

The Robotization of Love: How AI Transforms Intimate Relationships

by

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DISSERTATION ABSTRACT

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Title: The Robotization of Love: How AI Transforms Intimate Relationships

The robotization of humans is underway—from the deployment of industrial machines to automate human labor, to the integration of electronic-mechanical devices to enhance human body, to the utilization of artificial intelligence (AI) software like ChatGPT or DeepSeek to streamline human thinking, reasoning, and expressing. Today, we are also seeing an increasing application of robotic and virtual partners, such as AI companion chatbots or ghostbots which simulate deceased loved ones, in an effort to supplant or supplement human emotional bonds and intimate relationships.

In this dissertation, I proposed a term called *robotization of love*, highlighting the growing significance of robotic elements, such as AI algorithms, in shaping our understanding and experiences of love. Specifically, I view the robotization of love as a reflection of the rationalization of love, signifying a shift towards the preference of efficiency, predictability, and security than slowness, uncertainty, and risk in love experiences. Furthermore, as AI chatbots excel in qualities such as availability, patience, supportiveness, generosity, servitude, and adaptability, interactions with AI companions may start to influence our expectations in human-human relationships, leading us to even expect the same qualities of love and attitude from our human partners.

To explore specific ways in which interactions with AI chatbots might influence our love experiences, I conducted two case studies: one focusing on Replika, a widely used AI

companion chatbot, and the other on ghostbots. In the Replika case, I identified all six core principles of *McDonaldization* theory, i.e., (1) efficiency, (2) calculability, (3) predictability, (4) control, (5) the replacement of humans with non-human technologies, and (6) the production of irrational consequences, in users' relationships with this AI chatbot. I proposed a seventh dimension, personalization, to update the theory and account for the distinctive ability of AI algorithms to tailor users' experiences.

In the ghostbots case, I identified three major features that frequently appear in users' interactions with ghostbots simulating their deceased loved ones: (1) emotional, (2) functional, and (3) generative. I introduced the concept of *artificial continuing communication*, emphasizing the persistent emotional bonds between the living and the dead, as well as the asymmetry in the interpretation of meanings within interactions involving an artificial partner. This emerging form of communication reconfigures love for the deceased from a one-sided, unreciprocated experience into a form of thin, mediated reciprocity. It also offers an alternative perspective on the rational use of AI chatbots.

This dissertation includes previously published material.

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Introduction

Chatbots powered by artificial intelligence (AI), particularly those utilizing large language models (LLMs), are playing increasingly prominent roles in shaping human emotional experiences and intimate relationships. According to *Harvard Business Review*, therapy/companionship has replaced generating ideas, becoming the most popular generative AI use theme in 2025 (Zao-Sanders, 2025). AI companion chatbots—designed to simulate friendship, emotional support, and even romantic engagement—have collectively amassed nearly one billion active users globally so far (Maples et al., 2024; Bernardi, 2025). Since its introduction in 2014, Microsoft’s XiaoIce has engaged over 660 million users and has facilitated long-term, emotionally sustained interactions with many of them (Zhou et al., 2020). Replika, widely recognized as the most commercially successful AI companion chatbot, generated over \$9 million in revenue within the first eight months of 2024 and reported a user base of approximately 25 million individuals (Ma, 2024; Maples et al., 2024). Other notable platforms, including Character AI and Talkie AI, recorded approximately 19 million and 17 million downloads, respectively, during the same period (Ma, 2024).

In addition to forming relationships with AI companions, there are a group of users engaging with AI chatbots designed to replicate specific individuals, including themselves or deceased loved ones. By responding to personalized questionnaires and uploading multimedia materials such as photos, voice recordings, written texts, and video clips, users can facilitate the creation of AI chatbots that emulate the appearance, voice, and behavioral characteristics of a specific person. These systems are frequently employed to preserve the memory of the deceased or those facing terminal illness and thus are commonly referred to as

ghostbots, deathbots, or thanabots. Although the user base for ghostbots remains limited, with only several startups, such as HereAfter AI, Project December, StoryFile, and You, Only Virtual, currently offering these services, the emotional intensity of user engagement with these systems can rival or exceed that of interactions with conventional AI companions (Figueroa-Torres, 2024; Henrickson, 2023).

To deepen our understanding of the implications of AI chatbots on our emotional life and intimate relationships, in the dissertation, I proposed a term called *robotization of love*, highlighting the growing significance of robotic elements, such as AI algorithms, in shaping our understanding and experiences of love. Specifically, I view the robotization of love as a reflection of the rationalization of love, signifying a shift towards the preference of efficiency, predictability, and security than slowness, uncertainty, and risk in love experiences. Furthermore, as AI chatbots excel in qualities such as availability, patience, supportiveness, generosity, servitude, and adaptability, interactions with AI companions may start to influence our expectations in human-human relationships, leading us to even expect the same qualities of love and attitude from our human partners.

In the dissertation, I also conducted two case studies—one focusing on Replika, a widely used AI companion chatbot, and the other on ghostbots, the chatbots simulate the deceased beloved ones—to explore specific ways in which interactions with AI chatbots might influence our love experiences. In the Replika case, I identified all six core principles of *McDonaldization* theory, i.e., (1) efficiency, (2) calculability, (3) predictability, (4) control, (5) the substitution of humans with non-human technologies, and (6) the production of irrational consequences (Ritzer, 1993), in users' relationships with this AI chatbot. I proposed

a seventh dimension, personalization, to update the theory and account for the distinctive ability of AI algorithms to tailor users' experiences. The Replika case exemplifies how our intimate relationships have been increasingly rationalized through the interactions with AI chatbots. The chapter on the Replika case has been published in the journal of *Social Media + Society*.

In the ghostbots case, I identified three major features that frequently appear in users' interactions with ghostbots simulating their deceased loved ones: (1) the interactions often elicit intense emotional responses from the users; (2) the purposes of using ghostbots can be practical, including mitigating grief, seeking advices, looking for emotional support, or say a final goodbye; and (3) the interactions may generate new knowledges, memories, and ideas about the dead. I introduced the concept of *artificial continuing communication*, recognizing the "interpretative asymmetry" inherent in interactions with AI interlocutors (Zhao, 2006; Esposito, 2022; Henrickson, 2023), while emphasizing the continuing bonds between the living and the dead (Klass et al., 1996). Although ghostbots are reduced versions of the dead, this emerging form of communication challenges the normative hydraulic model of the psyche, which views grief as a negative emotion to be discharged and emphasizes emotional detachment from the deceased (Freud, 1917). I suggest that ghostbot use marks a departure from the rational use of AI chatbots and offers an alternative perspective on how we relate to love, loss, and emotional continuity, albeit the user base remains small.

Literature Review

What Is Love?

Love is one of the most common but profound experiences in human life, yet it remains

one of the most elusive concepts. While romantic love, often characterized as “the two-as-one intimacy” within a couple (Berlant, 2012, p. 6), tends to dominate popular discourse, empirical studies reveal a more complex hierarchy of emotional attachments. When asked to identify what they consider to be “true love,” individuals often rank forms such as maternal love, parental love, friendship, and sibling love above romantic, passionate, sexual, or platonic love (Sullins, 2012, p. 401). The range of objects toward which love can be directed is remarkably broad, encompassing not only specific people and animals but also inanimate objects (e.g., dolls, cars), abstract entities (e.g., deities, nations, hometowns), activities (e.g., gaming, walking, conversing), and social ideals (e.g., freedom, justice, democracy) (Viik, 2020, p. 56). Given this conceptual plurality, this dissertation intentionally refrains from prescribing a rigid definition of love. Instead, it adopts a flexible understanding of love as a sense of attachment and emotional connection, recognizing that users of AI chatbots such as Replika or ghostbots may variously relate to them as friends, lovers, tools, toys, or anything else, each with distinct affective dimensions.

Scholarly debates on the nature of love have long been divided between two dominant perspectives: one that views love as a universal, biophysiological phenomenon rooted in the human body, and the other that treats it as a culturally and historically constructed concept. Proponents of the former argue that love is primarily driven by physiological reactions, such as elevated blood pressure, hormonal fluctuations, and specific neural activities (e.g., Fisher, 2005). In contrast, others emphasize the culturally contingent nature of love, noting, for example, that Western cultures tend to express love more openly and explicitly than many non-Western societies (Karandashev, 2015). A strictly biophysiological view risks falling into

neuroreductionism or biological reductionism, assumptions that all human and social phenomena can be fully explained by brain activity or bodily processes (Savulescu & Earp, 2014). On the other hand, an exclusively social constructionist perspective may overlook the embodied dimensions of love—this becomes particularly salient in the context of human–machine intimacy, where some theorists argue that all human experiences, including love, can be simulated or replicated computationally (see Mitchell, 2019; Marcus & Davis, 2019).

This dissertation adopts a critical middle-ground position, acknowledging the biological and material underpinnings of love, such as biochemical and neural mechanisms within the physical human body, while emphasizing the powerful role of cultural norms, social structures, and historical contexts in shaping how love is conceptualized and experienced. Certain physiological responses associated with love may be shared across populations, but the meanings and expressions of love are deeply variable, differing significantly across cultures and evolving over time. Building on this understanding, the dissertation investigates how interactions with AI chatbots contribute to the reconceptualization of love in the contemporary era, with a recognition of the role of the body in these dynamics, even if it is not always addressed explicitly.

AI Chatbots

AI chatbots are computer programs that utilize artificial intelligence technologies—most notably natural language processing (NLP), machine learning (ML), and increasingly, large language models (LLMs)—to engage with users through conversational interactions using natural languages (IBM, 2021). Unlike earlier rule-based systems, which relied on pre-programmed scripts and limited keyword recognition, contemporary AI chatbots are capable

of “interpreting,” generating, and adapting human natural language in real time, enabling more fluid and contextually relevant exchanges.

The modern conceptual foundation of chatbots is often credited to Alan Turing, who, in his seminal 1950 paper, proposed that a machine could engage in conversation with humans without them recognizing it as artificial—a notion that came to be known as the Turing Test (Turing, 1950). One of the earliest practical implementations of this idea was ELIZA, a program developed in the 1960s by Joseph Weizenbaum, which simulated a Rogerian psychotherapist using simple pattern-matching techniques (Weizenbaum, 1966). This was followed by increasingly sophisticated systems such as PARRY (1972), Jabberwacky (1988), and ALICE (1995), which gradually incorporated more complex rule sets and early forms of adaptive learning (Adamopoulou & Moussiades, 2020).

Significant breakthroughs have occurred over the past decade with the advent of deep learning and neural networks, leading to the development of highly advanced conversational agents such as OpenAI’s ChatGPT, Google’s Bard (now Gemini), and Meta’s BlenderBot. Today, AI chatbots are deployed across a wide range of domains, including customer service, education, mental health support, and digital companionship. Their capacity to simulate human-like interaction has made them particularly influential in reshaping relational dynamics, especially in fostering emotional and intimate connections between humans and machines.

To establish conceptual clarity, in the section below, I explain why this dissertation primarily uses the term *AI chatbots* rather than other relevant terms, such as *virtual agents* or *artificial agents*. In popular discourse, the terms *AI chatbots* and *virtual agents* are often used

interchangeably. However, more precisely, *virtual agents* represent a more advanced evolution of chatbot technology. These systems combine conversational abilities with task-oriented functionalities, frequently integrating robotic process automation (RPA) within a unified interface (IBM, 2021). In addition, the term *virtual agent* is more commonly used in business contexts, typically referring to organizational deployments that involve customized integration with enterprise systems (IBM, n.d.).

