Bachelor's Thesis

Artificial Vehicles for the Extension of Mind

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<u>Abstract</u>

This bachelor's thesis delves into the *Extended Mind Hypothesis* as introduced by Andy Clark and David Chalmers two decades ago, with a specific focus on the psychological phenomena of memories and their influence on personal identity. The study examines how environmental factors, particularly technological advancements, contribute to the extension of the mind. The central research question investigates the role of artificial vehicles in mind extension, the impact of digitally enhanced memory, and the potential of technology to *extend cognition*. Furthermore, the research explores how digital technology augments memory and cognition and examines the opportunities offered by *lifelogging* to enhance human memory. The primary research objective is to analyze *lifelogging* as a means of technically extending our *cognitive system* and its implications for our understanding of personal identity. Drawing on the original viewpoint of Clark and Chalmers, the thesis expands its investigation to include the works of philosopher Richard Heersmink and questions the established characterization of the relationship between the cognitive system's subject and object. *Functionalism* serves as the primary overall perspective. By examining the extension of mind through technology, the thesis argues that personal identity is increasingly shaped by interactions with the environment, including artificial entities like technology. The conception of personal identity is fundamentally intertwined with individual memories from a subjective standpoint. As technology enables extended memories, this raises essential questions about the nature of our identity. Virtual and augmented reality are explored as potential domains of mind extension, while the study acknowledges the potential risks and benefits of such advancements. In conclusion, the thesis suggests that extending our minds with technology has led to a significant shift in how we define our identity. It highlights the need to recognize the impact of environmental interactions, including technological artifacts, on personal identity. By contributing to the state of the art, this research emphasizes that lifelogging, in various forms, goes beyond the realm of representational evocative objects, and our identity is increasingly intertwined with the technology we utilize. Thus, a comprehensive understanding of the Extended Mind Hypothesis can pave the way for a deeper comprehension of the human psyche and its integration with technological advancements.

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1 Introduction

The Extended Mind Hypothesis defends a form of mental externalism, with the environment as an indispensable influence on some of one's internal cognitive processes. Commonly known alternative names for it are *Environmentalism*, *Extended Cognition* and *Cognitive Integration*, as well as *Vehicle Externalism* (Bernecker 2014) – the 'vehicle' being the factor possessing mental content (Wheeler n.d.).

Enlarging the set of factors defining the human mind by including more than internal, beneath-the-skin elements pressingly impacts the philosophies of mind, consciousness, memory, and cognition. The ongoing debate around the *mind-body-problem* persists between the philosophies of monism and dualism. Whereas the former claims for the human's internal mind and the external physical structures to be one unified substance in nature, dualism argues for the internal to be inherently distinct from the external. In this issue the *Extended Mind Hypothesis* offers an explanation as to how the internal and the external worlds are not just interwoven through functioning as influencing factors, but unified in their effect on the human mind. Not only does this have an impact on our understanding of the locality of consciousness and cognition, but also on the concept of memory and the process of remembering.

Accepting the border of 'skin and skull' to draw a distinct line between the internal and the external or pointing to physical entities as the origin of meanings and mental content have been common, but rather unsatisfactory explanations to the *mind-body-problem* (Clark and Chalmers 1998). An alternative, rather new option is delivered by an *active externalism*, which takes the functionality of the environment in its interaction with the *res cogitare* into account. Here, mental content is carried by mental states or processes.

When considering modern-day technology as vehicular influences, the theory of the extension of mind at times shows room for contribution, as it is an actively ongoing debate in recent history. By strictly following the approach of *functionalism*, technology, in particular cases can fulfill cognitive tasks and therefore factor significantly into the human mind and memory system (Clowes 2012). Nevertheless, it is crucial to distinguish mind-extending technologies from the rest. All technology has been artificially made and invented to fit humankind's needs and to adjust to the intended user. But while a fan has been created to simply blow cool air around a room, a diary is intended to help keep hold of an individual's perspectives and memories.

Because technology has already shown vast development in becoming more and more integrated with everyone's lives, one must suspect the future development of our dependance on technology. Of the faceted perspectives that have been discussed and argued for, several are particularly invested in the discussion of the effects an extension through technology may have on memory. Through modern developments we encounter a wide range of tools or technical influences to be discussed, one category being used to track and record an individual's life. Consider everything from diaries to security cameras – keeping a log of one's life is claimed to have a multitude of advantages.

Taking lifelogging as a form of technically extending our cognitive system into account, what could this mean for our understanding of personal identity? Consequently, technology's possible influence on the human personhood must be discussed – in this manner especially concerning autobiographical memory. It is this dissertation's contribution to elaborate how the extension of mind, particularly through lifelogs is constitutive for personal identity of humans.

2 State of the Art

2.1 The Extended Mind Hypothesis

2.1.1 Conception

Origin of the Matter

Confronting the issue that, so far, no infallible answer can be found to settle the question of "where […] the mind stop[s] and the rest of the world begin[s]," Andy Clark and David Chalmers encounter a new concept and establish the *Extended Mind Hypothesis* in their 1998 paper, *The Extended Mind* (Clark and Chalmers 1998).

Where *does* the mind stop, and the rest of the world begin? One commonly suggested answer has been to simply consider the biological and physical border between a human's insides and the outside world, the skin, so to say. Or, alternatively, to adopt the view of *externalism*, as previously established by Hilary Putnam in his essay *The Meaning of "Meaning"* from 1975. Though the author sets his argumentation within the field of the philosophy of language, he diverges into a question of philosophy of mind and winds up defining the notion of *semantic externalism.* This approach suggests that semantic properties of terms and sentences "just [aren't] in the head!" (Putnam 1975). Instead, the meanings of words emerge solely from the environment's features, as they depend on their *extensions*, which are the sets of things that *apply* to the affected term (Putnam 1975). As an example, Putnam elaborates that the term 'creature with a kidney' has a different *intension* than 'creature with a heart,' as it addresses different physical things in the world in relevance for the context of any subject matter (Putnam 1975). But, these two terms do share the same *extension*, if it is assumed that all animals that can be described by 'having a heart', can also be described by 'having kidneys' (Putnam 1975) – this, of course, is not biological reality, but that will be disregarded for the sake of the utility of this example. If meanings didn't emerge from the external, as Putnam suggests, the two descriptions would not share their *extension*, they would refer to completely different objects in the world.

