *relevant knowledge* and *financial and material resources* before ambitions can be realized.

At the same time there is another mechanism at play, namely the development of technology that was not intended to improve ADS but still might. If you want to speculate about the speed of development of ADS you can't just look at the relative level of sophistication of existing ADS or even the prevalence of the transhumanist ideology to estimate the speed of near-future development. Current ADS do not reflect how ADS could optimally look only based on already existing technologies. These services aren't based on a single technology but consist of different technologies that all serve a specific sub-goal, e.g. computer graphics or photo manipulation to create realistic visual reconstructions of both living and deceased people. These different hyper specialized technologies are also developed by different people and companies for entirely different products based on entirely different intentions and motivations. So, let's break these services down to their components and try to identify other current technological developments that could be appropriated for the relatively rapid development of more advanced versions of the ADS that already exist. These 'superficial' improvements in the form of better visuals or more platform affordances might

affect the attitudes of people towards these services. For example, compare the visuals of the earlier mentioned example of *Meeting You* with the graphics of the other case studies.

This chapter is organized in the following way: first, I will explore existing technologies and what that could mean for ADS platforms as they currently exist. Some of these individual technologies could also be relevant for the next section. Secondly, I will briefly explore developments in research on A.G.I. and consciousness and why these are crucial for understanding the future of ADS. The more distant future might see the emergence of (seemingly) independent intelligent avatars, because the stated goals within transhumanism as well as the creators of the existing ADS described above go beyond these online services. They aim to surpass the goal of a sophisticated memorialization or mourning tool, and to create a genuine path to immortality. Whether or not these more literal forms of immortality are possible depends on the nature of consciousness and A.G.I., as will be discussed in section 5.2. These avatars might take a variety of forms depending on how different technologies are combined to create these avatars. For the sake of brevity I will shortly discuss three different base-types of avatars: (1) a digital avatar with A.G.I., (2) an In Real Life (IRL)-avatar in the form of a standalone unit that appears human but is made of non-organic material, or a combination of organic and inorganic material, but with a synthetic artificial 'brain', i.e. it's 'mind' is still run by some form of A.G.I.. And, (3) an IRL-avatar in the form of a standalone unit that appears human and is based on cloned organic material, and for all intents and purposes fully human.

5.1 Potential components of ADS and digital avatars

5.1.1 Avatars: from Hinduism to virtual representations

The term 'avatar' is derived from Hinduism. Naamleela Free Jones described the shift away from a religious meaning to a secular meaning, or as she phrases it "the dogmas of (…) natural laws of science [and] to a human[-centric society]," wherein "the avatar now [has become] associated with our own incarnation from the human world downward into virtually created worlds" (17,19). New media researcher Beth Coleman has described the virtual avatar as "a computer-generated figure controlled by a person via a computer (…)[, and] often a graphical representation of a person with which one can interact in real-time" (12). The ability of synchronous communication creates the experience of 'copresence,' for example, when the avatars of two players wave to each other in a virtual space (Coleman 25). The way avatars

of contemporary ADS are designed suggests that these are meant to provide that illusion of synchronous interaction with someone through an A.I. that mimics them. Bereaved might see these avatars as being nothing more than an asynchronous library of a deceased person because they know that he or she has passed. This potential view makes these libraries barely different from creating an organized collection of written messages intended to be read by the bereaved. However, perhaps the effort put into programming A.I. to mimic a deceased person in real time could be beneficial to the bereaved, even though the sense of copresence arguably is an illusion that hides the asynchronous nature of the A.I. Take for example 'ancestor veneration avatars,' through which people have already been memorializing deceased family members by letting them metaphorically 'live' in the virtual world the same way they would have done if they were still alive (Bainbridge 196).

Avatars used on social media websites and other virtual accounts mostly consist of static images or of multiple static images as an animated GIF. However, for different purposes fully animated visual copies of actual human beings are also being developed. In the film industry, storylines could contain flashback scenes, where the cast, or some of the cast has to be de-aged. Before the invention of computer-generated imagery (CGI), this was often done by either casting another actor that resembles a younger version of the original one, sometimes using make-up and prosthesis. Nowadays, CGI is advanced enough to convincingly de-age or age a person on-screen. Alternatively, in video games it is common to use actors as characters, who are recreated completely as digital versions of themselves. Moreover, virtual reality techniques are advancing as well. For example, multiplayer spaces are developed as well as combinations of virtual and physical spaces. This section will go into developments that seek to digitally copy or alter the appearance of a human, specifically CGI, holograms, and deep fake technology. It will also describe some (virtual reality) gaming developments that may be appropriated for the development of virtual spaces where the still living can interact with the deceased.

5.1.2 De-aging and digital resurrection technology in film

It could be argued that the early predecessor of CGI is the manipulation of photos by adding or deleting elements without losing believability and deceiving the public, think of altering a personal photograph by smoothing away some blemishes. Over a very short period of time, the manipulation of photos has progressed from mere still photos to video and speech. For example, if an actor or actress dies, the continuity of movie franchises, such as *Star Wars*

(1977-present) or the *Marvel Cinematic Universe*, could be at stake. Without advanced technology, the only solution would have been to either recast the actor or actress or to forcibly and unnaturally write his or her character out of the story. However, by using CGI and motion capture, an actor that has passed away can still be inserted in the movie, by superimposing their likeness onto another actor or actress. CGI becomes more advanced every year, but is precisely the attempt to make CGI models look realistic which can lead to what is called the 'uncanny valley' effect, which "can be described as an eerie or unsettling feeling that some people experience in response to not-quite-human figures like humanoid robots and lifelike computer-generated characters" (Caballar).

Cinema already had brought CGI and motion capture to the screen, replacing the actor with entirely computer-generated creatures, such as Gollum in *Lord of the Rings* (2001-2003), but is also increasingly using (de-)aging and digital resurrection techniques. The *Star Wars'* movie *Rogue One* (2016) uses both de-aging and digital resurrection techniques to show Carrie Fisher and Peter Cushing as how they looked in the original Star Wars trilogy. While Carrie Fisher still lived to see her CGI de-aged version of herself and reacted positively (Rothman and Sandell), Cushing had been deceased for a long time. The estate of Peter Cushing allowed for the recreation and received positive but also critical responses (Shoard). Alternatively, according to Benjamin Lee, actor Robin Williams had it written down in a privacy contract that his image could not be used for 25 years after his death, when he became aware of technologies 'reviving' deceased celebrities (B. Lee).

5.1.3 Deep-fakes

Through *Instagram* and *Snapchat*, face filters have become common and widespread. One can look in the camera and instantly see other features or have another person superimposed on their face. This technology is called Deep Video Portrait (DVP). Deep-fake video alteration can look the same but is different as the output video is changed, instead of overlaying the person looking in the camera with a filter. Deep-fake video alteration uses machine learning to manipulate images, videos, and audio, for example, to make it appear as if someone had said something he or she has never actually said. The ethical issues concerning successful deep-fakes become clear when they are misused. Jordan Peele posted a convincing altered video of former US president Obama, wherein Obama appeared to make statements actually made by Peele (Vincent). His message is that people need to not automatically believe what they think they are seeing and hearing. At this time the visual and audio components of deep fake

technology are still separate from each other in terms of development. For example, the Jordan Peele video only digitally manipulated video footage of Obama – the audio consisted of Peele impersonating Obama. The combination of both visual and audio deep fake technology could be appropriated to create much more realistic avatars for ADS platforms.

5.1.4 Revived Artists through Hologram technology

When Tupac appeared on stage at Coachella, the audience went out of their minds. Two aspects of the previous sentence are weird: (1) Tupac Shakur died in 1996 and (2) This Coachella event took place in 2012. The booking of deceased artists is not that rare anymore and there even is a company that offers posthumous hologram performances from deceased artists such as Whitney Houston, Maria Callas, and Roy Orbison (*Base Hologram*). While hologram technology for the most part consists of 'just' a visual illusion created by projecting 2D images on transparent foil on stage, more technology goes into it: the creation of the projected images require body-doubles, machine learning, CGI, and more (Ottewill).

The use of hologram technology to 'revive' deceased artists, has gathered mixed responses (Ottewill). Mike Shinoda from the rock band Linkin Park rejects the idea to perform with a hologram of the late Chester Bennington. In contrast, Wendy, the widow of the late heavy metal vocalist Ronnie James Dio, sees the digital 'revival' as something positive (Buchanan). Perhaps, the mixed reactions to this phenomenon of hologram performances has something to do with the different way these artists died: Bennington committed suicide, whereas Dio died of stomach cancer ("Zanger Linkin Park pleegt zelfmoord"; Carioscia). Moreover, Dio already experimented with hologram technology in 1986, and his wife sees Dio's hologram as a way "for those who never got to see Ronnie on stage" (Carioscia). In complete contrast to the position of Shinoda, Madonna Wayne Gacy, the former keyboardist of the rock band Marilyn Manson, has expressed that he wants to be featured as a hologram after he dies. Gacy makes it clear that he does not see the hologram as a continuation of his life, since he suggests that people are free to do anything with his hologram as it does not change anything for him since he will be dead (Reeder).