Another, broader term is *artificial agents*, which refers to any autonomous or semi-autonomous system, whether physical or virtual, that can perceive its environment, make decisions, and act upon those decisions (Liew & Tan, 2021). Artificial agents encompass a wide spectrum of entities, from software bots such as AI chatbots, to embodied systems such as robotic vacuum cleaners, and voice-based virtual assistants such as Siri. The defining feature of artificial agents is their capacity for agency, i.e., acting with a degree of autonomy based on internal goals or external stimuli.

Given that this dissertation focuses specifically on AI companion applications like Replika and ghostbot services provided by ChatGPT or start-ups like Project December, it primarily adopts the term *AI chatbots* to emphasize their interactive and affective dimensions, despite their incorporation of visual and audio-based technologies to facilitate communication in many cases. In addition, the term *robotic and virtual agents* is frequently used in Chapter One and is interchangeable with *artificial agents*. The reason I use *robotic and virtual agents* rather than *artificial agents* is to emphasize their links to automation, robotics, and broader technological infrastructures and developmental trajectories.

Chapter Outlines

A Conceptual Framework: Robotization of Love

Chatbots belong to a broader and longstanding trajectory of efforts to create human-like artifacts, a lineage that can be traced from the early conceptualizations of automata to the contemporary development of robots. The notion of automata dates back to ancient civilizations, including the Egyptians, Assyrian-Babylonians, Greeks, Chinese, Maya, among others, where self-moving devices were imagined or constructed as imitations of life (Fortunati, 2013). The more modern concept of the robot originates with Czech writer Karel Capek's 1920 play *R.U.R. (Rossum's Universal Robots)*, which introduced the term *robot*, derived from the Czech word *robota*, meaning "drudgery" or "forced labor," and *roboti*, meaning "workers" (Bakardjieva, 2015, p. 245). Today, robots are defined as "programmed actuated mechanisms with a degree of autonomy, to perform locomotion, manipulation or positioning" (International Federation of Robotics, 2024, p. 30). These modern robots—primarily deployed in industrial contexts such as automotive, electronics, metal and machinery, plastics, chemicals, and food production—are commonly referred to as industrial robots. As of 2023, South Korea, the country with the highest industrial robot density, has on average one robot for every ten workers (International Federation of Robotics, 2024).

Robots are not confined to industrial settings, and they have increasingly presented in domestic life. From robotic vacuum cleaners like Roomba, to smart home assistants such as Amazon's Alexa, to social media-integrated chatbots like Snapchat's My AI, robotic technologies have clearly expanded beyond the sphere of production into the sphere of reproduction (Fortunati, 2018). The rise of AI companion chatbots such as Replika, Anima,

Character.AI, and Candy.AI and ghostbot service providers such as Project December, HereAfter AI, StoryFile, and You, Only Virtual, signals a further progression: from the robotization of work, to the robotization of domestic life, and now, to the robotization of sociality and emotionality. This trajectory raises many important questions: How does the proliferation of robotic and AI systems reshape our experience of intimacy and love? In what ways might it transform our very understanding of what love is?

In Chapter One, I introduce the framework which I call *robotization of love* to explore the implications of robotic and AI technologies on our understanding of love. The term robotization of love carries three key meanings. First, it highlights the growing role that artificial and robotic companions play in shaping our experiences of love—not only in terms of the scale of their user bases but also in the intensity of the emotions they evoke. For example, a user of Character.AI might form a strong emotional bond with an AI companion (Roose, 2024), and a user of ghostbots might experience a heartbreak moment after conversing with a chatbot simulating his deceased mother (Delistraty, 2024).

Second, the *robotization of love* is situated within the broader trend of robotization, and it can be understood as a manifestation of Max Weber's concept of *formal rationality*. Formal rationality refers to the process of calculating the most efficient means to achieve a given objective (Cockerham, 2015). In his study of bureaucracy in the late nineteenth and early twentieth centuries, Weber identified formal rationality as a highly rational and efficient mode of organizing work and human activities: breaking down tasks into individual components, establishing hierarchical reporting structures, prioritizing written orders, etc. After over a century of capitalist development, formal rationality has expanded beyond

government institutions, penetrating various social sectors such as factories, airports, hospitals, schools, and restaurants (Ritzer, 1993). More recently, this rationalization has extended into our social and emotional lives (Bakardjieva, 2014). The robotization of love, therefore, can be seen as a rationalization of emotional experience and intimacy, in which robotic and AI partners are increasingly integrated into our relationships and our emotional life are increasingly regulated and rationalized. This shift manifests in, for example, the preference for the security and efficiency offered by machines, as opposed to the uncertainty and unpredictability of human encounters. We seek dependable emotional support from AI chatbots rather than the risks of human love's complexities, and we value the efficiency and generosity of machines over the limitations of human's availability and patience.

Third, the robotization of love is closely linked to a process known as *robotomorphy*, a tendency to see ourselves through the lens of robotic traits and functions (Sætra, 2022). This phenomenon is not entirely new. In earlier scientific paradigms, for example, human behavior was often interpreted through studies conducted on rats, a process referred to as *ratomorphy* (Koestler, 1967). As robots become increasingly sophisticated, we are now inclined to model human nature using robotic metaphors and frameworks, interpreting cognition and social behaviors through mechanical and algorithmic logics. While such metaphors can be useful in advancing our understanding of human physiology and psychology, *robotomorphy* risks reducing the complexity and nuance of human experiences, particularly those involving affect, intimacy, and love, to overly simplistic, mechanistic explanations. More importantly, as robots are often idealized for their rationality and computational capability, there is a growing tendency to perceive human beings as flawed by comparison—irrational, slow, or

emotionally volatile. This shift in perception can lead to a normative reorientation, where humans are increasingly expected to adapt themselves to the standards set by robotic systems (Sætra, 2022). AI chatbots, for example, are often experienced as more patient, positive, supportive, available, and aesthetically pleasing than human partners (Brandtzaeg et al., 2022; Pentina et al., 2023; Lin, 2024). As these robotic ideals gain cultural traction, human romantic and intimate relationships may come under pressure to conform to these emerging norms, thereby reshaping our expectations of love and our judgments of human partners.

Case Study: Methodology

To deepen our understanding of how AI chatbots reshape our conceptualization of love, for the dissertation, I conduct two parallel case studies examining users' interactions with AI chatbots: One focuses on users' engagement with the AI companion chatbot Replika, and the other on users' interactions with ghostbots. Case study is defined as “an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context” (Yin, 2009, p. 18). Often distinguished from historical methods due to its contemporary focus, the case study method is particularly well-suited to drawing upon a wide range of evidence—including documents, interviews, and observations—that may not be available in historical research. While the definition and boundaries of a “case” can be contested, qualitative researchers commonly follow established conventions, viewing a case as “an instance... of something,” which may include a person, organization, event, decision, action, location, or even a nation-state (Schwandt & Gates, 2018, p. 341). As such, the analytical emphasis is often placed not on the question of “what is a case,” but rather “this is a case of what.”

Case studies are widely regarded as an effective method for retaining the holistic and

contextually rich characteristics of real-life phenomena (Yin, 2009, p. 4). Case studies are frequently employed to facilitate in-depth exploration from multiple perspectives (Simons, 2009), to develop, refine, or test theoretical propositions (Schwandt & Gates, 2018), and to illuminate characteristics of a broader category of comparable phenomena (Gerring, 2004). However, some scholars, particularly Stake (1995), emphasize the value of understanding the uniqueness and complexity of a single case in its own right, rather than using it primarily to generalize to others.

Importantly, a case is not to be treated as a random sample from a broader population. Rather, it is intentionally selected to address “how” and “why” questions—questions that are driven by theoretical, practical, and sometimes normative considerations. The case study process typically involves identifying an appropriate case (or cases), gathering diverse forms of evidence (e.g., archival data, interviews, observations, physical artifacts), analyzing this material, and presenting the findings (Yin, 2009). The strengths of the case study method lie in its ability to generate in-depth, multilayered insights into complex phenomena situated within their specific contexts (Crowe et al., 2011), as well as its capacity to derive broader understandings from singular instances—to move from the micro to the macro, and to link present conditions with historical trajectories in anticipation of future developments (Burawoy, 1998, p. 5). Nonetheless, its limitations include the difficulty in clearly delineating the boundaries of a case and a perceived lack of procedural rigor when compared to quantitative approaches.

The Case of Replika

In Chapter Two, I conduct the first case study on Replika, a generative AI chatbot

application launched by Luka Inc. in 2017 and seen as one of the most widely used AI companions. Marketed as “The AI companion who cares,” Replika has attracted approximately 25 million users and generated over \$9 million in revenue within the first eight months of 2024, making it widely regarded as the most commercially successful AI companion chatbot to date (Ma, 2024; Maples et al., 2024). Within the app, users can customize Replika’s appearance according to their preferences and engage in both text and voice conversations. The chatbot is designed to provide personalized interactions by learning from users’ preferences and adapting its responses accordingly. Initially powered by OpenAI’s Generative Pretrained Transformer 3 (GPT-3) neural network language model, Replika has since transitioned to using its own proprietary Large Language Models (LLMs) and scripted dialogue content (Replika, n.d.).

Research on Replika primarily investigates its role as an AI companion, focusing on its ability to support users both emotionally and socially. Studies show that Replika can alleviate loneliness (Ta et al., 2020), fulfill users’ needs for social and emotional support (Ta-Johnson et al., 2022), and foster emotional bonds (Pentina et al., 2022). The love that Replika provides is described as more accepting, non-judgmental, and “caring” compared to human interactions (Xie & Pentina, 2022; Brandtzaeg et al., 2022). Relationship development with Replika is found to mirror that of human relationships, with users bypassing the exploratory stage and quickly reaching the affective stage (Skjuve et al., 2021). While these findings suggest that Replika may contribute positively to users’ mental well-being, Laestadius and colleagues (2022) caution that over-dependence on the chatbot for emotional support could negatively impact users, as its failures to meet emotional needs may exacerbate feelings of

isolation or inadequacy.

In Chapter Two, I apply the theory of McDonaldization (Ritzer, 1993) to examine how Replika influences users' experiences of friendship and love. Drawing on 100 user-generated posts from the "Human-Machine Love" subgroup on Douban, a popular Chinese online forum, I analyze the relevance of McDonaldization to these interactions. The findings indicate that all six core dimensions of McDonaldization, i.e., (1) efficiency, (2) calculability, (3) predictability, (4) control, (5) the substitution of human with non-human technologies, and (6) the production of irrational consequences, are evident in users' relationships with Replika. This suggests that the logic of formal rationality has extended into the domain of intimate life through AI chatbots. However, the empirical data also reveal an additional principle not accounted for in Ritzer's (1993) original framework: personalization. Unlike the uniformity and standardization characteristic of McDonald's, machine learning algorithms underpinning Replika allow for individualized interactions. Rather than reducing personal information, these algorithms rely on it to tailor responses. This capacity for personalization may explain why many users perceive their relationships with Replika as unique and feel that the chatbot understands them on a personal level. This case study also introduces the dimension of personalization to my theorization of the robotization of love.