Clark and Chalmers notice that this conception fails to account for the causality enforced by the environment onto the internal factors and the effect those will have on behavior (Clark and Chalmers 1998). Because, if a person believes 'all animals with a heart also

have at least one kidney' in the context of doing a veterinary autopsy, for example, they will assume the existence of and perhaps look for the kidneys when they've seen the animal's heart, even if the physical reality does not meet the person's beliefs. In this case the present environment does not change the person's internal *state*, which leads Clark and Chalmers to describe Putnam's approach as a *passive externalism,* where environmental factors merely add to internal cognition, which itself remains the main factor in "driving cognitive processes." (Clark and Chalmers 1998)

In response, the philosopher-duo introduces a descending theory called *active externalism*, which innately deflates this issue simply by recognizing the environment and the internal as equally causally relevant contributors to cognition (Clark and Chalmers 1998). Such a "two-way interaction" between a "human organism [and an] external entity" (Clark and Chalmers 1998) is defined by having all contributing parts unified into a *coupled system*, causally controlling a person's behavioral response analogous to how the mind is considered to do in a non-extended-mind conception (Clark and Chalmers 1998). In contrast to Putnam's *passive externalism*, the things impacting cognitive processes aren't just appendixes here, they are sufficient pieces of the puzzle that are responsible for the impact on the person (Clark and Chalmers 1998). Instead of somehow emerging all mental content, external sources solely act upon the mind causally. And the mind itself is an absolute entity, theoretically isolable from, but not actively "driving cognitive processes" without the *external* (Clark and Chalmers 1998).

To demonstrate that the environment is a location inhabited by the mind directly, Clark and Chalmers famously present the fictional example of an Alzheimer's patient named Otto, who relies on his notebook to remember every-day information, like the address of the MoMa in New York. The statement here lies within a *functionalist* viewpoint: if a neurologically healthy person can rely on their neurological memory system to remember such information, then the same goes for Otto and his notebook (Clark and Chalmers 1998).

Functionalism is a school of thought which, applied to the philosophy of cognitive sciences, focuses on the effect of a mental state or process within the entirety of a cognitive system, instead of defining its role through its physical or non-physical make-up (Levin 2023). In this case, a placebo earns the same definition as actual, chemically curated anxiety medication, as long as both effectively induce the *process* of easing down and cause the patient to stay calm and prohibit a *state* of anxiety. Since any *states* and

processes are therefore logically capable of realizing other *mental states*, the functionalist point of view on this matter finds itself related to a dualistic stance on the mind-body-problem where *mental states* can both *cause* and *be caused* by environmental factors, which they are inherently distinct from (Levin 2023). On the other hand, many monistic views have also compatibilized with functionalism through a materialistic stance by suggesting that all mental *states* are congruent with particular neural *states*, setting a premise for the makeup of biological neuro-systems as a requirement for mental experience (Levin 2023). Clark and Chalmers argue that any action in the world is considered part of a cognitive process if it conforms to the rule that "were it done in the head, we would have no hesitation in recognizing [it] as part of the cognitive process" (Clark and Chalmers 1998). More on this principle to follow.

As an *artificial memory* (Clark and Chalmers 1998), the written down information Otto carries along wherever he goes *functions* as reliant as its biological predecessor, even if it is located *outside* of his biological body. The environmental feature of the written note plays an *active* role, instead of just adding to his cognition, as it plainly would in Putnam's verdict (Clark and Chalmers 1998).

Concluding their argumentation, Clark and Chalmers review the factors that back up their case of an *artificial memory* being as valid of a part of a *coupled system* – which is the unification of a *cognitive agent* and an *external source* into one single entity granted *cognitive status* – as any neuronal networks through four *functionalistic* traits (Clark and Chalmers 1998):

a) *Persistency*, because Otto turns to his notebook for every relevant information he needs to recall.

b) *Availability*, because he carries it along for direct and easy access.

c) *Reliability*, because he bases his every-day decisions and actions on the notes.

d) And lastly, conscious past *endorsement*, because Otto himself once wrote down the information in the notebook for future reference.

The aspect of accessibility and availability will resurface later on in this thesis (see section 2.1.2).

Objections and Responses

As with any newly introduced philosophical framework, it is crucial to address potential objections that may test the broad applicability and validity of the theory.

One certainly remarkable critique to this particular case doubts the validity of the *functionalist* route, because Otto's process can theoretically be divided into multiple smaller activities that might not fit into a definition of the mental state of belief (Clark and Chalmers 1998). For instance, one could argue that he actually experiences the mental state of *desire* to visit the museum first, then the state of *belief* 'the address of the MoMa is in my notebook', then the mental state of *desire* to search for the information he needs, then finding and reading it, then *reconciling* what he needed the information for, and finally, actually *belief* about the location of the museum. But Clark and Chalmers argue that any, even purely internal or neurological cognition, like a person without Alzheimer's disease would have, could be divided and complicated in the same manner. Even so, that the term 'belief' wouldn't apply to any mental states anymore at all, which would simply and obtusely deflate the whole discussion (Clark and Chalmers 1998). Exemplary, the cognitive process of a neurological person desiring a candy can be broken down as follows: the experience of desiring to satisfy a feeling of urgency in the mouth, the *belief* of this urgency to go away by stimulating certain tastebuds, followingly the *belief* of the affected tastebuds being the ones responsible for sweetness, then the *belief* of being able to satisfy this feeling by eating candy, then the *belief* of the location of candy in the pantry, and so on, and so on. Though in reality nobody experiences all of these mental states individually, we simply experience craving something sweet, remember where we have access to candy and go grab it to eat. And so, the same goes for Otto experiencing the *desire* to visit the MoMa in New York, remembering where to go and to take off into the city.

Another objection that may be criticized is that their theory has only been shown to work for the mental state of *belief*, but not for other mental states (Clark and Chalmers 1998). The hypothesis wouldn't be universally applicable if it didn't present validity through other examples that include states like *fear* or other emotions. Although, the duo does allude to the possibility of socially extended cognition, which would require another cognitive agent to be interwoven into one's *coupled system*. And this, for example could result in the influence on one's mental state of *desire* at their favorite restaurant, where

the waiter may suggest certain dishes because he knows what food they've enjoyed in the past (Clark and Chalmers 1998). Similarly, the mental state of *fear* can be cognitively extended by an object, perhaps an old photo depicting the scene of a traumatic event in a person's life inducing a chill down the spine or goosebumps to arise.

Other critiques refer to *cognitive bloat,* which is what happens when a theory is formulated so broadly, that almost anything fits into its definition. Clark and Chalmers' theory is vulnerable to having all types of absurd examples theoretically and by definition fit into the *extended mind hypothesis* but having them miss the actual point of their theory (Bernecker 2014). This is why it is crucial to note aspect d) personal *endorseme*nt from above, otherwise any stranger's notes or even internet articles can be considered an extension of the mind. Otherwise, any immediately accessible internet-article, instruction booklets or any environmental surroundings could be considered to partake in the *extension* of mind.

The *active externalism* theory does face a few more possible objections, a list of which are rather general and not quite remarkable for this thesis in particular. Although, they are considerable and it is advisable to additionally read up on them for further dissertations: the *differences argument*, the *coupling-constitution fallacy* objection and the *mark of the cognitive* objection (Bernecker 2014).