5.1.5 Emotional Chatbots

Multiple examples of functional and practical A.I. chatbots or virtual assistants can be found, from *Apple's* Siri to *Amazon's* Alexa and more. They can voice interact, set alarms, turn lights on or off, or can be asked for information. While these virtual assistants can make various things happen, they can't simulate emotion or have an emphatic conversation. Among many examples, *Replika* is an A.I. chatbot that will gradually learn how to talk and mimic a person on an emotional level. It presents itself as a friend, being there through the good and the bad. A subscription will allow the user to change the setting to a romantic partner, mentor, or 'see how it goes' (*Replika*). Another example is *Woebot*, a therapeutic chatbot created by psychologists as a tool due to the fact that "more than half of the world's population" has no access to mental health care. However, this is not a new concept. In 2014, a group of researchers created ELLIE, a virtual psychiatrist that scans the face for signs of sadness and generates an appropriate response. Their results showed a reduction in depression, and that the group that thought the virtual psychiatrist was a full automated chatbot, opened up more than the group that thought there was a human behind it "pulling the strings" ("The Computer will see you now" 63; Torous et al. 8; Lucas et al. 98).

Initially, software developer Eugenia Kuyda who is the creator of *Replika*, made an emotional chatbot as a digital memorial for Roman, her good friend who had died (Hamilton). This specific technology was designed to mimic a particular person, but comes closer to an after-life re-creation, even though it was only fed with 10.000 messages from Roman and messages that were "too personal" were not included (Newton). While this chatbot was meant as a memorial for Roman, Kuyda states that the commercialization of re-creation chatbots "poses a myriad technical and ethical challenges," such as, at what age does the user want to immortalize oneself? The same question arises for bereaved users: if there are multiple versions of the chatbots based on data sets derived from different periods in the life of the deceased, which one do you want to interact with?

5.1.6 Virtual spaces for the interaction between avatars and the living.

Virtual reality is a designed illusion, which makes images on a two-dimensional screen appear as if they are three-dimensional. When wearing a mounted display, the subject's eyes perceive the three-dimensional depth from vergence[4] in virtual reality. One company called *The Void* successfully combined the digital with the physical. They moved from merely creating a virtual reality environment where one can look in any direction and that is shared with other players, to successfully combining this with real objects outside of it.

While at first virtual reality was only experienced through the sight and sound senses, touch senses are added through wear pieces. The introduction of haptic suits and gloves have created the ability to simulate the feeling of impact or of holding or touching the virtual objects one sees through VR glasses or headsets. Companies such as *Haptx* and *TESLASUIT* are working on this technology. This technology can also be seen in *Meeting You*, where the mother is wearing haptic gloves, which gives her a simulacrum of the sensation of touching her deceased child.

To develop digital worlds where people can interact with virtual avatars of both the living and the dead developments in video games is more relevant. The difficulty of implementing CGI in video games is that the visualizations need to be rendered on the spot, while CGI in cinema can be rendered as long as possible to create a more realistic or sophisticated animation.

5.2 Different technologies and future avatars

5.2.1 Artificial General Intelligence, Consciousness and digitally immortal avatars

The first attempt to create artificial intelligence (A.I.) stems from the 1960s (Pennachin and Goertzel 1). Since, developers have been continuing to develop artificial intelligence, first focusing on 'narrow' A.I., which refers to programs that are designed to carry out "specific tasks like playing chess, diagnosing diseases, driving cars and so forth." More recently developers hope to create artificial *general* intelligence (A.G.I.): 'general intelligence' can mean different things to different researchers. In general terms A.G.I. refers to A.I. systems that,

[4] "When looking into the distance, the eyes diverge until parallel, effectively fixating the same point at infinity (or very far away). Vergence movements are closely connected to accommodation of the eye" (Khabiri, Kozloski, and Pickover n. pag)

metaphorically speaking, understand themselves and that have some autonomous self-control, "and have the ability to solve a variety of complex problems in a variety of contexts, and to learn to solve new problems that they didn't know about at the time of their creation." The word 'know' her refers to possession of programmed data, and not to the conscious experience of memory. (Goertzel and Pennachin V – VI).

The reason why questions surrounding A.G.I. are relevant for the future development of more advanced avatars is the following: it is not entirely clear what it means to 'upload' one's mind into a computer. This idea coincides with the concept of singularity, and specifically the concept of 'technological singularity', which is "a hypothetical point at which technological progress becomes unbounded" (Potapov n. pag). Some people like Ray Kurzweil believe that "[h]umans can merge their brains with the superintelligence and thereby live forever," seeing technological singularity as an opportunity (Lloyd 38). However, Alexey Potapov speculates that "AGI will emerge earlier and evolve faster than brain uploading or whole brain emulation" (n. pag). Others like Stephen Hawking and Elon Musk have expressed their skepticism and fear that "superintelligence would prove to be malign" (Pennachin and Goertzel 1; Lloyd 38).

In order to speculate about this, some basic understanding of the phenomenon of consciousness is needed. It should also be noted that many questions surrounding consciousness are still a mystery. According to Marvin Minsky, consciousness is a 'suitcase'-word: "describ[ing] a very wide range of activities—which include how we reason and make decisions, how we represent our intentions, and how we know what we've recently done" (128). David Chalmers considers these questions to be "[t]he easy problems of consciousness," the questions "that seem directly susceptible to the standard methods of cognitive science, whereby a phenomenon is explained in terms of computational or neural mechanisms" (200). In contrast, "The really hard problem of consciousness is the problem of experience." In other words, that there is a subjective experiencer of experiences in the first place (201). It is clear that data processing, neurological activity in the brain, is correlated to consciousness, "but there is also a subjective aspect." Fredric Schiffer has explained it as "the attempt to understand how a material brain, with material brain information, acquires experience"(60). The subjectivity of consciousness is difficult to research, as "conscious experience (…) is always tied to an individual first-person perspective" (Metzinger 1). In "What Is It Like to Be A Bat?," Thomas Nagel famously argued that "an organism has conscious mental states if and only if there is something that it is like to *be* that organism—something it is like *for* the organism" (436).

If consciousness is an emergent property from data processing in the brain, then maybe in the future the specific patterns in our brains can be translated to computer code. Because it might very well be that the phenomenon of consciousness is "substrate-independent" and thus that "[i]ntelligence doesn't require flesh, blood or carbon atoms" (Tegmark). This does not mean however that the *quality* of the phenomenon is also substrate-independent – because even if an A.G.I. based on your consciousness actually is conscious itself, how can its experience be comparable to your experience if it lacks the biological hardware underlying your sensory experience? Through a thought experiment drawing from physiological psychology, neurobiology and physics, Frank Wilczek tries to find the answer to the question if an A.I. can be conscious, creative and evil (108). It has to be noted that some don't believe in the importance of consciousness in the field of A.I. (Hutter 284). It cannot be expected, unless it is programmed into it (Kaiser 325).

These questions need to be answered in order to assess whether literal digital immortality is even possible, because the creation of A.G.I. does not imply the presence of consciousness. So, even a future sophisticated digital avatar with A.G.I. that can continue to grow as a person and change, with which one can interact in a virtual environment indistinguishable from the real world might still just be nothing more than a very sophisticated simulacrum. Considering the already existing technologies that mimic humans described above, one could contemplate on the idea how it could be known if the computer becomes conscious, and, in the words of Nagel, what it would be like to be a computer. If it were possible to transfer data from a biological brain of a person to inorganic computer hardware, would that be a continuation of that person, or a copy?

5.2.2 Care robots and robotic IRL-avatars

Perhaps the transhumanist ambition to achieve immortality has a higher chance with IRL-avatars: a continuation of one's life in a physical form. For, example, this could take the form of a robot or android. However, if the 'brain' of these robots are based on computer hardware, then the same questions about A.G.I. and consciousness faced by a digital avatar. So, whether or not people will accept these avatars as genuine continuations of a person's life depends on their values and attitudes, as will be discussed below in an analyses of two episodes of *Black Mirror* (2011-2019) that feature ADS avatars. But the wish to interact with potential robot avatars doesn't just depend on believing the robot to be 'alive.'

Look for example at 'care robots.' The therapeutic component of *Replika* is currently vastly researched and implemented within the care industry. According to the *United Nations*, "[g]lobally, the population aged 65 and over is growing faster than all other age groups" ("Aging"). As the 65+ group expanses, the stress on caregivers also rises. To help relieve the strain on caregivers, socially assistive robots are being developed. The robots vary from timed medicine distribution reminders, to robotic dogs and other animals, and to robots that can dance, sing, and entertain the elderly. Research supports the hypothesis that interactions with A.I. robots have decreased feelings of social isolation amongst the elderly in a real-life case study (Bemelmans et al.). However, concerns have been expressed that the increased use of these robots will literally dehumanize treatment by replacing humans resulting in increased loneliness (Coco, Kangasniemi and Rantanen 639).

Another use of robots lies in the development of sex technologies. One recent application lets the user design their own virtual sex robot and build a 'relationship' through interacting via the app. Then, a user can go into the process of buying the actual head and body (Cheok and Zhang 31). Possibly due to the stigma and taboo on this topic, there are many scientific questions still to be answered concerning the use of artificial sex partners (Cheok and Zhang 26). In "The 'Use' of Sex Robots: A Bioethical Issue," Elen Carvalho, Eugênio da Silva, and Rodrigo Siqueira-Batista discuss ethical concerns regarding the use of sex robots. While it can be said that the use of sex dolls can mitigate against solitude, it could also paradoxically contribute to a person becoming even more isolated (236).