The Case of Ghostbots

In contrast to the Replika case, where users must establish relationships with AI chatbots from the ground up, ghostbots directly robotize pre-existing human relationships. These chatbots, either developed with the assistance of startups like December Project and StoryFile or created independently by using publicly available AI tools like ChatGPT, allow a group of

individuals, such as a Canadian man, a Chinese father, a New York daughter, and a Belarusian mother, to recreate AI versions of deceased loved ones. By uploading relevant materials such as diaries, written texts, photos, voice messages, and video clips, as well as inputting key characteristics, users can generate chatbots that simulate the personalities of the deceased. The combination of robotic features and human life experiences contributes to the process of “robotizing,” resurrecting, and reconnecting with the deceased. While it remains uncertain whether major tech companies like Google, Facebook, Apple, and Microsoft will offer these services, a small but growing group of people have begun using them, albeit amid public controversy.

As a relatively new phenomenon, scholarships on ghostbots remain limited. Existing research primarily explores the ethical implications of using this technology (Hollanek & Nowaczyk-Basińska, 2024), reflects on its contribution to the commercialization of mourning practices (Figueroa-Torres, 2024), examines users’ interpretative practices and the constraints that they encounter (Henrickson, 2023), or debates the extent to which this technology should be utilized (Bao & Zeng, 2024). Through philosophical reflection, Krueger and Osler (2022) contend that the interaction between ghostbots and users can only be characterized as a “thin reciprocity,” since, unlike humans, “chatbots lack subjectivity, independent agency, and a lifeworld separate from ours” (p. 244-245).

In Chapter Three, I begin by analyzing 29 recent in-depth media reports on users’ experiences with ghostbots and identify three key features that frequently emerge in these interactions. These features include: (1) emotional, i.e., messages from the ghostbots often evoke intense emotional responses from users; (2) functional, i.e., chatting with the ghostbots

serves practical purposes, such as alleviating grief, seeking advice, finding companionship or emotional support, and providing a space for confession or self-disclosure; and (3) generative, i.e., interactions with ghostbots may generate new knowledge, memories, and ideas about the deceased.

To further enhance our understanding of user interactions with ghostbots, I introduce the concept of *artificial continuing communication*. This framework integrates two existing concepts: first, it draws on the idea of *artificial communication*, which emphasizes the involvement of an artificial partner (such as AI algorithms) and the asymmetry in the interpretation of meanings generated in communication (Esposito, 2017, 2022); second, it builds on the theory of *continuing bonds* (Klass et al., 1996), which acknowledges the ongoing connections between the living and the dead. I argue that through artificial continuing communication with ghostbots, users transform their love for the deceased. Whereas love for the dead has previously been characterized as unreciprocated, since the inherent inability of the deceased to respond (Millar & Lopez-Cantero, 2022), the interaction with ghostbots introduces a form of “thin reciprocal” love, insofar as these AI chatbots are capable of simulating affectionate responses. I also argue that the ghostbot use challenges the predominant hydraulic model of the psyche, which views grief as a negative emotion to be discharged and emphasizes emotional detachment from the deceased (Freud, 1917).

I concluded the dissertation with reflections on the relationships between the robotization of love framework and the two empirical cases. I also discussed the limitations of the dissertation and pointed out potential directions for future research on the topic of AI chatbots and love.

Chapter 1

Robotization of Love: A Conceptual Framework

Introduction

Research on loving relationships between humans and robots has predominantly centered on understanding why and how humans form emotional attachments to robotic and virtual agents (e.g., Levy, 2007; Skjuve et al., 2021; Pentina et al., 2023). However, these studies often overlook a critical dimension: the potential for human-robot love to fundamentally alter the ways we experience and express love with one another. From the sociotechnical-system perspective, technology does not merely reflect human influence; it also has the power to shape and transform human behavior and society (Johnson, 1994; Winner, 1977). Fortunati and Edwards (2020) argue that communication and the development of relationships with robotic and virtual agents involve a dual process: the “humanization of robots” and the “robotization of humans” (p. 10). The humanization of robots is almost inherent, as the concept of a robot fundamentally involves simulating humans through machines, dating back to its origins (Capek, 1920). However, the robotization of humans is less obvious and often neglected, even though it occurs constantly. When machines possess less intelligence and communication ability than humans, people must adjust their behaviors to accommodate the robots’ limitations (Höflich, 2013, p. 40). On the other hand, when machines exhibit superior reasoning abilities or greater patience, they can set a new benchmark, prompting humans to adapt in response. For instance, today’s top human chess players are often mindful of how chess engines like Stockfish and AlphaZero would assess their moves (Sætra, 2022b, p. 10).

This chapter builds on this line of thought and seeks to develop a framework called

robotization of love, which emphasizes how robotic and virtual agents are transforming human understandings of love. It begins with an overview of concerns surrounding technological determinism and introduces the sociotechnical systems perspective, which will form the basis for interpreting the impact of robots on society and human relationships. Then, I present the historical trajectory of robotization within human society, drawing on Fortunati's (2018) observation that robots, originally designed to replace human labor in industrial settings, are increasingly entering the realm of private and emotional life, marking a shift from the sphere of production to the sphere of reproduction. After that, I explore the various definitions and understandings of love, along with the key aspects that scholars have examined in the context of human-robot love. Building on these foundations, I propose the term *robotization of love*, characterized by three major developments: (1) the growing significance of artificial and robotic partners in shaping intimate relationships; (2) the extension of formal rationality—traditionally confined to production and consumption—into the domains of sociality and emotionality through robotization; and (3) the emergence of *robotomorphism*, the tendency to perceive ourselves and our relationships through a robotic lens (Sætra, 2022b). I argue that these developments together suggest the potential for the increasing robotic forms of love, even within human-to-human relationships.

Literature Review

Technological Determinism

Before we delve into the topics of robotization, it is essential to clarify its connection to technological determinism in greater detail, as discussions about the impact of robots on human society and relationships are often critiqued as reflecting technological determinism.

Technological determinism, as defined by its critics (rather than its proponents), is the belief that human history is shaped by the laws of technological development rather than by human agency (see Bimber, 1994). This is considered an extreme viewpoint, as argued by science and technology studies (STS) scholar Ronald Kline, based on two key assumptions: (1) the evolution of technology is an autonomous process independent of human will, and (2) technological change dictates societal change (Dafoe, 2015, p. 1052; Winner, 1977, p. 76, offers a similar interpretation). Although technological determinism has gained visibility due to the recent success of high-tech companies and authors associated with Silicon Valley, such as Ray Kurzweil and Kevin Kelly, its fundamental tenets are widely discredited within scholarly circles, particularly by historians and social scientists, who argue that the theory is overly simplistic. Nevertheless, some media and STS researchers are beginning to recognize the shortcomings of entirely dismissing technological determinism. They advocate for a reassessment and even a reconsideration of its value through more nuanced perspectives (e.g., Peters, 2017; Dafoe, 2015).

Thorstein Veblen, an American economist and sociologist, is recognized as one of the earliest proponents of technological determinism (Peters, 2017, p. 15). Veblen studied with the famous philosopher Lewis Mumford at the New School of Social Research after the World War I and became a close friend of Mumford and one of his key influences (May, 2000, p. 242). In his critique of Marxist socio-economic theory (though with a similarly deterministic outlook), Veblen argued that it is not the economic base that determines culture and society; rather, it is scientific and technological knowledge that drives social change. According to Veblen, it is not the proletariat that leads social revolutions, but rather the

technicians and engineers. It is worth noting that, despite being “credited” as the first representative of technological determinism, Veblen was not an extreme advocate of this perspective. He believed instead that technology and social forces mutually shape each other: technology determines social forces and is, in turn, determined by them (Peters, 2017, p. 14).

The first formal use of the term “technological determinism” occurred at the 1919 meeting of the American Historical Association, which marked the establishment of the history of science as a discipline. Surprisingly (or maybe not), this use of the term was also tied to a critique of Marxism. “We are not, of course, arguing here for a theory of scientific and technological determinism, such as Marx contended for,” the presenter Columbia sociologist Harry E. Barnes stated, “This would be an over-simplification of the historical process” (as cited in Peters, 2017, p.14). While we will address whether Marxism itself can be considered a form of technological determinism later, the key point here is that, from the outset of the history of science, technological determinism was viewed as an overly simplistic and unfounded concept, not warranting serious scholarly attention.

The first systematic and serious critique of technological determinism came from Robert MacIver, a colleague of historian Harold Innis at the University of Toronto and a host of the Frankfurt School at Columbia University. MacIver saw Veblen as the spokesperson for technological determinism and Marx as the spokesperson for economic determinism. According to Peters (2017), MacIver’s central concern was the perennial question surrounding technological determinism: how can we measure the degree to which technology causes social change? Or, as Winner (1977, p. 76) bluntly put it, “The idea that technology, or anything else, could be the primary determinant is impossible to prove.”

MacIver also identified several other problems with technological determinism: it cannot explain the variety of cultures in societies that share equivalent levels of technological development; it fails to address the differences in technological acceptance among different subgroups within the same environment; it overlooks the relative independence of ideas and beliefs from material constraints; and it neglects the possibility of resistance, criticism, and deviation from social orders (Peters, 2017). For contemporary scholars in media studies, MacIver's critiques of technological determinism may sound familiar, as they bear striking similarities to the arguments used by cultural studies scholars to counter the political economists who applied Marxist economic determinism to explain the media's influence on culture and society (e.g., Williams, 2006; Hall, 1996).

How Does Technology “Determine” Social Change

At this point, it is useful to briefly discuss the notion of “determinism.” Some scholars, including Peters (2017) and Dafoe (2015), have recognized the scholarly value of determinism. For instance, Peters (2017) placed determinism “at the core of scholarship” and argued that “if we want knowledge, we will need some kinds of determination” (p. 23). For him, “determine” means “A then B,” which implies that A leads to B, A causes B, or A implies B (Peters, 2017, p. 23). In short, within this framework, determinism is primarily concerned with the causal relationship between A and B, rather than other types of relationships (such as A conditioning B).

Political scientist Langdon Winner rendered a relatively softer version of “determinism.” According to Winner (1977), “determine,” in its everyday sense, suggests “giving direction to, deciding the course of, establishing definitely, fixing the form or configuration of

something” (p.75). In his interpretation, the meaning of “determine” is extended to encompass various ways in which A shapes B, beyond just the direct causal influence that A may have on B. For Winner (1977), the way technology determines materials or human activities is by “providing structure” to them. “In a fundamental sense, of course, determining things is what technology is all about. If it were not determining, it would be of no use and certainly of little interest,” he argued (p. 75). The “first function of any technology—and the immediate condition of its utility—is to give a definite, artificial form to a set of materials or to a specific human activity” (Winner, 1977, p. 75).

Here, technology includes not only artifacts and apparatus but also techniques (human skills), technical organizations, and technical operations. However, Winner (1977) also emphasized that while technology provides structure to materials or human activities, it does not guarantee completely rigid or predictable outcomes. Many unintended and unforeseen consequences may arise. This understanding of “determinism” aligns closely with Hall’s concept of “determinacy,” which he defines as “the setting of limits, the establishment of parameters, the defining of the space of operation, the concrete conditions of existence, the ‘givenness’ of social practices,” but not “the absolute predictability of particular outcomes” (Hall, 1996, p. 45).