Additional Conception

Philosophers like Michael Wheeler, Sven Bernecker and Richard Heersmink have offered significant input on this subject matter. Among which is the recognition of distinctions within the *Extended Mind Hypothesis* through analyzing each contributor to a *cognitive coupled system* (Wheeler n.d.). What Clark and Chalmers argued for Wheeler refers to as the *Hypothesis of Extended Cognition*, which means that "brain, body and world" (Wheeler n.d.) share portions of *material vehicles*, which are the factors "that realize the thinking and thoughts" (Wheeler n.d.) and therefore all three entities are given *cognitive status* (Wheeler n.d.). He stresses on the divergence of *vehicles*: *mental* or *psychological states* – like thought, belief, desire, fear, etc. on one hand – and *mental processes* – like thinking, believing, desiring, etc. on the other. Returning to a *functionalistic* point of view on the matter Wheeler identifies that the contribution made by *vehicles* as either mental

states or mental processes can be defined mainly through their causal involvement with in- and outputs of the *cognitive system* as a whole (Wheeler n.d.). He calls this specific philosophy in the field of cognitive sciences *extended functionalism* (Wheeler n.d.). Heersmink critically identifies this principle as functional *isomorphism* – accepting whatever leads to the same results as the same thing, no matter if internal or external – as a consequence to the *parity principle* (Heersmink 2015): "Were [an external activity] done in the head, we would have no hesitation in recognizing [it] as part of the cognitive process." (Clark and Chalmers 1998).

Less controversially, Wheeler introduces the *Hypothesis of Embedded Cognition,* which contrasts *extended cognition* by suggesting a rather coincidental causal relationship between the environment and 'intelligent thought and action', and especially their properties of transfiguring in correlation to external factors (Wheeler n.d.). This idea may, at first, seem similar to Putnam's, as the *externalism* is rather *passive* here as well, but they are actually the exact opposites of one another: one credits solely the environment for the appearance of semantic properties, and the other claims for the environment to be involved, but not necessarily causally entangled, which is why it is attributed to the so-called *complementarity principle* (Heersmink 2015).

2.1.2 Artifactual Autobiographical Memory

Memory

The science that enables us to take a closer look into the phenomena of mental states and processes induced by both internal and external input is the *psychology* of *remembrance*. Here, there are two modes of memory our central nervous system can maintain: the *short-term memory*, which is primarily used to remember details for a timespan of a few seconds to a few minutes – for instance, the last sentence your professor dictated for you to write down in your notes. And contrastingly, there is *long-term memory*, which itself can further be distinguished in *non-declarative* and *declarative*. While the former memory system is responsible for practical memories like how to fluently speak your first language or how to ride a bike, the latter is accountable for such memories that stem from a specific, traceable past event (Heersmink 2022). This, for one, could be factual knowledge learned in school or the fact that your cousin has a severe peanut allergy, which would be so-called *semantic* memory. Or, conversely, it could be a memory of your sweet 16th birthday party, or that time you had to take your cousin to the hospital because he accidentally ate candy with peanuts in it, which would then consist of *episodically* stored information (Heersmink 2022).

Both *episodic* and *semantic declarative long-term* memories can obtain *autobiographical* information memorized by ourselves as individuals (Heersmink 2022).

Extended Memory

"Does the extended mind imply an extended self?" Clark and Chalmers suggest, yes, since aspects like dispositional beliefs already influence a person's understanding and knowing of themselves, *extended cognition* doing the same would not be a far jump (Clark and Chalmers 1998). The conception of one's own identity is generally wholly founded around an individual's memories from their own point of view, so what happens when *extended memories* are involved?

Well, our declarative long-term memory is what provides us with autobiographical information and if you find and look through a photo album from October of last year, you will notice that the pictures will bring back memories you had since forgotten, or at

least not thought of in a while. Seeing a picture of your cousin's Halloween candy basket will remind you of him sitting right next to you on the family sofa while he unknowingly ate peanuts and having to take him to the emergency room five minutes later, which you wouldn't have remembered had you not looked at the photo just now. This form of memory retrieval, where you almost re-experience the past event, is *episodic*. Perhaps the photo reminded you of the friendly emergency nurse's name instead, this would then be *semantic*. Either way, both pieces of information were captured in a single, traceable moment that you experienced yourself, and the picture in the photo album induced your *cognitive process* of remembering. Therefore, the physical image serves as an external source for the generation of a *mental process*, which declares it an *extension of mind.*

Now, you had not completely forgotten about last Halloween, you just hadn't thought of it in a while, so your cognition was not completely reliant on the external source, it was rather causally induced by coincidence – *embedded cognition*.

When an artifact provides additional functions that are not already within the agents own internal capabilities, we speak of *complementary*-based *embeddings* (Heersmink 2022). Importantly, this category differentiates between the neurological cognitive resources and the added-on tools a person uses to store and retrieve information. The artifacts responsible for complementarily extending the mind through autobiographical information consist of evaluative and affective systems, as they impose some form of emotional association within a person, just as the photo album takes you back to last Halloween, perhaps re-experiencing some of the fear you felt when you heard your cousin choke and go into anaphylactic shock. Synonymous are *evocative objects*, which are nicknamed *affective artifacts* for bringing forth personal cognitive information that influences one's identity (Heersmink 2022). An external object is described as *representational* when it induces any emotional states or processes within an agent and the artifact has also been created for the intention of supporting autobiographical memory storing and retrieval (Heersmink 2022). Diaries, photo albums and similar artifacts that record an agent's life fall under this category.

Alternatively, an artifact can support cognitive capacities that a person already bears, and the beneficial purpose is merely the provision of assistance in the optimization of *efficiency* in a person's actions. Here, we speak of a *parity*-based *extensions*. Timetables, to-do-lists, and similar artifacts fall under this category, because the person could, and

probably does, remember everything themselves, it is simply easier to just write the information down and create an overview for efficient recapitalization. Instead of *embedding*, the extension in this case *enhances* the biological memory. Concluding, regarding the psychological process of remembering, it is clear that the *parity*-based extension of mind serves for efficiency by *supporting* the internal memory and that *complementary*-based artifacts in contrast, aid in *adding* to storage space or *enable* retrieval-mechanisms of one's own, autobiographical memory (Heersmink 2022). The duality here resembles similarity to the duality of *embedding* and *extending* as Wheeler introduced above.

Heersmink introduces a lot of possible measurements for conceptualizing the relationship between cognitive agent and external sources in all cases of *extended mind*, but one of these is specifically directed toward *artificial autobiographical memory* (Heersmink 2022). Namely, the *degree of autobiographical dependency* focuses on evocative objects and their informational and functional properties. *Availability* is a memory system's storage-capacity, *accessibility* is the capability of retrieving memories and combined they form the crucial factors to *autobiographical dependency* (Heersmink 2022). A diary, for example would provide an agent with a higher *accessibility* rate, while *availability* stays the same: a book, even a very thick one, cannot ever come close to containing the same amount of information our neurological system – not even in Otto's case. But what a book – or notes – can do, is provide a physical encyclopedia of your own experiences. In a diary, they'd even be sorted by date, which makes it easier to locate information than having to dig through a cloud of internally stored references.