So, even if it turns out that 'brain uploading' is physically impossible, it is clear that in the absence of human alternatives at least some people do not mind interacting with an entity they know to be only simulating specific human behaviors. Which means that robotic avatars might still be developed in the future, if only as a mourning or memorialization tool. Especially because, just as with the digital avatars, there are many concurrent developments in robotics for a variety of different purposes.

5.2.3 Cloning technology and organic IRL-avatars

Another possibility for future avatars is to create an organic one, possibly based on cloning technology. The first time that biotechnical scientists succeeded to clone was when they cloned a sheep, resulting in Dolly. However, in Miguel García-Sancho's article on the history of Dolly, he repeated that "the ultimate objective behind the birth of Dolly was not cloning a sheep, but using it as a tool to improve human health (299-300). The single cloning of the

sheep is not where this story ended. Nowadays, there are dog cloning companies that, for an exorbitant amount of money, will clone someone's pet. David Duncan interviewed some key individuals in the dog cloning business in his article published in *Vanity Fair* about the motivations of people that have lost their pets. While at the moment, human cloning does not exist yet, researchers say that in the future, people will try to, for example, clone a child that died (Duncan). Currently, this is still being restricted due to governmental bans, while non-human cloning has become relatively normal. The motivation for businesses is to answer the demands of grief-stricken customers: now it caters to the exceptional rich who have lost a pet, and who knows when it will move towards human cloning.

In contrast to digital avatars and artificial IRL-avatars, organic IRL-avatars will certainly be conscious, since they literally are human. What is still missing though, is the question on how to move someone's consciousness from their original brain to the one of their clone. Because a clone is merely a copy of one's biology, but not of the memories that have been stored in your brain over a lifetime.

5.3 Fictional depictions of avatars

The science fiction anthology show *Black Mirror* (2011-2019) provides two examples of avatars in two episodes with opposite attitudes: "Be Right Back" (2013) and "San Junipero" (2016). Examining the text of these two episodes arguably shows how important underlying attitudes and values of the creators are for understanding creative decisions. The two episodes also illustrate why different beliefs, a different understanding of the facts, can lead to very different audience reactions than the one arguably intended by the writer and/or director. The two episodes will be briefly analyzed below based on the science discussed above to further illustrate how important both implicit and explicit beliefs are for the formation of attitudes, as well as for arguing why certain attitudes might be unwarranted.

The episode "Be Right Back" depicts a company that provides three tiers of ADS, starting with a text-based one, followed by a speech-based one, and ending with an artificial IRL-avatar. The underlying idea of how all of these avatars are created closely resembles the existing ADS discussed above as case studies: they are recreations based on personal data published on social media by the deceased, or provided by the bereaved. An important difference with the ADS from the case studies is that it is the bereaved that makes use of the ADS, and not the person that ends up dying. The episode depicts a woman who suddenly loses her husband due to a car crash, and who after a tip from a friend decides to use ADS to

help with the grieving process. A variety of creative choices arguably make it clear that the makers do not consider this a healthy development and have a specific negative attitude towards these ADS technologies. Firstly, instead of providing a sense of closure, the protagonist gets addicted to the ADS. She starts with just text messages that mimic the personality of her deceased husband, then she continues to reach an all-consuming obsessive addiction talking to the processed voice of him, and ends up ordering an artificial IRL-avatar. The show does not go into details about the physical nature of this avatar, but the fact that it does not need sleep or food makes it clear the avatar isn't a biological clone. Second, the non-human nature of the avatar is emphasized through behaviors clearly meant to invoke 'the uncanny valley': such as 'sleeping' with its eyes open or standing outside the entire night after being commanded to 'go outside'. The authenticity of the avatar is also undermined by two scenes: the set-up scene shows the still living husband admitting to secretly liking a cheesy song which he pretended to dislike on social media out of shame. This is followed by a later pay-off scene, where the IRL-avatar expresses a strong dislike for this song to the protagonist, shattering the illusion. This, of course, is the result of it being a recreation based on social media data. Third, the value underlying the attitude underneath the negative portrayal seems to be that 'accepting the reality of death is necessary for a healthy grieving process', and not a general negative attitude towards technology. The exposition at the start of the episode reveals that the mother of the protagonist's husband acted on the same psychology of denial after the death of one of her sons (the brother of the deceased husband). Instead of accepting the death of her husband and moving on, she chose to hide all the pictures of her dead son, as if she wanted to pretend he never existed in the first place. The emergence of ADS technology provides a new form of denial however: instead of denying a loved one ever existed, one can deny that he or she ever died. The moments of 'uncanny valley' behavior breaks this illusion, which is why the protagonist ends up locking away the avatar in the attic, just like her mother in law did with family pictures.

The episode "San Junipero" depicts ADS in the form of digital avatars that live on in cyberspace in a town called San Junipero. There they can interact with each other and with digital avatars of still living people that are connected to computers through a mind-machine interface system. The text of the episode suggests that what is portrayed is a literal form of digital immortality, where the consciousness of people is somehow literally 'uploaded' into the cloud, and this intention is confirmed by its writer, Charlie Brooker, in *Vogue* (Garcia). As mentioned above, this still does not mean absolute immortality, since the cloud still depends on the existence of physical data banks which are depicted at the end of the episode. These data banks can still be destroyed, but it would be a way to cheat biological death and live for

a much longer period than people do now. The story follows two seemingly young women who fall in love in the digital world but who are revealed to be old women nearing the end of their biological lives in the real world. In contrast to "Be Right Back," the overall depiction of this technology is positive, even though nuance is added through some discussions of different death-related values: one of the protagonists is hesitant to upload her mind to San Junipero because she feels that to be a betrayal to her late husband, who chose to die in the hope of reuniting with their deceased daughter in the afterlife, even though she herself isn't religious. Note how this again shows that, to understand attitudes towards specific technologies, it is not enough to just examine general attitudes towards death and technology: the attitude towards death of her late husband was influenced by religious values and beliefs, while she was motivated by valuing a specific form of loyalty - as well as maybe still not having fully moved on, and suffering from some form of survivors guilt. Overall though the depiction is still positive since the episode has a happy ending with the two protagonists living on 'forever' in a sunny Californian beach town. They will remain young forever and have the option to turn off physical pain and drink and smoke without any consequences for their health (even though one protagonist remarks that the cigarettes don't taste of anything). Even more importantly: one of the protagonists is shown to have suffered from 'locked in syndrome' most of her life after a tragic car accident at the age of 21.

However, these two fictional depictions of avatars seem to be written on the basis of pre-existing attitudes and values of the makers, instead of an attempt to speculate about the relevant science in a more scientifically grounded way. For example, "Be Right Back" arguably uses 'the uncanny valley' in a manipulative way to support specific values about death and authenticity: the reason why the IRL-avatar ends up being creepy is not caused by any existential fears that emerge from questions about consciousness or authenticity, but because of the superficial reason of it being a flawed simulacrum. But what if the reconstruction of her dead husband was indistinguishable from her real husband? What if it was technologically designed to perfectly mimic human sleeping and the need for food? What if the data-set on which the avatar was based wasn't flawed? The implicit philosophical questions about consciousness actually are the same in both episodes, even though the specific qualities of the avatars and how they are depicted are completely different: both are artificial reconstructions and probably dependent on digital electronic hardware. As discussed above, it is very hard to determine if either of these avatars are actually conscious, and if they are, they are a continuation of existing people or a different entity that merely resembles a previously existing human being. If one is skeptical about the possibility of mind-uploading, then the ending of *San Junipero* can still cause some existential anxiety despite the intentions

of the makers. See for example the remark from the actress who plays one of the two lovers, Mackenzie Davis, as quoted by *The Telegraph*: "I think it is joyful, but there's all these little undercurrents communicating that there's darkness under this joy" (O'Hara).

Conclusion

This chapter argues that the speed of development of ADS might be independent from the transhumanist ideology that seems to drive most developers of ADS. A variety of technologies are being developed for vastly different purposes that can be appropriated for the improvement of ADS and its avatars. There only has to be one entrepreneur with the means to connect these technologies to create much more sophisticated ADS and avatars. However, I also hoped to show that much more needs to be known about consciousness and if, and how, A.G.I. can be conscious before any attempt can be made to develop actual 'mind-uploading' technologies. By looking at two examples of pop-cultural representations of ADS avatars I illustrated how important beliefs about scientific facts are for attitudes towards ADS, and that not only technology and death related values determine negative or positive attitudes towards ADS.

CHAPTER 6 - A DISCUSSION ON ATTITUDES, IDENTITY AND AFTER-LIFE AFFORDANCES

The question if the possible invention of immorality, digital or otherwise, will change the phenomenon of mourning not only depends on attitudes towards technology and death, but also on an array of other attitudes, values, and philosophical questions. It also depends on the creation of new after-life affordances.