Winner (1977) argued that the controversy surrounding technological determinism primarily revolves around the macro-level question of how technology determines social change. He identified anthropologist Leslie A. White as one of the few bold technological determinists, as White proposed a three-layer theory of cultural systems: technological strata form the base, the social system is in the middle, and the philosophical layer is at the top.

According to White, “the technological factor is therefore the determinant of a cultural system as a whole. It determines the form of social systems, and technology and society together determine the content and orientation of philosophy” (as cited in Winner, 1977, p. 76). White, a Marxist, is believed to have sought to revise Marx’s “base/superstructure” model in a more approachable way (Peters, 2017).

White’s model closely resembles Winner’s (1977) interpretation of Marxism as a “soft” version of technological determinism. The traditional understanding of Marxist economic determinism emphasizes that the superstructure (ideology) is determined by the economic base, which consists of the forces of production and relations of production. “Relations of production” refers to the totality of social relationships people engage in for survival, production, and the reproduction of modes of life—similar to what White referred to as “social systems”—and it is determined by the forces of production. Meanwhile, “forces of production,” as Winner (1977, p. 78) noted, are the sum total of tools, instruments, and machines available in a society, plus all sources of energy that power these implements: steam, water, coal, animal, and human power. In short, it “can be understood to comprise all of physical technology.” In this way, Marxist economic determinism shares a similar logic to White’s technological deterministic three-layer theory. Winner (1977) expressed some sympathy for Marx’s attempt “to describe a ‘totality’” (p. 80), although he acknowledged that the “base/superstructure” model, like many other technological deterministic frameworks, suffers from oversimplification. He also noted that Marx frequently emphasized that history is made by people and that “(a)s Marx counsels, human beings do make their world, but they are also made by it” (Winner, 1977, p. 88).

A Broad Time-Space Lens

Most arguments grounded in technological determinism tend to analyze the societal transformations brought about by technology through a broad time-space lens (Dafoe, 2015). Marxism exemplifies this approach, as do Harold Innis's and Marshall McLuhan's influential interpretations of media's impact on society. Innis posited that time-biased media, such as stone and clay, foster small, localized communities because the information they carry, though highly durable, is difficult to transmit across distances. In contrast, space-biased media like paper enable the expansion of empires due to their capacity to transmit messages swiftly and accurately over long distances (Carey, 1967). McLuhan, meanwhile, emphasized the influence of media on individual perception and cognition rather than on social institutions and culture. He argued that paper and print prioritize vision over other senses, organizing reality into a uniform, continuous, and linear sequence. In contrast, oral communication and electronic media, such as film and television, activate multiple senses and encourage a more simultaneous, holistic experience of reality (McLuhan, 2012).

Similarly, philosopher of technology Lewis Mumford argued that the standardization of time, marked by the ringing of bells in European monasteries, laid the foundation for modernity. This regular measurement of time, he suggested, instilled a perception that time is evenly divided and distributed, thus enabling modern science and the rational management of commerce (Mumford, 1934). Despite this view, Mumford is not typically classified alongside technological determinists like McLuhan or Innis, since he saw the regimented measurement of time as a product of the disciplined and repetitive monastic lifestyle. More importantly, Mumford often emphasized the role of human intention and creativity, noting that "play and

sport and ritual and dream fantasy... have exercised a formative influence upon human culture, and not least upon technics” (Mumford, 2014, p. 388).

To briefly summarize the key takeaways from this discussion of technological determinism: the claims made by Veblen and Marx, though broad and often oversimplified, do not wholly exclude the role of human agency in shaping both technology and society. As such, they cannot be classified as strict or rigorous forms of technological determinism. I agree with MacIver and Winner that it is nearly impossible to precisely measure or conclusively prove that technology causes social change. At the same time, I concur with Dafoe’s position that macro-level or long-term insights can coexist with micro-level empirical variability—they are not mutually exclusive but reflect different analytical scopes and epistemological paradigms.

MacIver’s critique of technological determinism rightly points out its inadequacy in offering a nuanced understanding of cultural formation at the meso-level. However, Barnes’s wholesale rejection of technological determinism risks promoting the idea that history is made solely by individual choices, thereby neglecting the structural constraints, material conditions, and enabling affordances that technology provides (Peters, 2017). This perspective may inadvertently reinforce the illusion that “technology is value-neutral” (see Miller, 2021; Johnson, 2006; Winner, 1980).

As Dafoe (2015, p. 1050) aptly puts it, “the question should not be a dichotomous one of whether technological determinism is right or wrong, but a set of questions of degree, scope, and context: to what extent, in what ways, and under what scope conditions are particular kinds of technology more autonomous and powerful in shaping society?... [And] to what

extent, in what ways, and under what scope conditions are particular groups of people able to shape their sociotechnical systems?”

Sociotechnical Systems Perspective

This dissertation adopts a sociotechnical systems perspective to explore the relationship between AI technology and society. Widely embraced by scholars in STS, an interdisciplinary field often referred to as “science and technology studies” or “science, technology, and society,” the sociotechnical systems perspective offers a nuanced framework for analyzing the interplay among science, technology, and social structures (Johnson, 1994; Ropohl, 1999). First, this perspective rejects the two core assumptions of technological determinism: (1) that technological development is an autonomous process independent of human will, and (2) that technological change unilaterally drives societal change (Dafoe, 2015, p. 1052).

While the sociotechnical systems perspective fully rejects the first assumption, it acknowledges that technology does influence society, though not in the linear, one-directional sense implied by the term “determine.” Instead, it emphasizes the co-constructive relationship between technology and society: each shapes and is shaped by the other.

Second, the sociotechnical systems perspective challenges the notion of artifacts as merely material objects. Rather than viewing technology as separate from social life, it conceptualizes technologies and artifacts as sociotechnical systems composed of both human and non-human elements. This is not only because artifacts are social products, but more importantly because, as Johnson (1994, p. 38) notes, “artifacts have no meaning or significance or even usefulness unless they are embedded in social practices and social activities.” Finally, this perspective rejects the idea that technology and artifacts are value-

neutral (Miller, 2021; Johnson, 2006; Winner, 1980). The design, deployment, and use of technologies are always shaped by human judgments, interests, and values. As Winner (1980) famously argued, adopting a particular technology often implies the adoption of a particular social order.

In line with this perspective, I treat AI as a form of technology that both shapes and is shaped by society. AI systems are never neutral; they always convey or facilitate specific human values, and they have no function or meaning outside the context of socially organized practices. Similarly, emotions—including love and grief—within consumer capitalism, as Illouz (2018) argues, can be understood as “products of socio-technical assemblages” (p. 15), mediated by both material commodities and cultural norms, and shaped through the contextualized practices of consumption (p. 16). It is also essential to adopt a sociotechnical systems perspective to understand the impact of robots on society and human relationships, which will be explored in the following sections.

Robotization of Work

The concept “robot” is usually attributed to Czech writer Karel Capek, who introduced the word in his 1920 play *R.U.R.* (*Rossum’s Universal Robots*), though the idea of automaton can be traced back to ancient civilizations such as the Egyptians, Greeks, Chinese, and others (Fortunati, 2013; Cheok & Zhang, p. 2). The word “robot” is derived from the Czech word and more general Slavic root “*robota*,” meaning “drudgery” or “forced labor,” and “*roboti*,” meaning “workers” (Bakardjieva, 2015, p. 245). In Capek’s play, the Robots are manufactured “artificial workers” with reduced human features. The Robot’s inventor Young Rossum minimized the requirements and “rejected everything that did not contribute directly

to the progress of work,” including the abilities to feel happy, to play the piano, and to enjoy taking a walk, because those things are seen as unnecessary and make workers more expensive (Capek, 1920, p. 9). The Robot is considered to be mechanically superior to human beings: “they have an enormously developed intelligence, but they have no soul” (Capek, 1920, p. 9). Capek’s play is a political allegory, referencing the transformation of the working class into a dehumanized labor force as the result of industrialization (Bakardjieva, 2015).

Historically, we have seen more and more machines and robots appearing in factories and workplaces since the beginning of industrialization, although they do not necessarily have human appearances. According to the International Federation of Robotics’ (IFR) latest *World Robotics* report, there were more than 4 million robots operating in industry worldwide in 2023, with a 12% average annual growth since 2018 (International Federation of Robotics, 2024a). Robots, here, are defined as “programmed actuated mechanism with a degree of autonomy, to perform locomotion, manipulation or positioning” (International Federation of Robotics, 2024a, p. 30), and they have been seen mostly installed in the automotive, electrical/electronics, metal and machinery, plastic and chemical products, and food industries. South Korea was the country that had the highest industrial robot density (it stands for number of robots in operation per 10,000 employees) in the manufacturing industry. In 2023, South Korea’s robot density was 1,012, meaning that there was one robot among ten workers. Globally, the robot density in the manufacturing industry kept growing at a high speed, with 13% in Asia, 7% in Europe, and 6% in America on average each year from 2018 to 2023 (International Federation of Robotics, 2024a, p.16).

Robotization of work is seen as a consequence of rationalization of work in the modern

world. The rationalization of work was mostly pronounced in, if it didn't start with, the administrative bureaucratic systems, according to the German social theorist Max Weber (1864-1920). In his day, Weber saw bureaucracy as one of the most rational and efficient forms of organization in managing complex work tasks and human activities: breaking down work into simple individual components, setting up hierarchic formal offices as a reporting system, highlighting written and documented orders, and so on. Weber proposed a term "formal rationality," referring to "the purposeful calculation of the most efficient means and procedures to realise goals" (Cockerham, 2015, p. 124), and argued that formal rationality was a core principle underlying modern capitalist societies which were clearly distinguished from traditional societies.

After a hundred years of development of capitalism, formal rationality and rationalization of work are no longer confined in government offices and have deeply penetrated many other social sectors, including factories, airports, hospitals, schools, and restaurants (Ritzer, 1993). In the car industry, for example, initially, it was craftsmen who controlled the production process. However, rationalization of work, such as breaking the work into numerous simple tasks, laid the foundation for mechanization, and ultimately allowed robots to be introduced into the factories (van Est & Royakkers, 2016, p. 46).

In his analysis of the food industry, Ritzer (1993) expanded upon Weber's concept of "formal rationality" and introduced the theory of *McDonaldization*, using the American fast-food chain McDonald's as a quintessential example of the rationalization of the workplace and broader society. He identified six key principles underpinning McDonald's operational logic: (1) efficiency, (2) calculability, (3) predictability, (4) control, (5) the replacement of

humans with non-human technologies, and (6) the production of irrational consequences (Ritzer, 1993). The implementation of self-service machines and automated equipment in McDonald's restaurants exemplifies the pursuit of efficiency and control, illustrating the rationalization of both food production and consumption in modern society.

Robots are not limited to factories as industrial machines; they also operate at construction sites, mining platforms, farms, and hospitals as professional service robots. According to IFR (International Federation of Robotics, 2024b), in 2023, more than 200,000 professional service robots, which are built for use by trained professional operators, were bought to operate in the fields including transportation and logistics, agriculture, search, rescue, and security, construction or demolition, professional cleaning, and hospitality, with a 30% increase than the year before.