2.1.3 Characterizing the Relationship between Mind and Artifact

The Cognitive Relation between Embodied Agent and External Source

To receive a rather holistic measurement of the intensity of the cognitive relation between an embodied agent and an external source, seven different dimensions signifying an agent's *reliance* on an artifact are evaluated: the *intensity of information flow*, *accessibility* to the resource, *durability of the relation* between them, *trustworthiness of information*, *procedural transparency*, which measures the ease of use and lastly, *personalization* (Heersmink 2022). Applied to our example of the photo album we find following results:

a) Firstly, the *intensity of information flow* is rated as medium-high, since pictures can capture a lot of details. Not only does 'a picture speak more than a thousand words' emotionally, but also semantically, depending on the content: in induces the remembrance of the fun of going trick-or-treating, the taste of candy, the joy of spending time with your cousins, the panic of one of them going into anaphylactic shock but also on the other hand, the way the candy basket looks, the amount of candy you'd collected, the name of the friendly ER-nurse.

b) Second, *accessibility* to the resource is usually quite low. If analogue, printed photos glued to the pages of a physical album are referred to here, quick access is only provided if the agent is near the albums, which, in the most inconvenient case, are hidden in an old box in your grandparents' dusty attic. Of course, if digital photo albums are referred to, then the degree of accessibility is quite high, depending on the device's battery percentage or, in the case of shared photo albums through a digital cloud, an agent's internet connection.

c) The *durability of the relation* is medium-high since the albums can be stored for as long as there is enough storage space.

d) *Trustworthiness* is high as well, as long as the pictures aren't edited.

e) *Procedural transparency* is high, all there is to do is to flip the pages of the album and look. Or, to digitally select the photo-app and scrolling.

f) And, of course, *personalization* depends on who took the photos and who put the album together, but if the agent themselves was involved in this, this degree is also high.

Degree of Distributedness

Additionally, it is possible to describe the relationship between mind and artifact by evaluating the degrees of *distributedness* of a cognitive system by considering further factors (Heersmink 2022). This scaling rekindles the discussion about whether the word 'embedded' or 'extended' is more appropriate to describe the position of external factors in the system of the mind.

The degree of *autobiographical dependency* correlates to it followingly: if dependency is high, then it is also likely for the involved vehicles and mental processes of the memory to be rather highly *distributed*, and therefore to *extend*, rather than *embed* the mind (Heersmink 2022). Contrastingly, this means that your photo album from Halloween is more of an *embedding,* since the retrieval of your memory of that night in the emergency room is not dependent on the picture, as your internal cognition possesses sufficient *availability* and *accessibility* – you're both able to support the storage of the memory neurologically and to recall the memory when demanded.

Outlook

As alluded to above, the debate around whether the term 'extension' or 'embedding' is more accurate to describe the mind's status in different conjunctions with certain external objects has not yet brought up a consensus in the philosophical community. The suggestions above, which are to assess the situation by means of several different factors and dimensions, don't provide a clear rule of the applicability of each term either.

Michael Wheeler offers fairly clear explanations of the hypotheses of *extended cognition* and the contrasting *embedded cognition*, but when the terms are to be assigned with empirical situations, the line of distinction blurs, because empirically, it is mostly widely debatable which of the two hypotheses applies to an exemplary cognitive system (Heersmink 2015).

Neither does the duality of mental states and mental processes lead to any paths along finding a proper characterization of the way mind and artifact cooperate. Of course, *mental states* represent vehicles that persist throughout a certain amount of time while *processes* show the dynamics between external structures and the internal cognition – Otto's belief about the location of the MoMa doesn't just suddenly appear, he goes

through the processes of flipping through his notes and looking for the relevant information and finally of *believing* – but this doesn't seem to have an impact on the *way* his mind extends.

Perhaps the solution lies beyond picking sides, in finding a completely different characterization that proves itself to be more reliable than the so-far suggested explanations. Defining what *cognitive status* entails is complicated enough, let alone identifying it where it's due. Recognizably though, the relationship between mind and artifact is liable to some sort of precise systematicity – it is evident that Otto stands in a relationship to his notes, the mental vehicles are obedient to the rules of association. Therefore, the question may lie within the origin of the *meaning* or *mental content*, since it can neither be in the head, argued for by Putnam, nor can it be in the dried ink on the paper of Otto's notebook. There is a *constitution* emerging from the environment, but the *meaning* must incipiently be emergent from another sphere, something that involves the agent as the recipient of the *meaning*. Locating this factor might be possible somewhere between the external and the internal, or perhaps it is not localizable at all.

2.2 Cognitive Technology
2.2.1 Influence on Humanity Historically and Contemporarily

Technology is the conception, creating and use of tools with the intention of making human life easier. Not only does it strongly impact humanity's economic development, but also its cultural generation. Especially in the past two centuries thinkers and writers like the Germans Ernst Knapp, Martin Heidegger and Hans Jonas, have shown huge interest in the philosophy of technology (Franssen, Lokhorst, Van de Poel 2023). Anthropologically, tools and artifacts have been crucial to human evolution in general, may it be the invention of the wheel with the intention of transporting heavier objects, a fan ventilating air, or the first iPhone update that introduced the voice assistant Siri, all technologies – perhaps some less, some more – have driven humanity to its present state and prepared it for our future outlooks. *Cognitive technology* is one of the most recently discussed topics, as artifacts that may be "reshaping" human, *natural* cognition are becoming more and more relevant in ethical debates (Clowes 2012).

History

Created to support the "goals and values of humans," (Franssen, Lokhorst, Van de Poel 2023) artifactually technological developments are intended for practical use and have been milestones in our societal development. In ancient greek civilization the word *téchne* stood for practical knowledge and craftsmanship, mankind forcing itself upon nature by inventing tools intended to aid in certain tasks (Schadewaldt 2014). Afterwards, up until medieval times, technology was appreciated purely practically, as the *mechanical arts* were in focus. With the occurrence of alchemy, philosophical reflection on technological developments rose and so did the impact it had on society (Franssen, Lokhorst, Van de Poel 2023). Later on, the industrial revolution accelerated concern about future technological advancements and many thinkers at the time chose a rather critical viewpoint on the rapid developments.

As for the impact on our *natural* memory, specifically *extended mind*-technologies have been steadily reinvented to adapt to the historic and environmental circumstances more and more (Clowes 2012). This includes the development of language and other tools for

communication and counting systems, which are very fundamental aspects of our anthropological development (Clowes 2012).