As stated in chapter two, after-life affordances are continuously being re-evaluated by the developers of current mainstream platforms in order to create accessible options for users to choose what happens to their data after they die, e.g. who gets access to their account, memorialization options or deletion. As ADS platforms are still basic, there are not that many after-life affordances as of yet, except specific affordances that automate the creation of new posts and comments on the social media platform *Eter9*. Both *Eter9* and *Lifenaut* offer an online networking site, while *Lifenaut* and *Eternime* added a simple animated avatar as well. However, these affordances are built on top of the existing platform affordances and its constraints. As *Eter9* is predominantly a social media network with an added automated bot that can post or react to posts, it lacks the ability for users to actually communicate directly with a person's 'counterpart.' *Lifenaut* does offer the ability to communicate with others and an avatar chatbot, while *Eternime* only provides the avatar chatbot. In my opinion these ADS services are still in a too basic form to be taken seriously as a contender to change the mourning process as projected in *Black Mirror's* "Be Right Back" or "San Junipero." However, as mentioned in the chapter on relevant technology, if these services would encompass all these other developed technologies, e.g. emotional chatbots and more realistic animation of people's digital images, it is plausible that some users would let themselves be immersed as they are when watching movies, reading books or playing video games.

As stated in chapter one, attitudes *guide* human action. Resulting from the analysis on public reactions to ADS and *Meeting You*, it shows how attitudes and values related to authenticity, identity, and commodification, appear to be just as important as attitudes and values related to the phenomenon of death and technology. For example, in the public reactions to ADS and *Meeting You*, many expressed their worries of the potential exploitative nature of these services, as well as not accepting these copies as 'authentic.' Arguably, it might not be very useful to separate these different domains of values and attitudes from values and attitudes related to death and technology in theoretical models because in reality they are intricately interwoven in the minds of people. Therefore, the use of these oversimplified

models will likely lead to misleading results. Of course, by their very nature models never entirely map reality exactly, but this oversimplification ignores relevant information to such an extent that it almost certainly leads to 'explanations' of both the 'why' and 'what', the nature and content, of people their attitudes and values that it might not be much more than projections and speculations of the researcher.

Concerning identity and authenticity, one question came forward: if the developers of ADS claim that they ultimately seek to provide lifelike avatars to interact with, how does the data selection process influence these copies, recreations or continuations? Human identity is built from various interwoven components, and is also able to change over time. Online, there is the matter of 'identity performance,' as explained by Danah Boyd (12). Users are able to pick and choose what they want to share about themselves, even if it is a more 'perfect' picture of their life than what it actually is in reality. The loss of bodily communication that normally adds to the articulation of someone's expression, is what can make it hard to understand what someone exactly means in an online message. This relates back to the difficulty of analyzing responses and extracting attitudes, as the presented public responses showed in section 3.3. If a person's reaction is negative, one cannot immediately conclude that this must be a technophobic or pessimistic attitude. One needs to find out if it is a stance directed at all technology or some, i.e. general or specific 'technophobia'. The same is true for technophilic attitudes in positive reactions. Additionally, attitudes towards human nature also add to the complex attitude analysis. Is the positive or negative reaction against a technology itself or certain (real or imagined) uses of it? If an opinion on a technology contains a negative reaction, it could be an indirect indication of misanthropy, i.e. distrust of humanity.

One could say that some people are romanticists to a certain extent. Romantics embrace irrationality, which further complicates inferring people their knowledge, values and attitudes. People could also have unconscious motivations, such as the paradox of people craving that which they claim to despise. For instance, if cyberpunk is meant to depict a dystopian future, then why do people enjoy cyberpunk aesthetics and stories in an escapist fashion? Is there a form of catharsis, a Romantic longing to a certain level of chaos and destruction? This could be why many articles and blogs connect ADS technology to science fiction and cyberpunk pop-culture. Some of them refer to them in a positive way, in awe of what the future will bring, others in a more negative and critical way. Some of them seem to be influenced by pop-culture in terms of their attitudes towards ADS. Although, as argued in chapter five, it is doubtful if attitudes towards ADS adopted from watching science-fiction are justified, as fiction stories not just convey the author's opinion, either explicit or implicit, but also their understanding of the underlying scientific facts.

Final remarks

This thesis aimed to answer the question if ADS technology can change or replace mourning and death. An array of ADS technology was analyzed in chapter four, but how to understand these platforms, one should also survey technological developments emerging from research and development departments of different companies and universities with completely different goals and aims, as shown in chapter five. Breakthroughs in one field could potentially offer solutions to questions in another field, which is why ADS technology might evolve quicker than expected. In addition, in the history of technological developments, it is generally shown that people adapt to new ways of doing old things. Mourning rituals have already changed over time and while people may object to new rituals or technologies, some of those have become accepted, e.g. the use of social media to express public mourning. In the current underdeveloped state of ADS, mourning will not change. However, if or when ADS evolves, or if they are appropriated by mainstream platforms, this could change, especially if one takes into consideration the after-life affordances these mainstream platforms have already implemented.

In regards to attitudes towards ADS, this thesis argued that they can't be determined by simply looking at attitudes towards technology or death. For instance, general moral values play implicit roles in a person's attitude towards a specific technology. There is also the difference between specific and general attitudes, which often is not clearly identifiable in short comments or articles. In this thesis, I argue that the categorizations of public perception too often leaves out the researcher's own opinion and prejudice, possibly resulting in vague descriptions and assumptions projected on responses. While new media studies also use a combination of qualitative and quantitative approaches, this needs more research as to how new media researchers go about categorizing and interpreting the results.

As a final remark, I would like to conclude with the statement that *digital immortality does not imply invulnerability* because digital copies are still dependent on physical structures and thus vulnerable to the elements . Possible socio-cultural changes on death and mourning have been illustrated in this thesis. However, as of yet there is no reason to believe that the phenomenon of mourning will disappear completely. Arguably, it will never entirely disappear until the heat death of the universe.

Works Cited

"About Inactive Account Manager." *Google*. 2020. April 16th 2020. <https://support.google.com/accounts/answer/3036546>.

Abu-Rabia, Aref, and Nibal Khalil. "Mourning Palestine: Death and Grief Rituals." *Anthropology of the Middle East* 7.2(2012): 1–18.

Adnan, Nashmia. "Black Mirror Becomes Reality | Mom Reunites With Dead Daughter Via VR." *Dankanator*. March 6th 2020. May 8th 2020. <https://dankanator.com/47951/black-mirror-becomes-reality-mom-reunites-with-dead-daughter-via-vr/>.

"affect." *The Cambridge Handbook of Psychology*. Ed. David Matsumoto. Cambridge: Cambridge University Press, 2009. 19-20.

"Aging." *United Nations*. May 7th 2020. <https://www.un.org/en/sections/issues-depth/ageing/ >.

Alpert, Joseph. "Emotional States and Sudden Death" *The American Journal of Medicine* 131.5(2018): 455-456.

Anonymous. Comment on "/g/thread/75730917." *archive.today*. May 9th 2020. June 23rd 2020. <http://archive.is/JMK0W>.

Au, Evelyn, and Chi Yue Chiu. "belief." *The Cambridge Handbook of Psychology*. Ed. David Matsumoto. Cambridge: Cambridge University Press, 2009. 80.

Bacchi, Umberto. "Data of the dead: Virtual immortality exposes holes in privacy laws." *Reuters*. April 17th 2020. Eds. Jumana Farouky and Zoe Tabary. Thomson Reuters Foundation. June 11th 2020. <https://www.reuters.com/article/us-global-tech-privacy-trfn/data-of-the-dead-virtual-immortality-exposes-holes-in-privacy-laws-idUSKBN21Z0NF >.

Bainbridge, William Sims. "Perspectives on Virtual Veneration." *The Information Society* 29.3(2013): 196-202.

Base Hologram. 2020. Base Entertainment. May 5th 2020. <https://basehologram.com>.

Bassett, Debra. "Who Wants to Live Forever? Living, Dying and Grieving in Our Digital Society." *Social Sciences* 4.4 (2015): 1127–1139.

Bearne, Suzanne. "How your digital self could 'live' on after you die." *BBC*. August 22nd 2017. May 12th 2020. <https://www.bbc.com/news/business-40935790>.

Beinecke, Frances et al. "Is Growth Good? Resources, Development, and the Future of the Planet/Lomborg Replies." *Foreign Affairs* 91.5 (2012): 163–175.

Bemelmans, Roger et al. "Socially Assistive Robots in Elderly Care: A Systematic Review into Effects and Effectiveness." *Journal of the American Medical Directors Association* 13.2(2012): 114-120.

Besley, John C. "The State of Public Opinion Research on Attitudes and Understanding of Science and Technology." *Bulletin of Science, Technology & Society* 33.1-2(2013): 12–20.

Bonasio, Alice. "How I learned to live forever." *Quartz*. October 7th 2016. May 12th 2020. <https://qz.com/803065/what-happens-to-our-digital-life-when-we-die-how-i-learned-to-live-forever/>.

Bouc, Amanda, Soo-Hye Han and Natalie Pennington. "'Why are they commenting on his page?': Using Facebook profile pages to continue connections with the deceased." *Computers in Human Behavior* 62(2016): 635-643.

Boyd, Danah. "Why Youth (Heart) Social Network Sites: The Role of Networked Publics in Teenage Social Life." *MacArthur Foundation Series on Digital Learning – Youth, Identity, and Digital Media Volume*. Ed. David Buckingham. Cambridge, MA: MIT Press, 2007.

Brown, William, Michael Basil, and Mihai Bocarnea. "Social Influence of an International Celebrity: Responses to the Death of Princess Diana." *Journal of Communication* 53.4 (2003): 587–605.