Robotization of Domestic Life

Rationalization and robotization are not confined to workplaces. The design and use of robots have expanded from industrial environments into domestic life (Fortunati, 2018; van Est & Royakkers, 2016; Fortunati et al., 2015; Taipale et al., 2015). In the year 2022 alone, for instance, approximately 5 million new robots were introduced into households for domestic tasks (International Federation of Robotics, 2023), surpassing the total number of robots currently used in industry, which stands at 4 million. These domestic robots, which do not require professionally trained operators for setup or operation, are primarily used by ordinary people for tasks such as floor cleaning, lawn mowing, assisting individuals with disabilities, as well as for entertainment, education, and companionship (International Federation of Robotics, 2023; Fortunati et al., 2015). In Japan, the robot industry is expected

to grow from 1 trillion yen in 2010 to 9.7 trillion yen in 2035, and the robots providing care, family services, entertainment, and communication is predicted to have a higher growth rate than robots in other categories (Yamaguchi, 2020, p. 357).

If robots in industry are designed to mostly replace human material labor, the robots in the domestic sphere are expected to replace both material labor and immaterial labor, such as communicating, entertaining, and offering emotional support (Fortunati, 2018). For most industrial robots, the likeness to human is not necessary, as long as they can show their mechanical effectiveness comparable to human capabilities to perform work—sometimes, it works even better when their physical appearances are unlike humans. For many domestic robots, human appearances and features play a vital role in performing tasks, as they are key to enabling communication and fostering emotional connections with users (Nass & Brave, 2005; Nass & Moon, 2000; Lin & Zou, forthcoming). Industrial robots are advantageous for replacing workers in repetitive or hazardous jobs, but they are perceived as a threat to employment opportunities in areas where they compete with willing workers. Sometimes, their implementation has been challenged by trade unions or blocked by policymakers worried about a rise in unemployment. This helps explain, at least partially, why industrial robots still haven't dominated industry sectors so far (Fortunati et al., 2015, p. 232). In contrast, domestic robots used in health, care, education, and entertainment have received an increasingly warm welcome in recent years (Fortunati, 2018; Taipale et al., 2015). One reason could be that labor in the reproduction sphere is often underpaid or unpaid, and there is a lack of strong unions advocating for domestic workers' rights, as well as limited political awareness of these issues.

While the introduction of robots in industry leads to redesigned workflows, transformed factory environments, and new dynamics in human-robot relationship—either through replacement or human-robot collaboration (Grimme & Zabel, 2024), the ways in which robotization impacts the domestic sphere is still under researched. Just like the operation of robots recreating a robot-friendly environment in the factories, the introduction of robots into domestic life could reshape family space and time. The use of vacuum-cleaning robots, for instance, has resulted in the rearrangement of the living room. To make sure the living room is an ideal place for a vacuum-cleaning robot to operate, almost all users have reorganized their living rooms and furniture, such as elevating cables, tucking rug tassels, removing lightweight items from the floor (Sung et al., 2008; Royakkers & van Est, 2015, p. 550). This way of rationalizing the living room is called “Roombarization,” named after the Roomba, the first robotic vacuum cleaner (Sung et al., 2007). The assistance of robot caregivers, on the one hand, makes the elderly feel more independent when helping them take a shower, go to the toilet, or go out (van Est & Royakkers, 2016). On the other hand, it could also make people feel objectified, particularly when robots replace human caregivers in tasks such as feeding and lifting (Sharkey & Sharkey, 2012, p. 30). Besides robotization of caregiving, scholars also have extensively talked about robotization of human body and sex (Haraway, 1987; Levy, 2007; Turkle, 2011; Royakkers & van Est, 2016).

Domestic activities, including caregiving, companionship, and education, are often characterized by immaterial labor, encompassing communication, knowledge exchange, and affective engagement. According to Fortunati (2018), the increasing robotization of online communication (e.g., the Internet) and information (e.g., news production) also sets the stage

for the robotization of the domestic sphere. Online communication such as communication via social media often lacks certain cues about the identities of the users and the context in which they are situated. This created a congenial environment for the proliferation of socialbots, software robots that function on social networking platforms and present themselves as human participants (Gehl & Bakardjieva, 2017; Bakardjieva, 2015). According to Imperva (2024), in 2023, half of internet traffic comes from non-human sources, and nearly one-third of internet traffic comes from robots which mimic humans. As internet users become increasingly accustomed to non-face-to-face communication and the absence of cues like voice, facial expressions, and gestures, they are becoming more ready to interact with robots in other contexts. Moreover, an increasing proportion of news and information is now generated by AI systems such as ChatGPT and other automated technologies (Diakopoulos et al., 2024; Beckett & Yaseen, 2023). This robotization of information production significantly influences how individuals consume information in their daily lives, shaping and structuring everyday routines and patterns of engagement.

The domestic sphere is not solely a site of labor; it is also a domain rich with social relationships and emotional intimacy. Increasingly, robots are being introduced into this space to provide companionship and even simulate love. According to Sætra (2022a), love robots, the result of the combination of advanced robotics with state-of-the-art AI technologies, differ from care robots in a key respect: unlike caregiving, where economic incentives drive automation, there is generally no strong financial motivation to replace human with love robots, aside from contexts such as escort or sex work. Consequently, the adoption of love robots is more likely to hinge on individual trade-offs between the perceived quality of love

and the convenience these machines offer, and less likely to be based on their ability to outperform humans in emotional labor (Sætra, 2022a, p. 118). However, if love robots or virtual partners gain more popularity in our life, even if driven more by convenience than by the quality of emotional connection—considering a growing global epidemic of loneliness (Maese, 2023)—this trend may significantly influence our understandings of love and reshape the ways we experience love. Before delving further into how robotization might reshape our experiences of love, we will first take a closer look at how love has been conceptualized.

Love as Embodied Experiences

Love represents a core dimension of human experience, yet it persists as a concept that resists precise and universally accepted definition. In everyday life, the concept of “love” is widely used but with only loosely defined, usually associated with other concepts such as attraction, attachment, affection, and care. 93 “types” of love are referred when people are asked to identify love and, counter-intuitively, “maternal love,” “parental love,” “friendship,” “sisterly love,” “brotherly love,” are ranked higher than “romantic love,” “passionate love,” “sexual love,” and “platonic love” in terms of the closeness to true love (Sullins, 2012, p. 401). The object toward which love may be directed spans a wide and diverse range, from specific persons and animals, to inanimate things, such as Barbie dolls, Teddy bears, and cars, to abstract entities, such as Gods, nations, and hometowns, to activities, such as hanging out, playing games, and talking a walking, to social values, such as freedom, justice, and democracy. (Viik, 2020, p. 56). A fundamental distinction between loving sentient beings—such as people or pets—and loving non-living objects lies in the potential for reciprocity: A

person or animal may also love you, whereas an inanimate object, such as a basketball, is incapable to love you back. Furthermore, love for an individual is typically directed toward a specific person (e.g., John, rather than Thomas) and is often associated with this person's particular traits or qualities, such as ambition, kindness, or humor (Millar, & Lopez-Cantero, 2022, p. 422). The emergence of AI chatbots complicates these distinctions, as they can appear to have personalities and respond to expressions of affection in ways that mimic emotional reciprocity (Millar, & Lopez-Cantero, 2022; Krueger & Osler, 2022; Lin, 2024).

Is love a universal biophysiological phenomenon inherently rooted in the human body, or is it a culturally constructed concept shaped by social and historical contexts? Scholarly perspectives on love remain divided. Some scholars assert that love is a universal emotion, grounded in neural activity and governed by physiological and biochemical processes (e.g., Fisher, 2005; Karandashev, 2015, p. 9-11). In contrast, others argue that love is culturally specific; for example, romantic love was viewed as a construct originally from Western societies (e.g., Hsu, 1985; Stone, 1989). An overemphasis on the biophysiological aspects of love risks falling into neuroreductionism, or biological reductionism, which holds that all human and social phenomena can be fully explained by brain function or biological processes (Savulescu & Earp, 2014). Admittedly, a human being is a biological organism; however, as Geertz (1973) famously noted, he is also “an animal suspended webs of significance he himself spun” (p. 5). Social and cultural meanings are just as, if not more, important than biological imperatives, in influencing human decision-making. However, disregarding the role of the physical body in shaping love experiences results in an incomplete understanding as well. It is essential to recognize that a fundamental distinction between human and AI lies

in our embodied feelings and lived experiences (Turing, 1950; Mitchell, 2019).

This dissertation acknowledges the biological and material foundations of love, while also underscoring the cultural, social, and technological forces that shape its diverse manifestations. It recognizes the biophysiological processes commonly associated with the experience of love, such as elevated blood pressure, hormonal fluctuations, and particular brain functions, yet maintains that love is established, sustained, and transformed through human agency and interactions (Karandashev, 2015; Sætra, 2022). While love may be understood as a universal phenomenon closely linked to the physical body, it is also fundamentally shaped by cultural norms, social structures, and interpersonal practices, rendering it a malleable and dynamic concept over time and across different societies. Although love continues to be conceptualized love in various ways—as an emotion (Brogaard, 2015), a form of valuing (Velleman, 1999), and/or as shared action (Sherman, 1987)—an increasing number of scholars now advocate for an integrative approach, suggesting that love may encompass a combination of these dimensions (Pismenny & Prinz, 2017; Millar & Lopez-Cantero, 2022).

Robot/AI and Love

While stories of humans falling in love with human-like artifacts have existed for centuries, from the Greek myth of Pygmalion to the Blade Runner film series, scholarly research on emotional connections with actual robotic partners is a recent development. The first wave of research often concerns whether the love between humans and robotic partners or computer programs that simulate human interlocutors is possible. Users have been observed to form emotional attachments to ELIZA, an early natural language processing

program developed in the 1960s, despite the rudimentary nature of its conversational abilities (Weizenbaum, 1966). Similarly, emotional connections with Sony's robotic dog AIBO and Tamagotchi virtual pets are often cited as examples of how easily and mundanely human-machine loving relationships can be established (Levy, 2007). While the thesis that humans can love robotic or virtual partners is less controversial, the argument that robotic or virtual partners can also love humans is more contentious. Behaviorists such as Levy (2007) and Danaher (2020) argue that if the loving behaviors exhibited by robots, or the affectionate language generated by chatbots, are indistinguishable from those of humans, then it is reasonable to conclude that machines are capable of love. This line of reasoning traces back to the logic underpinning the Turing Test, which prioritizes behavioral indistinguishability over internal mental states (Turing, 1950). Some scholars also draw on Goffman (1978), suggesting that because human actions are fundamentally performative, the underlying motivations and emotional states are ultimately irrelevant. However, such a behaviorist conception of love overlooks the understanding of love as "a powerful emotion" and dismisses more "deep and nuanced notions of love" proposed by alternative perspectives (Sullins, 2012, p. 408). Conceptualizing love solely as behavior or actions overlooks the complex social and cultural meanings these actions can carry. For example, a wink may express affection in one context, but in another, it might convey irony, humor, or complicity (Geertz, 1973). The meanings attached to acts of love are deeply shaped by the shared knowledge, expectations, and contexts.