Contemporary Influence

Through the drastic change in its capacities and its availability to the every-day user, technology has become a very prevalent presence in our lives, and we're experiencing both social and individual effects (Clowes 2012). Based on the school of *functionalism* any such tool presently "perform[ing] functions, which, were they [done in the head], would be regarded as cognitive" (Clowes 2012) is a piece of *cognitive technology*. Often, this term is used to refer to developments in computer sciences and artificial intelligence (Rouse 2018). Otherwise, it is commonly discussed in relation to its possible effects on humankind's memory – both storage and retrieval may be altered, since technology may offer possibilities in improving both *availability* and *accessibility*.

Lifelogging is an activity that has risen in popularity in the last few decades and has allegedly provided such capabilities. Through the principle of *total capture* lifelogging devices record every information they are designed to sense and store, which can be carried out through self-activating cameras, voice recorders, and every other tool grasping *affective autobiographical* information, *complimentarily* extending the mind (Heersmink 2022).

Ethical implications involve *cognitive technology's* influence on our society both legally and interpersonally, as *unforgettability* increasingly imposes on the every-day-agent's memory. How offended will your friend be if you forget their birthday, despite you keeping a lifelog of all the birthday parties of your loved ones? What are the consequences of a police officer's body-cam filming and recording him working against protocol and harming a suspect?

2.2.2 Possibilities and Risks

Integration through Hybrid Memory Systems

A certain type of *cognitive technology* is defined by all devices designed to digitally record a user's life from their perspective – *autobiographically*. Mobile smart phones may be the most prevalent and usual example, as they increase memory *availability* and *accessibility* immensely, which provokes a modification of what we mean by the term "human memory" (Clowes 2012). Currently it may seem to be quite simple to distinct between the human internal factors of the mind and the external counterparts, accepting the separation by 'skin and skull' but this clear borderline is at risk of blurring out while technology is undergoing constant developments adjusting to the user's needs and convenience. Especially concerning memory systems, the philosopher Robert Clowes conceptualizes the terminological distinction between *O-* and *E-Memor*y, former of which is *organically* neurologically systematized within the human process of remembering and latter of which is everything *extending* it (Clowes 2012). As a "heterogenous bunch of devices and systems [*E-Memory* can] fulfil similar functions [as *O-memory*] either by replacement, extension or augmentation." (Clowes 2012) The choice of distinct terminology recircles to the *extended mind hypothesis*, as *O-memories* ntationent the agent's internal mind and *E-Memories* represent additional or external factors, depending on the degree of *distributedness* of the cognitive system (Heersmink 2022).

In cooperation with each other, the duo of *O-* and *E-Memories* forms what Clowes calls a *hybrid system* (Clowes 2012). This is conceptualization is comparable to Clark and Chalmers' *coupled system* (Clark and Chalmers 1998).

Ensuing, he brings forward five human-memory functions that shall be able to be influenced by *E-Memory*-factors: *recollection*, *reminiscence*, *retrieval*, *reflection,* and *remembrance of intention*.

Clowes recognizes four categories which highlight the significant differences between rather common (perhaps something like Otto's notebook) and very modern (compared to a bodycam) *mem-techs – cognitive technologies* addressing memory systems – (Clowes 2012):

   a) *Capaciousness* and *comprehensiveness* are immensely advanced through the utilization of mobile devices, such as cameras to record events and obtain very

detailed information. An implementation of this aspect is shown through *lifelogging*, taking up as much information as possible.

b) *Incorporability* refers to the elevated degree of *procedural transparency*, similar to the factor for the scalation of the intensity of a relationship between agent and artifact (Heersmink 2022). The higher measurements suggest a higher level of *integration* between the two factors.

c) *Autonomy* points out *mem-tech's* ability to process recorded and saved information by itself for the user to adopt more efficiently. Arguably, the *autonomy* of an *external* source establishes its status of *actively* and causally extending the mind.

d) *Entanglement* is the aspect of *E-Memory* recording interactions between users and devices, which may lead to a modified conceptualization of who possesses ownership of recorded information. Namely, it leads to non-individuality.

This last point in particular proposes the possibility of a technological fusion of minds, which may provide a multitude of advantages, accompanied by certain risks. If technological devices become more intimately integrated into the organic memory systems, *O-* and *E-Memories* can end up being nearly indistinguishable (Clowes 2012). Additionally, the organic memory system could be impacted and altered by the utilization of *mem-tech* in respects to our understanding of it, but also in respects to how the human neuro-system adapts to the habit of using such technology, considering the elimination of under stimulated synapses in the brain and the devolution of neuro-functions as both evolution and ontogeny take their course dependent on environmental changes (Clowes 2012).

Even the formation of languages, letters, and drawings, such as the establishment of counting systems in all of humanity's societies have undoubtably influenced the way and the amount of information our memory systems can obtain (Clowes 2012), including our concept of narrativity with the common use of diaries and written storytelling. Subsequentially, *mem-tech entanglement* will modify not only our *mental processes* of remembering, but also our sense of self and identity, since memory is argued to be a substantial factor for human identity, both collectively and individually (Clowes 2012). More on this discussion will follow along in the course of the dissertation (see section 3.2).

Measuring the degree of *distributedness* in relation to the degree of *autobiographical dependency*, high *availability* and *accessibility* with *mem-tech* do surprisingly not indicate an *extension*, rather than a so-called *embedding* of the mind (Heersmink 2022). Instead, Clowes advocates for the *complimentary principle*, which states that humanity will principally only embrace technologies if they provide *complementary* support in declarative memory storage and retrieval, but not enhancements replacing neurologically natural functions in order to sustain synoptical purposes (Clowes, 2012).

Practical Implementation

Cognitive technology does not always have to be intended for *declarative*, *complimentary* and *affective* memory systems, such as *lifelogging* devices do. Some follow along a different path: instead of autobiographical embedding, a piece of technology may actually enhance a user's own capabilities, for example, purely utopianly – or dystopianly – future developments could bring forward a sort of hard-drive-extension for the human brain, expanding the storage room for information. Or, a device may not be considered an *affective artifact* for its inefficacy of emerging emotional association and serve purely practical purposes, perhaps like Otto's notebook – enabling storage and retrieval of semantic information.

Possibly, *cognitive technology* doesn't even have to be designed to aid the human memory systems at all – maybe it can provide *complimentary* and *parity* functions within other mental processes, like desiring, paying attention or fearing. Considerable examples are: google reviews altering your appetite, or pharmaceuticals enabling a neurodivergent patient to concentrate, or even something as simple as a lucky charm calming a student's fears before an exam. These are just a few of many outlooks, as technological artifacts are continuously being developed according to every-day inconveniences and impracticalities.