Brubaker, Jed, Gillian Hayes, and Paul Dourish. "Beyond the Grave: Facebook as a Site for the Expansion of Death and Mourning." *The Information Society: Death, Afterlife, and Immortality of Bodies and Data* 29.3 (2013): 152–163.

Bucchi, Massimiano. "Of deficits, deviations and dialogues: theories of public communication of science." *Handbook of Public Communication of Science and Technology*. Eds. Massimiano Bucchi and Brian Trench. London & New York: Routledge, 2008. 57-76.

Buchanan, Brett. "Mike Shinoda Reacts To Idea Of Chester Bennington Hologram Joining Linkin Park." *Alternative Nation*. December 17th 2017. May 5th 2020. <https://www.alternativenation.net/mike-shinoda-reacts-idea-chester-bennington-hologram-joining-linkin-park/>.

Bucher, Taina, and Anne Helmond. "The Affordances of Social Media Platforms." In *The SAGE Handbook of Social Media*. Eds. Jean Burgess, Thomas Poell, and Alice Marwick. London and New York: SAGE Publications Ltd, 2017. n. pag.

Bullock, Saxon. "From The Vault: Richard Morgan Interview (2002)." *Saxon Bullock*. April 18th 2014. May 24th 2020. <http://www.saxonbullock.com/2014/04/never-mind-the-cyberpunks-an-interview-with-richard-morgan-2002/>.

Burgess, Jean, Peta Mitchell, and Felix Victor Münch. "Social Media Rituals: The Uses of Celebrity Death in Digital Culture." *A Networked Self and Birth, Life, Death*. Taylor and Francis, 2018. 224–239.

Byock, Ira. "The Meaning and Value of Death." *Journal of Palliative Medicine* 5.2 (2002): 279–288.

Caballar, Rina Diane. "What Is the Uncanny Valley?" *IEEE Spectrum*. November 6th 2019. June 28th 2020. <https://spectrum.ieee.org/automaton/robotics/humanoids/what-is-the-uncanny-valley >.

Cable-Williams, Beryl, and Donna Wilson. "Awareness of Impending Death for Residents of Long-Term Care Facilities." *International journal of older people nursing* 9.2 (2014): 169–179.

Cann, Candi K. Virtual Afterlives, Grieving the Dead in the Twenty-First Century. Lexington: The University Press of Kentucky, 2014.

carcharoth. Comment on "The "Terasem" group wants to help transform you into an AI." September 28th 2015. May 12th 2020. <https://arstechnica.com/gaming/2015/09/the-terasem-group-wants-to-help-transform-you-into-an-ai/>.

Carioscia, Anthony. "Wendy Dio Talks Charity Event And Opinions On Dio Hologram." *Alternative Nation*. April 18th 2017. May 5th 2020. <https://www.alternativenation.net/wendy-dio-talks-charity-event-opinions-dio-hologram/>.

Carroll, Brian, and Katie Landry. "Logging On and Letting Out: Using Online Social Networks to Grieve and to Mourn." *Bulletin of Science, Technology & Society* 30.5 (2010): 341–349.

Carvalho, Elen, Eugênio Silva, and Rodrigo Siqueira-Batista. "The 'Use' of Sex Robots: A Bioethical Issue." *Asian Bioethics Review* 10.3 (2018): 231–240.

Chalmers, David J. "FACING UP TO THE PROBLEM OF CONSCIOUSNESS*." *Journal of Consciousness Studies* 2.3(1995) 200-219.

Chang-won, Lim. "Sorrow-stricken mother reunites with deceased daughter in virtual world." *Aju Business Daily*. February 7th 2020. May 8th 2020. <https://www.ajudaily.com/view/20200207175148638>.

Cheok, Adrian, and Emma Yann Zhang. "Sex and a History of Sex Technologies." *Human–Robot Intimate Relationships*. 2019. Cham: Springer International Publishing, 2019.

Clark, Liat. "This creepy AI will talk to loved ones when you die and preserve your digital footprint." *Wired*. February 5th 2015. May 9th 2020. <https://www.wired.co.uk/article/eterni-life-after-death-ai>.

Coco, Kirsi, Mari Kangasniemi, and Teemu Rantanen. "Care Personnel's Attitudes and Fears Toward Care Robots in Elderly Care: A Comparison of Data from the Care Personnel in Finland and Japan." *Journal of Nursing Scholarship* 50.6 (2018): 634–644.

Coleman, Beth. *Hello Avatar : Rise of the Networked Generation*. Cambridge, Massachusetts, United States: The MIT Press, 2011.

"Complexity & Stupidity." *Sam Harris*. November 13th 2016. May 24th 2020. <https://samharris.org/complexity-stupidity/>.

Connolly, Kate. "Parents lose appeal over access to dead girl's Facebook account." *The Guardian*. May 31st 2017. June. 25th 2020. <https://www.theguardian.com/technology/2017/may/31/parents-lose-appeal-access-dead-girl-facebook-account-berlin>.

Cox, Lisa. "Remote rituals: in a time of coronavirus, mourners find comfort where they can." *The Guardian*. April 12th 2020. May 4th 2020. <https://www.theguardian.com/society/2020/apr/13/remote-rituals-in-a-time-of-coronavirus-mourners-find-comfort-where-they-can>.

Cuddon, John A. "cyberpunk/steampunk." *A Dictionary of Literary Terms and Literary Theory* . 3rd edition. Oxford: Blackwell, 1991. 181-182.

Cuthbertson, Anthony. "Artificial intelligence social network offers \'digital immortality\' through virtual counterpart." *International Business Times*. August 20th 2015. June 23rd 2020. <https://www.ibtimes.co.uk/artificial-intelligence-social-network-offers-digital-immortality-through-virtual-counterpart-1516296>.

Danes, Jane. "Eter9 – Immortality Becomes a Reality?" *SocialBarrel*. August 26th 2015. May 12th 2020. < http://socialbarrel.com/eter9-immortality-becomes-a-reality/99230/>.

Davenport, James. "A grieving mother meets her deceased daughter in VR in this tragic, unsettling documentary." *PC Gamer*. February 7th 2020. June 28th 2020. <https://www.pcgamer.com/a-grieving-mother-meets-her-deceased-daughter-in-vr-in-this-tragic-unsettling-documentary/>.

DeMarche, Edmund. "South Korean doc used VR to 'reunite' mother with deceased daughter." *Fox News*. February 12th 2020. April 20th 2020. <

https://nypost.com/2020/02/12/south-korean-doc-used-vr-to-reunite-mother-with-deceased-daughter/>.

Dretske, Fred. "belief." *The Oxford Companion to Philosophy*. 2nd ed. 2005. Ed. Ted Honderich. New York: Oxford University Press Inc., 1995. 85.

Duggan, Francis. "Death The Great Equalizer." *Citatepedia*. May 24th 2020. <http://poems.citatepedia.com/by.php?p=30&a=Francis+Duggan>.

Duncan, David. "Inside the Very Big, Very Controversial Business of Dog Cloning." *Vanity Fair*. August 7th 2018. May 5th 2020. <https://www.vanityfair.com/style/2018/08/dog-cloning-animal-sooam-hwang>.

Ellis, Cat. "Does Facebook know when you'll die?" *Techradar*. June 28th 2018. May 21st 2020. <https://www.techradar.com/news/does-facebook-know-when-youll-die>.

Emmons, Libby. "The Transhumanism Revolution: Oppression Disguised as Liberation." *Quillette*. July 11th 2018. May 24th 2020. <https://quillette.com/2018/07/11/the-transhumanism-revolution-oppression-disguised-as-liberation/>.

Engle, Karen. "Putting Mourning to Work: Making Sense of 9/11." *Theory, Culture & Society* 24.1(2007): 61–88.

Eswaran, Vijay. "The case against techno-pessimism." *Politico*. July 10th 2018. May 24th 2020. <https://www.politico.eu/article/the-case-against-techno-pessimism/>.

Eter9. May 4th 2020. <https://www.eter9.com>.

Eternime. May 4th 2020. <http://eterni.me>.

Feigelman, William. *Devastating Losses How Parents Cope with the Death of a Child to Suicide or Drugs*. New York: Springer Pub., 2012.

Fennell, Eli. "ETER9 user guide." *Eli Fennell*. September 19th 2015. June 24th 2020. <http://elifennell.com/eter9-user-guide/#CounterpartSettings>.

Ferdinand, Pam. "Korean TV Show Reunites Mother With Dead Daughter in VR." *GameRant*. February 9th 2020. May 8th 2020. <https://gamerant.com/mother-reunion-dead-daughter-vr/>.

Field, Matthew. "Virtual reality used to 'reunite' grieving mother with avatar of dead child." *The Telegraph*. February 11th 2020. June 28th 2020. <https://www.telegraph.co.uk/technology/2020/02/11/virtual-reality-used-reunite-grieving-mother-avatar-dead-child/>.

Finley, Klint. "If You Plug Twitter Into a Digital Avatar, Can You Live Forever?" *Wired*. September 30th 2013. May 12th 2020. <https://www.wired.com/2013/09/lifenaut/>.

Froolyks, Julia. "Why bringing the dead back to life with VR is torture." *AndroidPit*. February 14th 2020. April 20th 2020. <https://www.androidpit.com/dealing-with-grief-vr-glasses>.