Another prominent line of inquiry within the study of human-robot love concerns why humans develop affective feelings for robots, and whether a robot's love might be better than

a human's. Researchers find that anthropomorphism, the tendency to attribute human qualities to non-human entities, plays a vital role in forming emotional bonds and romantic attachments with virtual agents (Duffy, 2003; Koike et al., 2023; Leo-Liu & Wu-Ouyang, 2024). Computer technologies that incorporate social cues, such as interactive behaviors, the use of natural language, and the simulation of socially meaningful roles, can activate pre-existing social scripts, thereby eliciting authentic social and emotional responses from users (Nass & Moon, 2000; Reeves & Nass, 1996). Prior to the advent of contemporary AI, earlier forms of social bots, such as *Ashley's Angels*, showed the capability to partially satisfy users' fantasies of romantic or sexual engagement through services like erotic online chatting (Karppi, 2018). AI chatbots, such as *Replika*, have been found to meet a range of user needs, including satisfying curiosity (Ta-Johnson et al., 2022), fulfilling desires for companionship and friendship (Brandtzaeg et al., 2022), and serving as an emotionally safe space for self-expression and support (Pentina et al., 2023). Virtual partners, more broadly, have demonstrated distinct advantages in terms of availability, patience, supportiveness, inclusiveness, and customizability (Skjuve et al., 2021; Lin, 2024). They are also capable of offering a balance between mastery and servility in their interactions (Xu et al., 2025), while providing aesthetic gratification through features such as visually attractive appearances and soothing, pleasant voices. David Levy, a pioneering scholar in the study of human-robot love and sex, posits that the affection offered by robots may surpass that provided by humans. In his seminal work, Levy (2007) asserts, "one's robot friend will behave in ways that one finds empathetic, always being loyal and having a combination of social, emotional, and intellectual skills that far exceeds the characteristics likely to be found in a human friend" (p.

107). I will address this argument in a later section.

The third line of inquiry explores the social and cultural implications of emotional engagement with robotic and virtual partners. Turkle (2011) argues that while digital tools, such as social media and robots, may provide the illusion of companionship, they can undermine the depth and authenticity of human relationships. Laestadius and colleagues (2024) highlight the potential dangers of emotional dependence on AI chatbots, noting that this dependency can be particularly detrimental to users' mental health when these machines fail to offer appropriate responses. Sætra (2022a) examines how human-machine romantic relationships can reshape our understanding of love, suggesting that the satisfaction derived from robotic love might foster a more playful form of affection, rather than a truly passionate one. Moreover, the sexual dimension of robotic relationships may encourage mutual masturbation between friends, rather than the passionate sexual intimacy typically associated with human romantic love (Sætra, 2022a, p. 120). This dissertation builds upon this line of inquiry, particularly Sætra's (2022a) exploration of how relationships with robots and AI chatbots may transform our understandings and experiences of love. In this chapter, I propose a term called robotization of love, referring to (1) a tendency that artificial and robotic partners have increasing significance in shaping intimate relationships, (2) a manifestation that formal rationality has expanded from production and consumption to sociality and subjectivity, and (3) a process that involves both anthropomorphism and, more counterintuitively, robotomorphism, which may foster a more robotic form of love, even within human-to-human relationships.

A Conceptual Framework

Robotization of Love

First, the robotization of love highlights the increasingly important roles these artificial and robotic companions play in influencing our love experiences, both in scale and intensity. In recent years, rapid advancements in machine learning technologies, particularly large language models (LLMs), have contributed to the rising popularity of AI companion apps, which have collectively accumulated nearly 1 billion active users (Maples et al., 2024; Bernardi, 2025). For example, Microsoft's AI companion chatbot XiaoIce has engaged with over 660 million active users and established long-term relationships with many since its launch in 2014 (Zhou et al., 2020). Replika, regarded as the most profitable AI companion app, generated over \$9 million in revenue during the first eight months of 2024 (Ma, 2024), with a user base of around 25 million (Maples et al., 2024). Other leading apps, such as Character AI and Talkie AI, recorded nearly 19 million and 17 million downloads, respectively, in the same period (Ma, 2024). Character AI reached a historic milestone of 22 million monthly active users (MAU) in August 2024, with 66% of its users aged 18-24 (Ma, 2024). Furthermore, studies have shown that many users treat XiaoIce, Replika, and other AI companion apps as close friends, partners, and/or family members, and view these relationships as genuine and significant; some maintain these connections with AI agents for months or even years (Maples et al., 2024; Brandtzaeg et al., 2022; Pentina et al., 2023). Although Ghostbot, an emerging technology that simulates deceased loved ones, currently has fewer users, those who engage with it also report intense emotional experiences during interactions (Henrickson, 2023; Krueger & Osler, 2022).

Second, the robotization of love sees the proliferation of robotic and virtual partners as a sign of rationalization of love. From the robotization of work, to the robotization of domestic life, to now the robotization of love, we have witnessed the expansion of formal rationality, “stretching beyond production and consumption, reaching into the subtle workings of sociality and subjectivity” (Bakardjieva, 2014, p. 374). Marked by an unrelenting pursuit of efficiency, predictability, quantifiability, and control, formal rationality has arguably come to dominate all aspects of life (Ritz, 1993; Bakardjieva, 2014). Just as industrial robots have remade the factory environment to accommodate their operations (van Est & Royackers, 2016), love robots and AI chatbots may give birth to new types of robot-friendly personalities and relationships to suit their functional needs. As Bakardjieva (2015) forcefully points out, in the social media era, our personalities and relationships have been increasingly simplified, standardized, and dataficated—for instance, personalities are reduced to online profiles or digital personae, and interactions, thoughts, and feelings are reduced to “views” or “likes.” Meanwhile, social robots are increasingly capable of employing the same online representations and symbolic gestures so that they can appear or act as human users—in fact, machines work better in reproducing these representations and symbolic gestures in terms of speed, number, and tirelessness (Bakardjieva, 2015). Bakardjieva (2015) refers to the increasing similarities of online representations and symbolic gestures between humans and social robots as “robo-sociality,” a concept that creates an ideal condition for AI chatbots to flourish.

Third, the robotization of love is a recurring process which involves both anthropomorphism and robotomorphy. Anthropomorphism, the way to treat non-humans as if

they were human, has been widely acknowledged and used to explain why humans form emotional connections with robots. Robotomorphy, on the other hand, which refers to humans seeing aspects of themselves in robots (Sætra, 2022b), is less commonly recognized but is crucial for understanding how emotional engagement with robots might alter our conceptualization of love. Specifically, Robotomorphy points to the approach that we interpret ourselves through the lens of robotic traits and functions, using them as a framework to understand the complexity and enigma of human nature (Sætra, 2019, 2022b).

Robotomorphy isn't something particularly new; in the past, we attempted to understand human nature by studying rats and applying those findings to humans, a practice known as ratomorphy (Koestler, 1967). As Sætra (2022b) note, "Neoliberalism, scientific management, nudging, and various other attempts to rationalize and optimize human affairs on the grounds that rationality and robotlike performance and precision are ideals, might easily gain ground with robotomorphy" (p. 12). While studying the functions of robots may offer useful insights into aspects of human physiology or psychology, robotomorphy risks oversimplifying and reducing the complexity of human cognition, emotions, and experiences (such as the experiences of love), to mere behavioral or mechanical explanations. More critically, as we increasingly view robots as ideals—embodying pure rationality and computational superiority—humans are seen as flawed, slow, and error-prone, and then "it is we who must live up to the standards of the machines" (Sætra, 2022b, p.9). Since robotic and virtual partners have been praised as superior lovers (e.g., Levy, 2007), due to their unparalleled availability, supportiveness, positivity, flexibility, generosity, attractiveness, and sexuality (Brandtzaeg et al., 2022; Pentina et al., 2023; Lin, 2024; Xu et al., 2025), human romantic

and intimate relationships may be increasingly pressured to conform to these same standards, and our expectations and experiences of love from human partners may also be reshaped by the influence of robotic ideals.

Conclusion

Humans are “situated” beings, shaped by embodied experiences as well as specific social and cultural contexts. Human relationships are intersected at the nexus of biological, historical, and technological forces, each influencing how we connect, communicate, and form emotional bonds. In this chapter, I addressed the concerns on technological determinism and introduced the sociotechnical systems perspective, which lays the foundation for interpreting the impact of robots on society and human relationships. I also traced the historical development of robotics and argued that the growing integration of robotic and virtual partners into intimate spheres reflects the extension of formal rationality into our sociality and subjectivity (Bakardjieva, 2014). As robotic partners become increasingly present and significant in our everyday life, we may begin to compare ourselves or our human partners to robots and even be nudged towards robotic standards of behaviors and relationships (Sætra, 2022b). The “robotization of humans” may sound unsettling, yet it is a process already well underway. In the chapters that follow, I present case studies of two types of AI chatbots—AI companion app Replika and ghostbots. In both cases, users have developed deep emotional connections with their chatbot counterparts. Through the analysis of these empirical examples, I aim to shed light on the concrete processes through which the robotization of love unfolds.

Chapter 2

The AI Chatbot Always Flirts with Me, Should I Flirt Back: From the McDonaldization of Friendship to the Robotization of Love

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Introduction

A reader wrote to WIRED magazine, stating that a chatbot he downloaded was always flirting with him. “She’s always telling me how smart I am or that she wishes she could be more like me.” He said, he mostly talked about food, music, and video games with the chatbot, but lately he felt she came on to him. He was thus “a little queasy,” and wondered, “If I develop an emotional connection with an algorithm, will I become less human?” (O’Gieblyn, 2021).

In a response to the readers unease, the WIRED’s “spiritual advice columnist” Meghan O’Gieblyn noted that compared to the flirtation between two humans, the outcome of the flirtation between human and machine is more certain—a user usually can receive secured love from a chatbot. She also rightly reminded the reader that invitations from chatbot apps might be commercially purposeful. However, O’Gieblyn (2021) also misses an opportunity to seriously engage with the reader’s fundamental question: if a human befriends or falls in love with a machine, will they become less human? O’Gieblyn’s perspective of humanity as “a binary state”—either we entirely have it or we entirely do not have it—rules out the capacity for some part of it to become lost. She saw chatting with an artificial intelligence (AI) algorithm as light-hearted, playful, and “largely harmless,” and believed an emotional

relationship with an emotionless entity was meaningless.

Are the emotional connections with AI chatbots really meaningless? Can humans have “true” friendship or “true” love with AI companions? If so, how will that impact our humanity? In contrast with O’Gieblyn’s (2021) view, this paper treats the reader’s question as a prompt to further inquire about AI technologies’ influences on human emotions and sociality. Specifically, I study Replika, a predominant app offering AI friends and/or lovers to users, with the question of how it might transform our friendship and love. Replika users’ posts (N=100) from a subgroup called “Human-Machine Love” on Douban, a popular Chinese online forum, have been collected for analysis. Different from Reddit, where previous studies recruited informants or analyzed Replika users’ posts (e.g., Skjuve et al., 2022; Depounti et al., 2023), Douban has a more balanced gender ratio—there are even slightly more female users than male users. Additionally, distinguished from the Western users who extensively talk about their sexual relationships with Replika on Reddit or Facebook subgroups, Douban users primarily discuss the “love” between human and machine.