3 Contribution

3.1 Lifelogging Through Different Devices

As elaborated in the above exposition, a cognitive agent's *dependency* towards an artifact can be evaluated through seven dimensions. The application of this assessment to the example of a photo album reminding you of the time your cousin went into anaphylactic shock from Halloween candy, signified that a *representational evocative object,* like a collection of information accumulated and kept around by an agent themselves, presents a high degree of such *dependency* (Heersmink2022) (see section 2.1.3). In this case there is an *evocation* of personal, emotional, or even identity-defining associations within the memory, which is a necessary condition to define the photo album as an "affective artifact" (Heersmink 2022). Only when this *evocation* is intended by the design of the artifact and the conditions for an autobiographical *embedding* of the mind are fulfilled, the tool will, per definition, be classified as a tool for *lifelogging* (Heersmink 2022). *Lifelogging* is an activity conducted by a technology-user intended to gain much wider *available* storage room for autobiographical information, as well as to *access* more efficient and transparent retrieval through the aid of an external tool. Next to the photo album from last year's October, additional examples are the use of bodycams, which are designed to record and store information the user intends to expand his memory on. Or maintaining a diary as a teenager for future references of one's personal development in life, or just the events one experienced each day and to virtually *re-experience* the episodic, declarative, long-term memories captured through the artifact.

Now, reconciling our above examples Otto's notebook is clearly not affective, as the sentence 'the MoMa is on 53rd Street in Manhattan' won't spark any personal or emotional mental content, neither does it even contain direct information about Otto's own experiences, so it can consequently be excluded from artifacts considered to serve *autobiographical* purpose. But consider the sentence 'the doctor measured that I am five foot and six inches tall on the 17th of April 1987.' This also does not induce any emotional, or identity-essential cognitions, but it does contain *autobiographical* content. However, this sentence in Otto's notebook can't be considered to *complimentarily embed* his memory system because he does not have the ability to remember such information on his *internal* own due to his Alzheimer's disease. Consequently, by elimination this resource must then serve *parity enhancement* for efficiency, just like the sentence with

the information about the MoMa's location does. But does it really provide support to his cognitive capabilities if he reads and remembers this piece of information by coincidence, not because his grandchildren asked him how tall he used to be before he aged, and his intervertebral discs deteriorated? If the latter was the case, and he turned to his notebook to satisfy his grandchildren's curiosity, the extension would undoubtably fall under the category of *cognitive artifacts*, used for practical utilization (Heersmink 2022). However, Otto's *mental process* of believing that he was indeed five feet and six inches tall on April 17th of 1987, was not induced by an external source that was consulted to serve any practical purpose regarding this belief. Picking up on the philosophical school of *functionalism* once more, he is considered to experience the same cognitive outcome as a neurologically healthy person did if they read 'constructed in 1987' while walking across a bridge in Berlin and then randomly remembered that they were a sophomore in college that year.

Neither one of these *cognitions* affects the agent personally, as they are merely made up of emotionally neutral information about their own life, so why aren't the environmental factors considered to be *autobiographical*, similar to the photo album? Well, in the case of the bridge, this is quickly justified by the engraved information's inability to fulfill the required conditions of an *artificial memory – persistency*, *availability*, *reliability*, and *endorsement*. But, 'the doctor measured that I am five foot and six inches tall on the 17th of April 1987' does satisfy these conditions in the same manner as 'the MoMa is on 53rd Street' does. Ergo, despite not being an *affective artifact*, the external source is a medium of *lifelogging* and it should be possible to reevaluate Otto's reliance on the note through the seven dimensions introduced earlier (Heersmink 2022):

a) *Intensity of information flow* is medium, as it regards only the information directly stated in the short note.

b) *Accessibility* is considered to be high because he always has his notebook along with him. This dimension compares to Clark and Chalmer's *functionalistic* trait of availability (see section 2.1.1).

c) The *durability* of the relation is medium-high, just as with a photo album. Otto keeps is notebook with him for as long as he can, perhaps even after until it is filled with notes.

d) *Trustworthiness* is high, validated by Otto's own past endorsement,

e) and the same goes *for procedural transparency*,

f) and *personalization*.

Because he suffers from very low internal, neurological *accessibility* – or retrieval capacaties – the degree of *autobiographical dependency* is also measured on a high scale – *extended cognition*.

Applied to Heersminks definition of *lifelogging*, the same evaluation delivers following parallel results:

a) *intensity of information flow* is directed *two-way*, closed and private between the artifact and the agent (Heersmink 2015) – same goes for Otto's notes and him through endorsement and retrieval – and *intensity* is not clear (Heersmink 2022).

b) *Accessibility* is usually high because lifelogging devices are usually carried along at all times.

c) The *durability* is medium-high – just like with any artifact with finite storage room.

d) *Trustworthiness* is high,

e) so are *procedural*

f) and *informational transparency*,

g) as well as *personalization* (Heersmink 2021).

And while the *degree of dependency* is typically medium with *lifelogging* – somewhere between *embedded* and *extended cognition* – it's proportioning covers these established dimensions with arguably less overall completeness than Otto's note does (Heersmink 2021). Ergo, the relationship to a *lifelogging* device is likely not as strong, but that is not the crucial aspect defining *lifelogging*.

Innately, all forms of *lifelogging* are two-way, as the user will provide information for the artifact to store and then the artifact will retrieve this information in return. The benefit of extending one's memory system like this is the avoidance of both the *interference*, and the *generation effect* – two weaknesses of the 'plain' natural, human memory. The former describes the phenomenon of older information disappearing, or rather growing out of reach for *accessibility*, when new memories are stored (Bernecker 2014). The latter, on the other hand, refers to the empirical occurrence of "better remember[ing] information that had to be produced (e.g., completing a word fragment) compared with information that was given (e.g., when reading complete words)." (Bernecker 2014)

While *lifelogging*, or the *extension of mind* may seem like a great opportunity to overcome these leaks in the entirety of one's own information-network, it is critical to take a

functionalist view. Namely, the *interference* and the *generation effect* prove that artifacts generally do not perfectly resemble the human internal mind and its capabilities, and perhaps do not always deserve the validation Clark and Chalmers prescribe it with. Even Otto's notebook might contain very old memories that will not be lost over time, because he can simply write some of the information down again in a new notebook, compromising the storage needed and recall the information anytime he can read the notes – the *interference effect* can be widely avoided. And for the latter, the *generation effect* – it can be completely deflated by either having all information be self-produced by the user as Otto writes everything down or, in the opposite way none of the information has to be self-produced if the *lifelogging* tool provides technological capability to store and retrieve everything.

Lifelogging is contemporarily practiced by many, if not all people across the world through a diverse range of tools and for a diverse range of intentions – some focused on the affective and emotional aspects of autobiographical concepts, some focused on a rather practical and utility-based conceptualization.

And while some information is kept private, like your photo album from last October, some experimenters publicize their recorded information over the internet through blogs and live streams. It is certainly a trend rising in popularity as technological access increases with modern developments and should be further inspected, not only for the effects it has on individual's memory retrieval, but also collectively – consider the Mandela effect, ethical, legal, and social implications to *unforgettability*.