Garcia, Patricia. "*Black Mirror* Creator Charlie Brooker on What Really Happened at the End of 'San Junipero'" *Vogue*. October 27th 2016. June 27th 2020. <https://www.vogue.com/article/black-mirror-creator-charlie-brooker-san-junipero>.

García-Sancho, Miguel. "Animal Breeding in the Age of Biotechnology: The Investigative Pathway Behind the Cloning of Dolly the Sheep." *History and Philosophy of the Life Sciences* 37.3 (2015): 282–304.

Gaver, William. *Technology affordances*. Proceedings of the SIGCHI conference on Human factors in computing systems, March 1991, New Orleans, Louisiana, USA. New York: Association for Computing Machinery, 1991. 97-84.

Geraci, Robert M. "There and Back Again: Transhumanist Evangelism in Science Fiction and Popular Science". *Implicit Religion* 14.2(2011): 141-72.

Gibson, James Jerome. "THE THEORY OF AFFORDANCES." *The Ecological Approach to Visual Perception*. New York: Psychology Press, 1986.

Gibson, Margaret. "Death and Mourning in Technologically Mediated Culture." *Health Sociology Review: Death, Dying and Loss in the 21st Century* 16.5 (2007): 415–424.

Gibson, William. *Neuromancer*. New York: Ace, 1984.

Glazer, Miriyam. "'What is Within Now Seen Without': Romanticism, Neuromanticism, and the Death of Imagination in William Gibson's Fictive World." *Journal of Popular Culture* 23.3 (1989): 155–164.

gmerrick. Comment on "The "Terasem" group wants to help transform you into an AI." September 28th 2015. May 12th 2020. <https://arstechnica.com/gaming/2015/09/the-terasem-group-wants-to-help-transform-you-into-an-ai/>.

Goertzel, Ben, and Cassio Pennachin. "Preface." *Artificial General Intelligence*. Berlin Heidelberg New York: Springer, 2007. V-VII.

Gravis Zero. Comment on "Startup Still Working On 'Immortal Avatars' That Will Live Forever." *Slashdot*. April 23rd 2017. May 12th 2020. <https://tech.slashdot.org/comments.pl?sid=10523095&cid=54288619>.

Greene, Jayson. "Are Hosts, Replicants, and Robot Clones Closer Than We Think?" *The Ringer*. September 19th 2018. May 12th 2020. <https://www.theringer.com/tech/2018/9/19/17877428/artificial-intelligence-immortality-black-mirror-westworld>.

Greystoke. Comment on "Too Far? Mother Reunited With Deceased Daughter In Virtual Reality Demo." *The Daily Wire*. February 12th 2020. May 8th 2020. <https://www.dailywire.com/news/too-far-mother-reunited-with-deceased-daughter-in-virtual-reality-demo>.

Gulotta, Rebecca et al. "Engaging with Death Online: An Analysis of Systems That Support Legacy-Making, Bereavement, and Remembrance." *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*. ACM, 2016. 736–748.

Gyu-lee, Lee. "'Meeting You' creator on his controversial show: 'I hope it opens up dialogue' [VIDEO]." *The Korea Times*. April 5th 2020. May 8th 2020. <https://www.koreatimes.co.kr/www/art/2020/04/688_287372.html>.

Hamilton, Isobel. "These 2 tech founders lost their friends in tragic accidents. Now they've built AI chatbots to give people life after death". *Business Insider*. November 17th 2018. May 7th 2020. <https://www.businessinsider.nl/eternime-and-replika-giving-life-to-the-dead-with-new-technology-2018-11?international=true&r=US>.

Haptx. 2019. HaptX Inc. May 6th 2020. <https://haptx.com/solutions/>.

Hayden, Scott. "Mother Meets Recreation of Her Deceased Child in VR." *Road to VR*. February 7th 2020. May 8th 2020. <https://www.roadtovr.com/mother-meets-recreation-of-deceased-child-in-vr/>.

Hellsten, Iina, and Brigitte Nerlich. "Genetics and genomics The politics and ethics of metaphorical framing." *Handbook of Public Communication of Science and Technology*. Eds. Massimiano Bucchi and Brian Trench. London & New York: Routledge, 2008. 93-109.

Hisschemöller, Matthijs and Rob Hoppe. "Coping with Intractable Controversies: The Case for Problem Structuring in Policy Design and Analysis." *Knowledge and Policy* 8.4(1996): 47–72. <http://works.bepress.com/robert_hoppe1/7/>.

Holliday, Andrew. Comment on "From here to Eterni.me – the quest for digital immortality." *The Conversation*. November 14th 2014. May 12th 2020. <https://theconversation.com/from-here-to-eterni-me-the-quest-for-digital-immortality-33688>.

Hong, Li, and Dolores Albarracin. "attitude." *The Cambridge Handbook of Psychology*. Ed. David Matsumoto. Cambridge: Cambridge University Press, 2009. 59.

Hopkins, Curt. "Eter9's virtual avatars learn from you in life and mimic you in death." *Daily Dot*. February 29th 2020. May 12th 2020. <https://www.dailydot.com/debug/eter9-social-network-afterlife/>.

Hutter, Marcus. "Universal Algorithmic Intelligence: A Mathematical Top→Down Approach∗." *Artificial General Intelligence*. Eds. Ben Goertzel and Cassio Pennachin. Berlin Heidelberg New York: Springer, 2007. 227-290.

"Internet Archive: Wayback Machine." *Archive.Org*. 2018. June 8th 2020. <https://archive.org/web/>.

"intuition." *The Cambridge Handbook of Psychology*. Ed. David Matsumoto. Cambridge: Cambridge University Press, 2009. 266.

Jabberwacky. Rollo Carpenter. 1997. June 15th 2020. <http://www.jabberwacky.com>.

JamesTheRationalist. Comment on "Too Far? Mother Reunited With Deceased Daughter In Virtual Reality Demo." *The Daily Wire*. February 12th 2020. May 8th 2020. <https://www.dailywire.com/news/too-far-mother-reunited-with-deceased-daughter-in-virtual-reality-demo>.

jappleng. Comment on "The "Terasem" group wants to help transform you into an AI." September 28th 2015. May 12th 2020. <https://arstechnica.com/gaming/2015/09/the-terasem-group-wants-to-help-transform-you-into-an-ai/>.

Jones, Naamleela Free. "From Gods To Gamers: The Manifestation of the Avatar Throughout Religious History and Postmodern Culture." *Berkeley Undergraduate Journal* 28.2(2015): n. pag.

Jorge, Henrique. "Digital Eternity." *The Transhumanism Handbook*. 2019. Ed. Newton Lee. Switzerland: Springer, 2019. 645-650.

Kaiser, Lukasz. "Program Search as a Path to Artificial General Intelligence." *Artificial General Intelligence*. Eds. Ben Goertzel and Cassio Pennachin. Berlin Heidelberg New York: Springer, 2007. 291-326.

Keach, Sean. "HOW TO LIVE FOREVER Bizarre social network promises to give you 'eternal life' – by creating virtual clones of users that carry on after you die." *The Sun*. February 10th 2019. May 30th 2020. <https://www.thesun.co.uk/tech/8387101/eter9-live-forever-immortality-eternal-life-social-network/>.

Kerschner, Christian, and Melf-Hinrich Ehlers. "A Framework of Attitudes Towards Technology in Theory and Practice." *Ecological Economics* 126 (2016): 139–151.

Khabiri Elham, Kozloski James R, and Pickover Clifford A. "EYE-FATIGUE REDUCTION SYSTEM FOR HEAD-MOUNTED DISPLAYS." *Espacenet (European Patent Office)*. May 4th 2017: n. pag.

Kilonzo, Gad, and Nora Hogan. "Traditional African Mourning Practices Are Abridged in Response to the AIDS Epidemic: Implications for Mental Health." *Transcultural Psychiatry* 36.3(1999): 259–83.

Kim, Hyunchul. "Making Relations, Managing Grief: The Expression and Control of Emotions in Japanese Death Rituals." *The Asia Pacific Journal of Anthropology* 16.1(2015)17–35.

Klastrup, Lisbeth. "'I didn't know her, but...': parasocial mourning of mediated deaths on Facebook RIP pages." *New Review of Hypermedia and Multimedia* 21.1-2(2015): 146-164.

Lakoff, George, and Mark Johnson. "Conceptual Metaphor in Everyday Language." *The Journal of Philosophy* 77.8 (1980): 453–486.

Lee, Benjamin. "Robin Williams restricted use of his image for 25 years after his death." *The Guardian*. March 31st 2015. May 5th 2020. <https://www.theguardian.com/film/2015/mar/31/robin-williams-restricted-use-of-his-image-for-25-years-after-his-death>.

Lee, Newton. "Brave New World of Transhumanism." *The Transhumanism Handbook*. 2019. Ed. Newton Lee. Switzerland: Springer, 2019. 3-48.

Libertore, Stacy and Sophie Curtis. "Korean TV show uses virtual reality to 'reunite' sorrow stricken mother with her seven-year-old daughter who died in 2016." *Daily Mail*. February 10th 2020. May 8th 2020. <https://www.dailymail.co.uk/sciencetech/article-7988645/TV-uses-virtual-reality-reunite-mother-7-year-old-daughter-died-2016.html>.