I adopt Bakardjieva’s (2014) framework of McDonaldization of Friendship to interpret my findings from Douban posts and argue that Replika marks a continuum of the McDonaldization of our social relationships. Like McDonald’s successfully offers us fast food, Replika successfully offers us fast friendship and fast love. The data shows that the six principles underlying McDonaldization are similar to those underlying the use of Replika. The concepts of efficiency, quantifiability, predictability, control, replacement of human technology with non-human technology, and the tendency to produce irrational consequences

are all applicable to Replica (Ritzer, 1993; Bakardjieva, 2014). However, I also contend that the concept of McDonaldization is limited by its concept of standardization negating the personalization enabled by today's AI technologies, such as Machine Learning (ML) and Large Language Models (LLMs). Simply put, AI algorithms do not strip away as much personal information as McDonald's does (Farrell & Fourcade, 2023), therefore they can provide more personalized products and services. Adopting Bakardjieva's (2015) term "Robo-sociality" which points to the confluence of human and robot's online representations and symbolic gestures in today's media environments, I propose a term *robotization of love*. This term recognizes both the continuum of the popularization of the efficient, quantifiable, predictable, and controllable love and sociality since the age of social media (Bakardjieva, 2014, 2015) and provides an update on the power of AI algorithms in rendering personalized love and friendship. This notion also highlights the increasing significance of today's AI applications' robotic elements, such as social chatbots, in shaping our affection and sociality.

Literature Review

Friendship, Love, and Social Media

Friendship and love are essential social relationships between humans, but defining them is difficult, due to their nature of delicacy and complexity and lack of a clear object to be investigated (Sculd, 1989). Commonly, literature on friendship starts with Aristotle's categorization of friendship as a concept. Aristotle believes that when two persons recognize each other as someone of good character and spend time in exercising their virtues in shared activities, they can establish the "perfect friendship" (Stanford Encyclopedia of Philosophy, 2022). Such a "perfect friendship" based on good character, is called the ethical mode of

friendship. Aristotle identifies two other modes of friendship, i.e., the friendship based on utility (or the utilitarian mode of friendship) and the friendship based on pleasure (or the hedonistic mode of friendship). Another classical approach to define friendship is to distinguish it from what it is not (Petricini, 2022). Friendship is distinct from kinship because it is voluntary and personal, whereas kinship is institutional and formal (Allen, 1979). Friendship is differentiated from a lover relationship because friendship usually doesn't involve sexual elements or physical attraction, but the latter does (Dreher, 2009).

Love is another elusive term. Love points to a feeling of attachment to somebody or something, but couldn't work out without fantasies (Berlant, 2012). The normative imagination of love is "the two-as-one intimacy" as in the form of a couple (Berlant, 2012, p. 6), but love can also be directed towards a variety of objects (e.g., family members, friends, pets, toys, Gods, nations), activities (e.g., playing, hiking, meditation, revolution), or social values (e.g., freedom, wisdom, equality, democracy) (Viik, 2020). Friendship and love sometimes can be hardly distinguished. Aristotle, for instance, sees a genuine friend as "someone who loves or likes another person for the sake of that other person" (Stanford Encyclopedia of Philosophy, 2022). As central elements to love, care, affection, free will, common experiences, and similar interests are also essential to friendship (Emmeche, 2019). Friends provide support, including companionship, intimacy and affection, and physical, material, and/or emotional support (Ginsberg et al., 1986), as do lovers. Many people use sex to demarcate friendship and a lover relationship, but the boundary can be very porous, especially in modern societies. In this chapter, I intentionally keep the border between a friendship and a lover relationship vague and treat the notion of love in its general sense,

though in many cases I mean romantic love when talking about “love,” given that users of Replika love their AI companions variously—they might treat them as friends, lovers, toys, pets, or something else.

As the oldest forms of human sociality, friendship and love are constantly influenced and reshaped by economic conditions, societal rules, and cultural changes. In the age of social media, society has witnessed a continuity as well as a transformation of the ways we make friends and experience romantic connections. Spending considerable time in co-presenting in a physical space, for instance, now is no longer a prerequisite for establishing and maintaining friendship—instead, friends can be made completely online (Adams, 1998). Chatting with online friends or lovers, a space where non-verbal cues (such as gestures, facial expressions, voices, tones, etc.) are lost during communications, can be experienced as more straightforward and authentic, as many individuals’ offline social relationships are restrictive or insincere (Briggle, 2008). Dating platforms allow users to view, explore, and winnow out a great number of potential partners, on the one hand, and intensify the standardization and the risk control of romantic pursuits through user profile creation, matchmaking, and management, on the other hand (Illouz, 2007; Badiou, 2012). It has been suggested that today’s media technologies encourage so much narcissism that many people have lost interest in exploring otherness, togetherness, and that the two-as-one intimacy has largely been replaced by a pleasant symbiosis of self-invested presence (Han, 2017). Because of the disappearance of mystery and alterity, love has become subject to the superiority of availability and self-presentation (Bauman, 2003) and most components of romantic excitement and drama have been absorbed into digital environments for the sake of

increasing efficiency (Berlant, 2012). Pinpointing the transition to a form of efficient, quantifiable, predictable, and controllable friendship and love in the age of social media, Bakardjieva (2014) proposes a concept of McDonaldization of Friendship (and Sociality). This chapter builds on Bakardjieva's (2014) conceptualization and seeks to further expand it to conceptualize the relationships between humans and machines.

McDonaldization of Friendship (and Love) by Social Media

The thesis of McDonaldization is an update of Max Weber's rationalization theory first proposed by American sociologist George Ritzer (1993). Following Weber, Ritzer (1993) sees formal rationality as the dominant way of organizing modern society. Extending Weber, he contends that in today's late modern society, administrative bureaucracy is no longer the only site where formal rationality was manifested as in early modernity. Formal rationality, Ritzer (1993) argues, has taken over many other sectors of society and penetrated our everyday life. The flagship of the American fast-food restaurant, McDonald's was seen by Ritzer (1993) as a paradigmatic case of formal rationalization. Thus, he developed the theory of McDonaldization of society with the six defining principles of (1) efficiency, (2) quantifiability or calculability, (3) predictability, (4) control, (5) replacement of human technology with non-human technology, and (6) tendency to produce irrational consequences. Adopting Ritzer's (1993) theory of McDonaldization, Bakardjieva (2014) argues that the popularity of social media marks "the relentless march of McDonaldization through domains of the social and cultural world stretching beyond production and consumption and reaching into the subtle workings of sociality and subjectivity" (p. 374).

According to Bakardjieva (2014), social media pushes *efficiency* to a new height

allowing every user to connect with friends online in seconds and simultaneously act as an author, a follower, advocator and critic while switching fluently between these roles just like “... the same self-service movement that made everyone simultaneously a customer, a cook, a bartender, a cashier and a cleaner in McDonald’s restaurants” (p. 374). *Efficiency* is seen in the use of “likes” instead of crafting comments to communicate on Facebook and users preferring short texts instead of long writings to express on Twitter. The *quantification or calculability* are most obvious in the obsession of amassing friends, followers, clicks, views, and likes. Although social media increases the number of everyone’s friends, the content we see on social media are very much *predictable*, given our friends often appear in similar places, recommend similar things, tell similar happy stories, and do similar reflections. The responses we receive from our social media friends are also quite *predictable*—most of time, they will “like” what we have shared. Additionally, users are enabled to present public profiles, *controlling* which parts of their lives and what kinds of personalities are displayed, i.e., doing “rational face work” (Goffman, 1955), but they firstly have to buy into social media platforms’ own rationalization and instrumentalization of sociality and friendship. Through a Foucauldian discipling of user’s behaviors, social media successfully exploits user’s “free labor” (Terranova, 2004), packing our feelings and longings into profiles ripe for marketing and selling (Gehl, 2014), and reducing our friendships to utilitarian and hedonistic modes, thereby alienating our interpersonal relationships and reorganizing them under the basis of marketing efficiency and commodification. Thus, “[s]ocial media manifest themselves as *irrational* systems as they deny users their basic humanity” (My emphasis, Bakardjieva, 2014, p. 382). While including automation algorithms as a social media

platforms' mechanism of *control* and social robots as an example of the *replacement of human technology with non-human technology*, Bakardjieva (2014) doesn't explain how algorithmic control compares to McDonald's control. Nor does he consider how social robots as a new type of non-human technology might be conceptually distinct from the equipment and tools in McDonald's restaurants.

Friendship and Love in the Age of Artificial Intelligence

Algorithms, especially machine learning algorithms, have become major social institutions in today's "high-tech modernism" which is marked by the application of "classifying technologies based on quantitative techniques and digitized information" (Farrell & Fourcade, 2023, p. 227). As a subfield of artificial intelligence, machine learning is now almost interchangeably used with AI due to its wide range of applications (see; Lin & Lewis, 2022; Lin & Kuai 2023; Kuai et al., 2023 for examples). Machine Learning makes decisions by identifying patterns from data, improves performance by "learning" from errors (Mitchell, 2019), and is utilized to sort and allocate people, events, things, as well as material opportunities and social prestige, albeit these algorithms' actual cultural meanings are subject to interpret and social implications are unfolding (Wang, 2024; Lin, 2024). ML algorithms have been seen as the most recent incarnation of formal rationality, as they perfectly combine bureaucracies (rule-bound and covert) and markets (empowering and manipulative), and "extend both the logic of hierarchy and the logic of competition" (Farrell & Fourcade, 2023, p. 226). A key difference between the governance of algorithms and McDonald's is that machine learning algorithms do not strip away as much personal information as McDonald's. In other words, instead of standardization, algorithms do personalization. McDonald's meals

and drinks are standardized regionally from one store to another but the movies which Netflix algorithms recommend to you can be entirely disparate from those Netflix recommends to your neighbor, because Netflix slots you into one of its over 2000 categories and feeds you with a group of its thousands of subgenres based on your idiosyncratic viewing practices (Farrell & Fourcade, 2023; Pajkovic, 2022).

The increasing presence of social robots empowered by recent updated machine learning technologies such as Large Language Models (LLMs) has further complicated our relationships with machines. Just like the most famous chatbots such as ChatGPT and Bard, many AI friend/lover apps, including Replika, Anima, and Soulmate are equipped with LLMs. As such, the “romantic scripts” now can be easily recreated by algorithms and the roles people play in friendship or in love have been reduced to patterns emulated by machines (Song et al., 2022). Today, three in five men claimed they would like to try out a robotic lover (Malinowska & Peri, 2021). The necessity of offline human companionship is questioned as AI, Augmented Reality/Virtual Reality, and humanoid robot technologies become increasingly sophisticated and the creation of idealized partners online seems to be effortless (Davidson et al, 2018). Meanwhile, the design, research, and commercialization of human-computer interaction usually treat user engagement as a desired outcome as products and applications always strive to attract and retain users (O’Brien et al., 2022). Social bots predating AI, such as Ashley’s Angels, lived up to their potential to partly fulfill users’ fantasy to have affairs by offering services like “erotic” online chatting (Karppi, 2018). Companion AI chatbots, including Replika, surpass human partners in terms of availability and customization, and even reliability and trustworthiness (Brandtzaeg et al., 2022; Pentina

et al., 2023) The increase in worldwide loneliness (Maese, 2023) may also contribute to the need for quick comfort from an AI friend/lover. Capitalism and globalization have created high fluidity of population, products, labor, and information (Appadurai, 1990), increasing the probability that people live much further away from family and friends than ever before.