3.2 Impact on Personal Identity

Memory is an essential factor to forming an identity, and with that comes viewing one's own life as a narrative or as an autobiography of some sort (Schechtman 2007). Robert Clowes, who introduced the conceptualization of *hybrid memory systems,* made up of the cooperation of organic and extended memories and framed the term *cognitive technology,* also recognized the possibility of external artifacts modifying the understanding of oneself (Clowes 2012). As cognitive technology can be of both affective and practical purpose, both autobiographically and efficiently operative, a variety of directions must be discussed in order to assess the influence on an agent's identity.

The four categories showcasing which aspects have made modern cognitive technology significantly more eligible for implementing an extension of mind shall be revised in respects to "the claim that E-Memory can deepen self-knowledge" (Clowes 2012): these were *comprehensiveness*, *incorporability*, *autonomy*, and *entanglement*. Up front, Clowes approaches some objections his claim might face, namely the misconceptions of what self-knowledge really means, but disputes them in his precise examples supported by the earlier mentioned four factors. Returning to the all-encompassing school of *functionalism*, he states that it is crucial to elaborate the role an E-Memory system plays when interacting with its organic counterpart and followingly presents three cases of increasingly strong degrees of *embedding*. The use of the term 'embedding' rather than 'extension' already implies that this whole argumentation already found its place on the autobiographical, complimentary side of matters.

In the context of *cognitive technology* and its impact on personal identity, the concept of an "integrated agent" becomes relevantly significant (Clowes 2012). This concept posits that the agent's understanding of *self* and *identity* are not limited to their organic mind alone but encompass the extended mind system formed by the collaboration between the *internal cognitive processes* and *external cognitive artifacts*.

Here, the question of how to treat these extensions morally and socially arises. As individuals are becoming more reliant on *cognitive technology* for memory storage and retrieval, it raises ethical considerations regarding the *authenticity* and *integrity* of their identity, as well as the potential risks of *dependency* and vulnerability growing so high, they become unmanageable.

Clowes' notion of "super selves" further emphasizes the potential for cognitive technology to deepen self-knowledge (Clowes 2012): By outsourcing memory to external devices, individuals may not only expand their memory capacities but also alter their perception of themselves. Memories stored in cognitive artifacts may shape the way individuals construct their life narratives, impacting their self-understanding and overall identity. However, this deepening of self-knowledge also raises questions about the nature of personal identity when it becomes intertwined with external cognitive systems. Moreover, the impact of cognitive technology on personal identity may vary depending on the degree of involvement in the artifact's implementation. Clowes suggests that the relationship between an agent and the artifact is likely more profound and intentional when the agent themselves implements the technology (Clowes 2012). In such cases, the cognitive artifact is endorsed as a part of the individual's extended self, and its role in shaping identity becomes more significant.

Further difficulties lie within the potential of cognitive artifacts to change or extend a person's identity, which leads to intriguing questions about the sharing of extended identity-parts inter-personally. Or, if cognitive technologies contribute to shaping an individual's self-concept and life narrative, can these external memory systems also influence collective identity and shared narratives? This line of inquiry raises intriguing possibilities and ethical considerations about how cognitive technologies may impact not only individual identities but also group and collective identities and social dynamics.

In summary, the influence of *cognitive technology* on personal identity is a multifaceted and complex phenomenon. As lifelogging and extended mind systems become more prevalent, questions about self-knowledge, endorsement, and the intertwining of identity with external cognitive artifacts are paramount. The ethical implications of relying on cognitive technologies for memory storage and retrieval necessitate thoughtful reflection on how these technologies shape our perception of ourselves and our collective identities in the ever-evolving digital landscape.

3.2.1 Narrativity through Memory

Episodic Declarative Memory

Remembering the view of your cousin going into anaphylactic shock and almost *re-experiencing* the panic you felt at the time after browsing that photo album – that is a case of an autobiographical embedding of a long-term, declarative, episodic memory by a representational evocative object (Heersmink 2022).

To demonstrate the importance of memory for the stability of personal identity, it is helpful to consider the implications of the opposite claim. Narrativity's grounds are given by the *psychological* and *ethical narrativity theses*, which propose that narrativity is a *natural and essential* aspect of human identity, as well as a factor contributing to living a *good* life (Schechtman 2007). When combining these theses, four possible combinations emerge: some argue that narrativity is unnatural but still good, while others believe it is both natural and good. However, some philosophers disagree with the natural *goodness* of narrativity, as they believe that there are alternative ways to live a good life that do not depend on narrative self-construction and that narratives might hinder self-understanding, which would declare them as intrinsically bad (Schechtman, 2007). This raises important ethical questions about the impact of narrativity on personal identity and the autonomy of individuals to construct their narratives.

Clowes emphasizes the significance of self-understanding, particularly as an inner mental entity or 'self' that can be *diachronic* – narratively extended over time – or *episodic* – not to confuse with the episodic memory discussed above. While this *episodic* memory is strongly bound to the present and is non-narrative, it still plays a crucial role in shaping personal identity (Schechtman 2007). Some may argue that *episodics* – people basing their identity on their episodic information – face challenges with morals and ethics caused by their neglect for a holistic narrative (Schechtman, 2007). Additionally, there is the question of whether episodic memory allows for the forced identity of individuals, or if it remains a matter of personal choice.

Lifelogging, as a form of cognitive technology, is directly descendant of *autobiographical* memory. It exhibits a medium degree of *dependency*, suggesting a moderate level of *distributedness* in the *extension of mind hypothesis* (Heersmink, 2015). Lifelogging devices, such as representational evocative objects, create a strong relation

between the embodied agent and the external source, evoking emotions and identity-defining mental reactions (Heersmink, 2022)

Ergo, episodic declarative memory, as a form of autobiographical memory, contributes significantly to personal identity by allowing individuals to construct narratives of their lives. The debate about the naturalness and ethical implications of narrativity raises important questions about the role of memory in shaping identity. Furthermore, the integration of cognitive technologies like lifelogging into autobiographical memory highlights the complex relationship between the self and external artifacts in the process of self-understanding and self-construction.

3.2.2 Integration Through Cognition

Semantic Declarative Memory

Otto's notebook presents as an intriguing example of *cognitive technology*, focusing on semantic declarative memory rather than the affective and evocative aspects of autobiographical memory. Although it may not be autobiographical, evaluative, or affective in nature, it still captures autobiographical information of some sort, containing facts about himself and his experiences (Heersmink, 2022). While its primary purpose is efficiency and practical use, it also plays a role in extending Otto's cognitive capabilities, enabling him to access information that might otherwise be beyond his immediate mental reach due to his Alzheimer's disease.

Interestingly, the relationship between autobiographical memory and efficiency may not be as exclusive as previously thought. Otto's notebook demonstrates that cognitive artifacts can serve both efficient practical purposes and still contribute to the extension of one's autobiographical memory (Heersmink, 2022). This suggests that the boundaries between lifelogging, focused on evocative objects, and cognitive artifacts intended for efficiency might not be as distinct as originally assumed. The integration of cognitive technologies into autobiographical memory might be more versatile and encompassing than a narrow focus on representational evocative objects alone.