Lifenaut. The Terasem Movement Foundation, Inc. May 4th 2020. <https://www.lifenaut.com>.

Lincez, Mathew. "The Industry of Immortality Rising." *MISC Magazine*. June 17th 2016. May 12th 2020. <https://miscmagazine.com/industry-immortality-rising/>.

Lloyd, Seth. "WRONG, BUT MORE RELEVANT THAN NEVER." *Possible Minds*. Ed. John Brockman. New York: Penguin Press, 2019. 29-43.

Lomborg, Bjørn. "Environmental Alarmism, Then and Now: The Club of Rome's Problem- and Ours." *Foreign Affairs* 91.4 (2012): 24–40

Lord, Benjamin, Sandra Gramling, and Stephen M. Auerbach. "The Search for Meaning: A Framework for How Individuals Cope with Bereavement and Other Existential Stressors." *Handbook of the Psychology of Coping: New Research*. Nova Science Publishers, Inc., 2012. 35–58.

Lucas, Gale M et al. "It's Only a Computer: Virtual Humans Increase Willingness to Disclose." *Computers in Human Behavior* 37.C (2014): 94–100.

Mabry, Jan. "Live Forever? Social Network ETER9 Promises Humans Digital Immortality Through Artificial Intelligence." *CBS SF BayArea*. August 31st 2015. May 12th 2020. <https://sanfrancisco.cbslocal.com/2015/08/31/new-social-network-eter9-promises-humans-digital-immortality-through-artificial-intelligence/>.

manu0601. Comment on "Startup Still Working On 'Immortal Avatars' That Will Live Forever." *Slashdot*. April 23rd 2017. May 12th 2020. <https://tech.slashdot.org/comments.pl?sid=10523095&cid=54289613>.

Meese, James. Bjorn Nansen, Martin Gibbs, Michael Arnold, and Tamara Kohn. "From here to Eterni.me – the quest for digital immortality." *The Conversation*. November 14th 2014. May 12th 2020. <https://theconversation.com/from-here-to-eterni-me-the-quest-for-digital-immortality-33688>.

Mele, Alfred R. "attitude." *The Oxford Companion to Philosophy*. 2nd ed. 2005. Ed. Ted Honderich. New York: Oxford University Press Inc., 1995. 66.

Metzinger, Thomas. "Introduction: Consciousness Research at the End of the Twentieth Century." *Neural Correlates of Consciousness: Empirical and Conceptual Questions*. Ed. Thomas Metzinger. Massachusetts: Massachusetts Institute of Technology, 2000. 1-12.

Minsky, Marvin. *The Emotion Machine: Commonsense Thinking, Artificial Intelligence, and the Future of the Human Mind*. New York: Simon & Schuster, 2006.

Mitima-Verloop, Huibertha, Trudy Mooren, and Paul Boelen. "Facilitating Grief: An Exploration of the Function of Funerals and Rituals in Relation to Grief Reactions." *Death studies* (2019): 1–11.

Morgan, Richard K. *Altered Carbon*. London: Victor Gollancz Ltd, 2002.

Mouffe, Chantal. "Art and Democracy. Art as an Agonistic Intervention in Public Space." 2007. *Open! Platform for Art, Culture & The Public Domain*. <https://www.onlineopen.org/art-and-democracy>.

Moyer, Lisa, and Suzanne Enck. "Is My Grief Too Public for You? The Digitalization of Grief on Facebooktm." *Death Studies* 44.2 (2020): 89–97.

Nagel, Thomas. "What Is It Like to Be a Bat?" *The Philosophical Review* 83.4(1974): 435-450.

Neimeyer, Robert, Holly Prigerson, and Betty Davies. "Mourning and Meaning." *American Behavioral Scientist* 46.2 (2002): 235–251.

Neimeyer, Robert, Joachim Wittkowski, and Richard Moser. "PSYCHOLOGICAL RESEARCH ON DEATH ATTITUDES: AN OVERVIEW AND EVALUATION." *Death Studies* 28.4 (2004): 309–340.

Newton, Casey. "Speak, Memory". *The Verge*. Eds. Josh Dzieza and Michael Zelenko. October 7th 2016. May 7th 2020. <https://www.theverge.com/a/luka-artificial-intelligence-memorial-roman-mazurenko-bot>.

Nicholson, Lindsay and Rebecca Evans. "Would you want to reach out to a child you'd lost? Technology helped a Korean mother 'reconnect' with an image of her seven-year-old daughter after she died. Now two writers who've also grieved for daughters give their verdicts..." *Daily Mail*. February 12th 2020. May 8th 2020. <https://www.dailymail.co.uk/news/article-7997585/Would-want-reach-child-youd-lost-Two-writers-verdicts.html>.

Nimrod, Galit. "Technophobia among older Internet users." *EDUCATIONAL GERONTOLOGY* 44.2-3(2018): 148–162.

Norman, Donald. "Affordance, Conventions, and Design." *Interactions* 6.3 (1999): 38–43.

O'Hara, Helen. "The story of San Junipero: why Charlie Brooker's Emmy-winning vision of Heaven will live forever." *The Telegraph*. September 18th 2017. June 27th 2020. <https://www.telegraph.co.uk/on-demand/2017/09/16/san-junipero-revisited-black-mirrors-heartbreaking-vision-heaven/>.

O'Hare, Ryan and Richard Gray. "Would YOU turn a loved one into a robot clone? Rising numbers of people want to live on as machines by 'uploading' their brains." *Daily Mail*. March 16th 2016. May 12th 2020. <https://www.dailymail.co.uk/sciencetech/article-3495552/Would-turn-loved-one-robot-clone-Rising-numbers-people-want-live-machines-uploading-brains.html>.

O'Neill, Martha. "VR can bring your loved ones "back to life"—but I wouldn't want to virtually meet my dad." *Prospect*. April 20th 2020. April 20th 2020. <https://www.prospectmagazine.co.uk/philosophy/vr-can-bring-your-loved-ones-back-to-life-but-i-wouldnt-want-to-meet-my-dad>.

Öhman, Carl, and David Watson. "Are the Dead Taking over Facebook? A Big Data Approach to the Future of Death Online." *Big Data & Society* 6.1 (2019): n. pag.

Öhman, Carl, and Luciano Floridi. "An ethical framework for the digital afterlife industry." *Nature Human Behaviour* 2(2018): 318-320.

Ottewill, Jim. "How hologram technology is changing the future of the music industry." *MusicTech*. May 9th 2019. June 11th 2020. <https://www.musictech.net/features/trends/hologram-technology-future-of-music-industry/>.

Park, Eun-jee. "[INTERVIEW] The controversial reality of bringing back a loved one." *Korea JoongAng Daily*. February 16th 2020. The New York Times. May 7th 2020. <https://koreajoongangdaily.joins.com/news/article/article.aspx?aid=3073877>.

Park, Minwoo. "South Korean mother given tearful VR reunion with deceased daughter." *Reuters*. February 14th 2020. April 20th, 2020. <https://www.reuters.com/article/us-southkorea-virtualreality-reunion/south-korean-mother-given-tearful-vr-reunion-with-deceased-daughter-idUSKBN2081D6>.

Parkin, Simon. "Back-up brains: The era of digital immortality." *BBC News*. January 23rd 2015. May 12th 2020. <https://www.bbc.com/future/article/20150122-the-secret-to-immortality>.

Pennachin, Cassio, and Ben Goertzel. "Contemporary Approaches to Artificial General Intelligence." *Artificial General Intelligence*. Eds. Ben Goertzel and Cassio Pennachin. Berlin Heidelberg New York: Springer, 2007. 1-28.

Phillips, Nicholas. "The Fallacy of Techno-Optimism." *Quillette*. June 6th 2019. May 24th 2020. <https://quillette.com/2019/06/06/the-fallacy-of-techno-optimism/>.

Pickford, Giles. Comment on "From here to Eterni.me – the quest for digital immortality." *The Conversation*. November 14th 2014. May 12th 2020. <https://theconversation.com/from-here-to-eterni-me-the-quest-for-digital-immortality-33688>.

Potapov, Alexey. "Technological Singularity: What Do We Really Know?" *Information* 9.4 (2018): n. pag.

Reeder. "EX-MARILYN MANSON Keyboardist Wants KURT COBAIN's Hologram To Shoot Him In The Face With A Shotgun." *Metal Addicts*. February 11th 2018. May 5th 2020. <https://metaladdicts.com/site/ex-marilyn-manson-keyboardist-wants-kurt-cobains-hologram-to-shoot-him-in-the-face-with-a-shotgun/>.

Replika. 2020. Luka, Ing. May 6th 2020. <https://replika.ai>.

Rossetto, Kelly, Pamela Lannutti, and Elena Strauman. "Death on Facebook: Examining the Roles of Social Media Communication for the Bereaved." *Journal of Social and Personal Relationships* 32.7 (2015): 974–994.

Rothblatt, Martine. "THE TERASEM MIND UPLOADING EXPERIMENT." *International Journal of Machine Consciousness* 4.1(2012): 141-158.

Rothman, Michael, and Clayton Sandell. "Carrie Fisher's Reaction to Her Latest 'Star Wars' Cameo." *ABC News*. January 5th 2017. May 5th 2020. < https://abcnews.go.com/Entertainment/carrie-fishers-reaction-latest-star-wars-cameo/story?id=44571752 >.

Savin-Baden, Maggi, and David Burden. "Digital Immortality and Virtual Humans." *Postdigital Science and Education* 1.1 (2019): 87–103.

Schiffer, Fredric. "The physical nature of subjective experience and its interaction with the brain." *Medical Hypotheses* 125(2019): 57-69.

Semino, Elena, Zsófia Demjén, and Veronika Koller. "'Good' and 'Bad' Deaths: Narratives and Professional Identities in Interviews with Hospice Managers." *Discourse Studies* 16.5(2014): 667–685.

Sheppard, Stephen Lea. Comment on "Is Cyberpunk v.3 a failure?" *RPG*. July 29th 2006. May 24th 2020. <https://forum.rpg.net/index.php?threads/is-cyberpunk-v-3-a-failure.277274/#post-6091068 >.

Shoard, Catherine. "Peter Cushing is dead. Rogue One's resurrection is a digital indignity." *The Guardian*. December 21st 2016. May 5th 2020. < https://www.theguardian.com/commentisfree/2016/dec/21/peter-cushing-rogue-one-resurrection-cgi >.

Sinders, Caroline. "I spent the last 6 months planning my online death." *Splinter*. March 3rd 2016. May 19th 2020. <https://splinternews.com/i-spent-the-last-6-months-planning-my-online-death-1793855127>.

skicow. Comment on "The "Terasem" group wants to help transform you into an AI." September 28th 2015. May 12th 2020. <https://arstechnica.com/gaming/2015/09/the-terasem-group-wants-to-help-transform-you-into-an-ai/>.

Stroebe, Margaret, and Henk Schut. "The Dual Process Model of Coping with Bereavement: A Decade On." *OMEGA - Journal of Death and Dying* 61.4(2010): 273–289.

Sylvz Fz. Comment on "Mother Meets Recreation of Her Deceased Child in VR." February 10th 2020. May 8th 2020. <https://www.roadtovr.com/mother-meets-recreation-of-deceased-child-in-vr/>.

Szurmak, Joanna and Pierre Desrochers. "Eco-Pessimism versus Techno-Optimism." *Areo*. August 6th 2019. May 24th 2020. <https://areomagazine.com/2019/08/06/eco-pessimism-versus-techno-optimism/>.

Tegmark, Max. "2017 : WHAT SCIENTIFIC TERM OR CONCEPT OUGHT TO BE MORE WIDELY KNOWN?" *Edge*. 2017. June 28th 2020. <https://www.edge.org/response-detail/27126>.

Terasem Movement Foundation. 2007. April 16th 2020. <http://www.terasemmovementfoundation.com>.

TESLASUIT. 2020. Tesla Studios. May 6th 2020. < https://teslasuit.io >.

"The Computer Will See You Now; Artificial Intelligence and Psychology." *The Economist* 412.8900 (2014): 63.

The Void. 2019. The Void, LLC. May 6th 2020. < https://www.thevoid.com>.

Thomas, James. "From People Power to Mass Hysteria: Media and Popular Reactions to the Death of Princess Diana." *International Journal of Cultural Studies* 11.3 (2008): 362–376.

Timmer, John. "The "Terasem" group wants to help transform you into an AI." *ARS Technica*. September 28th 2015. June 28th 2020. <https://arstechnica.com/gaming/2015/09/the-terasem-group-wants-to-help-transform-you-into-an-ai/>

Torous, John et al. "Delivering Cognitive Behavior Therapy to Young Adults With Symptoms of Depression and Anxiety Using a Fully Automated Conversational Agent (Woebot): A Randomized Controlled Trial." *JMIR Mental Health* 4.2 (2017): 1-11.

van den Berg, Mariecke. "Bones Talking Back: Theology and Public Mourning after the Crash of Flight MH17." *Journal of the European Society of Women in Theological Research* 27 (2019): 175–2454.

Vincent, James. "Watch Jordan Peele use AI to make Barack Obama deliver a PSA about fake news." *The Verge*. April 17th 2018. May 6th 2020. <https://www.theverge.com/tldr/2018/4/17/17247334/ai-fake-news-video-barack-obama-jordan-peele-buzzfeed >.

"Virtual reality reunites mother with dead daughter, bringing tears but also helping her let go of child she has missed so dearly." *South China Morning Post*. February 12th 2020. April 20th 2020. <https://www.scmp.com/lifestyle/family-relationships/article/3049985/mother-cries-when-reuniting-dead-daughter-vr-learns>.

Walter, Tony. "Modern Grief, Postmodern Grief." *International Review of Sociology* 17:1(2007): 123-134.

"What will happen to my Facebook account if I pass away?" *Facebook*. 2020. April 16th 2020. <https://www.facebook.com/help/103897939701143>.

Wilczek, Frank. "THE UNITY OF INTELLIGENCE." *Possible Minds*. Ed. John Brockman. New York: Penguin Press, 2019. 103-116.

Wissenburg, Marcel L. J. "A taxonomy of green ideas." *Journal of Political ideologies* 2.1 (1997): 29-50.

Woebot. May 6th 2020. <https://www.woebot.io>.

"Zanger Linkin Park pleegt zelfmoord." *NOS*. Ed. Marcel Gelauff. July 20th 2017. The Dutch Broadcasting Foundation. May 5th 2020. <https://nos.nl/artikel/2184222-zanger-linkin-park-pleegt-zelfmoord.html>.

Zuin, Lidia. "ETER9: Remember That You Will Die, Prepare To Live Forever." *Neon Dystopia*. January 31st 2016. May 12th 2020. <https://www.neondystopia.com/cyberpunk-technology/eter9-remember-will-die-prepare-live-forever/>.

혼자걸어요. Comment on "[VR휴먼다큐멘터리 - 너를 만났다] 세상 떠난 딸과 VR로 재회한 모녀 | "엄마 안 울게. 그리워하지 않고 더 사랑할게" (ENG/SPA subbed)" *YouTube*. May 8th 2020. <https://www.youtube.com/watch?v=uflTK8c4w0c&feature=emb_logo>.

Media List

2B. Dir. Richard Kroehling. Terasem Media and Films, 2009.

"A.I. and Afterlife | Marius Ursache | TEDxBucharest." *YouTube*. July 19th 2019. April 16th 2020. <https://www.youtube.com/watch?v=bANg1rJxTUo>.

Altered Carbon. Netflix. February 2nd 2018 – present.

"Be Right Back." Season 2 Episode 1. *Black Mirror*. Channel 4. February 11th 2013.

Black Mirror. Channel 4, Netflix. 2011-2019

"Creating A Digital Identity in the 21st Century | Bruce Duncan & BINA 48 | TEDxOrlando." *YouTube*. September 5th 2017. May 30th 2020. <https://www.youtube.com/watch?v=zx561RXomdQ>.

"Eternime Alpha One." *Vimeo*. October 23rd 2015. April 30th 2020. <https://vimeo.com/143376663 >.

"Eternime Alpha Three." *Vimeo*. April 18th 2017. April 30th 2020. <https://vimeo.com/213774083 >.

"Eternime Alpha Two." *Vimeo*. October 13th 2015. April 30th 2020. <https://vimeo.com/142260863 >.

"Martine Rothblatt: My daughter, my wife, our robot, and the quest for immortality. " *YouTube*. May 18th 2015. April 20th 2020. <https://www.youtube.com/watch?v=rTJpJlVkRTA>.

MBClife. "[VR휴먼다큐멘터리 - 너를 만났다] 세상 떠난 딸과 VR로 재회한 모녀 | "엄마안 울게. 그리워하지 않고 더 사랑할게" (ENG/SPA subbed)". *YouTube*. 2020. June 14th 2020. <https://www.youtube.com/watch?v=uflTK8c4w0c>.

Meeting You. Dir. Kim Jong-woo. MBC Global, 2020.

MIT 15.390X. "Identify Your Next 10 Customers: Eterni.me (Pt 1)." *YouTube*. July 1st 2016. April 16th 2020. <https://www.youtube.com/watch?v=iE6UD77-xAc>.

Robotex. ""The Impossible Tomorrow Thanks to AI" by Henrique Jorge from ETER9." *YouTube*. December 15th 2018. April 16th 2020. <https://www.youtube.com/watch?v=MlUJ7GQRqVo>.

Rogue One. Dir. Gareth Edwards. Walt Disney Studios Motion Pictures, 2016.

"San Junipero." Season 3, Episode 4. *Black Mirror*. Netflix. October 21st 2016.

Star Trek: The Next Generation. First-run syndication. September 28th 1987.

Star Trek: The Original Series. NBC. September 8th 1966.

Star Wars. Dir. George Lucas. 20th Century Fox, 1977.

The Real Tocha. "ETER9 - Create a social virtual counterpart in your absence." *YouTube*. October 30th 2018. April 16th 2020. <https://www.youtube.com/watch?v=BupTQxUqFmg>.

Westworld. HBO. October 2nd 2016 – present.

"Will Wall-E Come True? (vs. Star Trek) – Wisecrack Edition." *YouTube*. May 28th 2019. May 24th 2020. <https://www.youtube.com/watch?v=48mf2QUtUmg&t=462s>.

List of Figures