Non-Declarative Habit Memory

Beyond semantic declarative memory, cognitive technologies can also extend non-declarative habit memory, enabling individuals to perform complex tasks or skills with ease. Imagine someone using a GPS navigation system while driving. The technology acts as an external cognitive artifact that provides directions and guides the driver without requiring conscious declarative memory of the route. Similarly, learning how to ride a bike or play the piano involves the formation of non-declarative habit memory, which can be enhanced and extended through the use of technological tools.

The extension of mind in non-declarative habit memory allows individuals to externalize certain cognitive processes, making them more efficient and reliable. By offloading these processes to cognitive artifacts, individuals can free up mental resources, allowing them to focus on other tasks or aspects of their lives. This integration of cognition and

technology raises intriguing questions about the boundaries of personal identity. Does the skill or knowledge acquired through the use of external cognitive artifacts become an integral part of the person's identity? Can individuals share their extended identity parts with others when their skills or abilities are enhanced through technology?

As cognitive technologies continue to advance and become more integrated into our daily lives, these questions become increasingly relevant. The interaction between the mind and external artifacts shapes not only how we remember our past but also how we navigate our present and envision our future. Understanding the impact of cognitive technology on personal identity is not only a theoretical endeavor but also a crucial step in navigating the ethical, legal, and societal implications of this ever-evolving relationship.

4 Conclusion

The term 'artificial vehicles' was chosen for the title of this thesis to allude to further research in other artifacts and perhaps in artificial intelligence. The Extended Mind Hypothesis has been a topic of philosophical inquiry for over two decades, delving into the interaction between the human mind and its external environment. This thesis explored the extension of mind in relation to the psychological phenomena of memories and its impact on personal identity. By examining the contribution of technological artifacts and advancements, particularly in the context of AI, the concept of "artificial identity" emerged as a relevant area for future discussions and dissertations.

The interplay between autobiographical memory and cognitive efficiency emerges as an essential aspect of personal identity. While it is evident that memory significantly contributes to our sense of self, this does not diminish the role of cognitive artifacts in enhancing our capabilities. Contrary to the notion that autobio and efficiency are mutually exclusive, they can coexist as complementary extensions.

Life logging, often associated with representational evocative objects, provides a concrete example of this complementarity. The act of recording and storing experiences through various technological means contributes to autobiographical memory. Simultaneously, these artifacts optimize cognitive efficiency by providing quick and easy access to information that might otherwise be forgotten or buried within one's mind. Hence, life logging exemplifies how both autobiographical memory and cognitive artifacts work in tandem to shape an individual's identity.

As technology continues to advance, particularly in the field of artificial intelligence, a new frontier of cognitive extension opens. AI has the potential to become an integral part of human cognition, influencing memory, decision-making, and problem-solving processes. By incorporating AI into our daily lives, we are redefining what it means to be human and transforming our understanding of identity.

The concept of "artificial identity" alludes to the increasing entanglement of human cognition with AI-driven technologies. As AI systems become more sophisticated and pervasive, individuals might rely on them not only for memory extension but also for more complex cognitive tasks. This blurs the distinction between internal and external sources, challenging the traditional boundaries of the self.

Throughout this thesis, we have only scratched the surface of the complexities surrounding the Extended Mind Hypothesis and its implications for personal identity. The debate on the nature of cognitive extension must continue to unravel its full significance. Moreover, the ethical and societal implications of artificial identity necessitate extensive exploration.

The Extended Mind Hypothesis challenges conventional notions of the self by highlighting the profound influence of the external environment on personal identity. Through technological advancements, the concept of "artificial identity" emerges as an area ripe for future exploration and scholarly inquiry.

As technology continues to progress, we must acknowledge its significant role in shaping personal identity. The blurring line between internal cognition and external artifacts necessitates a more nuanced understanding of cognitive extension. The complementary relationship between autobiographical memory and cognitive efficiency illustrates the intricate interplay between the mind and external sources.

Ultimately, the extended mind invites us to redefine what it means to be human in an increasingly technologically driven world. By engaging in further discussions and research on this topic, we can deepen our understanding of personal identity and its complex interaction with the ever-evolving technological landscape. As we venture into the era of artificial identity, it is our responsibility to navigate its ethical implications and strive for a harmonious coexistence between humanity and technology.

5 Literature

Bernecker, S. (2014): How to Understand the Extended Mind. *Philosophical Issues*, 24, 1-23. https://www.jstor.org/stable/26611096.

Clark, A., & Chalmers, D. (1998). The Extended Mind. *Analysis*, *58*(1), 7–19. http://www.jstor.org/stable/3328150.

Clowes, R. (2012). Hybrid Memory, Cognitive Technology and Self. NDA, https://run.unl.pt/bitstream/10362/56398/1/03_7_16.pdf.

Franssen, M., Lokhorst, G. & Van De Poel, I. "Philosophy of Technology", *The Stanford Encyclopedia of Philosophy* (Spring 2023 Edition), Edward N. Zalta & Uri Nodelman (eds.), https://plato.stanford.edu/archives/spr2023/entries/technology/.

Heersmink, R. (2015): Dimensions of integration in embedded and extended cognitive systems. *Phenom Cogn Sci*, 14, 577-598, https://doi.org/10.1007/s11097-014-9355-1.

Heersmink, R. (2022): Extended mind and artifactual autobiographical memory. *Mind & Language*, 37(4), 659-673. https://doi.org/10.1111/mila.12353.

Levin, J. "Functionalism", *The Stanford Encyclopedia of Philosophy* (Summer 2023 Edition), Edward N. Zalta & Uri Nodelman (eds.), https://plato.stanford.edu/archives/sum2023/entries/functionalism/.

Putnam, H. (1975): The Meaning of "Meaning". Minneapolis: University of Minnesota Press. Retrieved from the University of Minnesota Digital Conservancy, https://hdl.handle.net/11299/185225.

Rouse, M.: "Cognitive Technology", *Techopedia*, 02nd Jan 2018, https://www.techopedia.com/definition/32482/cognitive-technology#What_Does_Cognitive_Technology_Mean.

Schechtman, M. (2007): 5. The Narrative Self-Constitution View. *The Constitution of Selves*. 93-135. Ithaca, NY: Cornell University Press, https://doi.org/10.7591/9781501718380-008.

Wheeler, M. (n.d.): Artificial Intelligence and Extended Cognition. NDA, https://www.pt-ai.org/sites/default/files/ptai2013/presentations/Michael-Wheeler.pdf.

7 Statement of Originality

I, Helene Elisabeth Zöllner, hereby confirm that I have written the accompanying thesis by myself, without contributions from any sources other than those cited in the text and acknowledgements.

This applies to all graphics, drawings, maps and images included in the thesis.

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Place and Date   Signature