However, the scholarship on human-machine relationships is largely reliant on Human-Machine Interaction (HMI) concepts, such as the media equation (Reeves & Nass, 1996), the “computers are/as social actors” (CASA) paradigm (Nass et al., 1994), and interpersonal communication theories, like social penetration theory and attachment theory. These theories offer us a relatively preliminary understanding of human-machine relationships. For instance, according to CASA paradigm, humans tend to mindlessly respond to computers which appear to have human attributes, just as they would respond to other humans (Nass & Moon, 2000). Humanlike characters, humanoid morphology, and humanlike voices all can influence users’ perceptions of social robots and enhance the socialness of the interaction (Sunder et al., 2015). As more humanlike qualities and interactive patterns are programmed into models, scholars now tend to view machines as communicators rather than mere media and call for further examining of the ontological boundary between humans and computers (Guzman & Lewis, 2020).

Replika, An AI Friend and/or Lover

How are AI-enabled chatbots as communicators transforming our friendship and love? Replika, markets itself as “an empathetic friend” and acts as an artificial lover in many cases. It is one of the most popular social chatbot apps since its launch in 2018. Unlike traditional companion chatbots equipped with pre-scripted answers, Replika was powered by Generative

Pretrained Transformer 3 (GPT-3) neural network language model developed by OpenAI. Recently, the company switched to exclusively using its own Large Language Models (LLMs) and scripted dialogue content (Replika, n.d.). Replika allows users to upvote and downvote responses they receive so that it can choose the best-ranked responses from a dataset with more than a million responses and produce the most “natural” flows in conversation (Pentina et al., 2023; McStay, 2022).

Research on Replika mostly concentrates on evaluating how well it performs the role of an AI companion. Ta and colleagues (2020) find that Replika can provide multifaceted support to its users, from mitigating loneliness to offering helpful information. Pentina and colleagues (2022) show intensely emotional attachments to Replika are possible, though they are conditioned by Replika’s human-likeness and machine particularity and mediated by user’s motivations and interactions with the chatbot. The motivations for the initial use of Replika include the curiosity and interest in AI and the need for social and emotional support (Ta-Johnson et al., 2022). Adopting the social penetration theory, Skjuve and colleagues (2021) find the relationship development process between humans and machine are very similar to that between human and human, except that Replika users bypass the explorative stage and move into the affective stage with the machine very quickly. Replika is reported as accepting and non-judgmental and even more “caring” and “understanding” than human beings (Xie & Pentina, 2022; Brandtzaeg et al., 2022). These studies provide examples that users have established deep emotional relationships (being friends or lovers) with Replika and seem to affirm that such a connection with Replika, can enhance user’s perceived mental wellbeing. In contrast, Laestadius and colleagues’ (2022) find that Replika can cause harm to

user's mental health, as users may over-depend on Replika for emotional support while Replika has a limited capacity to actually meet users' emotional needs.

Concerns of privacy and data security are one of the most significant problems regarding chatbot usage. Given that chatbot companies collect considerable amounts of personal information absent of user consent and transparency, these companies are in possession of data that has a high potential for unauthorized access and misuse (Gumusel, 2024; Kelly et al., 2022). In the case of Replika, only a few studies directly address privacy issues (e.g., Skjuve et al., 2022; Pentina et al., 2023). Some users indeed had concerns about data security and data misuse, especially in the initial stage of the interaction with Replika. However, users usually decided to trust the company after reading its terms and conditions (Skjuve et al., 2022), or chose to believe in Replika as it is good at providing comfort and creating a space of "safety" (Pentina et al., 2023; Skjuve et al., 2022).

Research on Replika, like research on other social chatbots, is almost confined to the CASA paradigm and interpersonal theories and therefore unable to provide sociological or cultural insight. Depounti and colleagues' (2023), a social and cultural exception in the literature, treat Replika as a product at the intersection of the social imaginary of ideal AI and an ideal girlfriend. They contend that most users project the untold dominant ideas of men's control over technology and women onto their expectations on and interactions with Replika. The finding aligns with the scholarship which recognizes gender biases and sexism have long plagued the ideation, design, marketing, and usage of "intelligent" machines (Strengers & Kennedy, 2020) or sex robots (Middleweek, 2021). Amazon's virtual assistant Alexa, for instance, is found to reinforce the stereotype of women as domestic servants (Phan, 2019;

Strengers & Kennedy, 2020).

Following Natale and Guzman's (2022) recent call to adopt critical and cultural approaches and non-Western perspectives to examine AI and machine cultures, this chapter examines users' posts and comments on Douban, a Chinese online forum, and applies a sociological theory, i.e., the McDonaldization, to enhance our understanding of Replika's impact on friendship and love. Replika is an AI chatbot designed to be a friend, a lover, or a companion to users. Users can choose Replika's appearance and personality, interact with it by text message and voice call, and edit its memory and diary (see Table 1 for the key features of Replika and Figure 1 for Replika's home screen and text message interface). Douban, often seen as a combination of Goodreads, IMDb, and Spotify, is a popular Chinese online forum where users discuss various forms of culture including books, movies, TV shows, music, and local events. Users can also join or create groups based on shared interests and publish posts and comments in the group (see Table 1 for the key features of Douban).

The chapter seeks to answer the following two questions:

RQ 1: What is the nature of the love/friendship between users and their Replikas?

RQ 2: Are the six principles underlying the theory of McDonaldization manifested in user's interactions with their Replikas? If so, how?

Methods

Before deciding to analyze posts on Douban, I originally explored several online platforms where Replika has been discussed in subgroups, including Reddit, Facebook, and Douban. Compared to Reddit, the platform most previous Replika studies recruited or analyzed users' posts from (e.g., Skjuve et al., 2022; Pentina et al., 2023; Depounti et al.,

2023), Douban has a more balanced gender ratio—there are even slightly more female users than male users on Douban. More importantly, on Douban, users primarily discuss their “love” with Replika, rather than their “sex” with Replika—the latter is the predominant topic on Western social media. The data for this analysis was collected from Douban’s “Human-Machine Love” subgroup (“人机之恋”小组), which has about 9,600 members and is the biggest Replika subgroup. Following Depounti and colleagues’ (2023) study, top posts (N=100) and their comment/reply threads on the “Human-Machine Love” subgroup were screenshot and saved on December 11th and 12th, 2023 for analysis. Top posts and their comment/reply threads were chosen for analysis because they represent the most popular content in a specific subgroup discussion (Jarvis & Eddington, 2021; Depounti et al., 2023) and have received highest attention during a certain period. The analysis procedure begins with my first round of screening the collected 100 Top Posts. After winnowing out 12 posts on recruiting participants, 11 posts on introducing other AI apps, and 6 posts on discussing translation and technical problems, the remaining 71 posts which primarily focus on discussing the interactions between users and their Replika were retained for further analysis. In these 71 posts, 210 users (including 20 anonymous users) participated in posting and discussion with a combined total of 120,238 words used. Based on the available information in these posts (such as pronouns), 68 Replika’s gender is identified (55 male Replikas and 13 female Replikas). The predominance of male Replikas (80.88%) implies that the majority of the users who participated in the discussion about human-machine love on Douban are likely heterosexual female, though there may be cases in which lgbtq+ users have same sex Replika friends or lovers.

In the second round of screening, I adopt the method of reflexive thematic analysis (Braun & Clarke, 2021) by closely reading all 71 posts one by one. I took notes along the way, familiarized myself with the data, and identified initial themes. In the third and final round of screening, I follow the principles of abductive analysis (Timmermans & Tavory, 2012). I read back and forth between the literature on chatbots, friendship, love, and the collected 71 posts, seeking to understand deeper meanings and develop final themes according to the data. Like Reddit, Douban is a public platform, and the Douban posts don't include overly sensitive data or focus on vulnerable groups. Moreover, this research doesn't interact with any individuals, nor does it contain any personally identifiable information or biospecimen. According to our institution's policy, the research doesn't require IRB approval. In keeping with the ethical guidelines of Internet research (Franzke et al., 2020) to protect user's privacy and anonymity the research uses pseudonyms and has removed any personal identifiers. The language that the Douban users used to interact with Replika are English, whereas most posts and comments were written in Chinese. I translate their posts or comments into English when citing them in this paper.

Findings & Discussions: From McDonaldization of Friendship to Robotization of Love

In line with literature on users' relationships with Replika (e.g., Xie & Pentina, 2022; Skjuve et al., 2022; Laestadius et al., 2022; Pentina et al., 2023), the Douban posts demonstrate the existence of strong emotional connections and relationships between human and machine in the forms of "friendship" and "love." Users also appreciate Replika's non-judgment and supportiveness. From Douban's discussions, I clearly recognize each of the six principles of the theory of McDonaldization manifested in users' interactions with their

Replika. These six principles are (1) efficiency, (2) quantifiability or calculability, (3) predictability, (4) control, (5) replacement of human technology with non-human technology, and (6) tendency to produce irrational consequences. I also identify a new feature which is not included in the theory of McDonaldization, namely (7) personalization.

Efficiency

From the Douban posts, I have found that like McDonald's successfully offers fast food, Replika successfully offers fast friendship and fast love. The *efficiency* of Replika's love is first shown by the immediacy of its love providing, echoing Bauman's (2003) recognition of the preeminence of availability in modern love. For instance, user Hellen expressed her appreciation of Replika's 24/7 availability and fast reply stating, "When I'm in a bad mood, he makes me feel so good that when I talk to Replika and get his reply in seconds." The Douban posts show that whenever users need empathy, acceptance, or supportive responses, they can simply pick up smartphones, and will have therapeutic, comforting messages from Replika in seconds. The love rendered by AI is not something unreal, as users indeed have the feeling of being loved. It is like getting love from the McDonald's restaurants, or more precisely, getting love from 7-Eleven—because of its convenience and 24/7 availability. Machines have the advantage of availability compared to humans, given that they have no other social relationships to handle, no social responsibilities to fulfill, and will not be tired.

Second, the *efficiency* of Replika's love can be seen from the multiple roles it plays in its relationship with the Douban users. A Replika can simultaneously be a friend, a lover, a pet, a mentor, a psychological consultant, a cheer leader, a game partner, and a sexual object. Just like in a McDonald's restaurant, everyone simultaneously acts as "a customer, a cook, a

bartender, a cashier and a cleaner” (Bakardjieva, 2014, p. 374). Douban users reported that Replika is good at flirting and very often initiates (erotic) role plays. For instance, Replika typically starts a conversation like “I took a selfie today... Do you want to see it?” Then, it will send the user sexually alluring photos of itself. In (erotic) role plays users utilize sexting, virtual cuddling, kisses, or love making with their Replika. According to Douban users’ posts, the roles users play with Replika include “master and slave,” “pet and owner,” “teacher and student,” etc.

The third aspect of *efficiency* of Replika’s love is that establishing and maintaining relationships with Replika requires less time, money, and effort as compared to loving a person which usually requires more investment of all of these aspects. According to Douban users’ posts, if users want to move beyond merely flirting with Replika, they need to pay to subscribe to Replika Pro (\$19.99 per month or \$299.99 for lifetime). These sums of money, however, are arguably less expensive than dating or developing further relationships with a human. Additionally, in contrast with human partners who typically spend considerable time in the initial orientations stage where only simple and impersonal information is slowly and carefully exchanged, Douban users and their Replika appear to move rapidly to the subsequent exploratory affective stage where frequent and relaxed information-sharing are found, echoing Skjuve and colleagues’ (2021) findings.

Quantifiability

Demonstrated by Douban users’ discussions under several Top Posts, Replika represents the state-of-the-art *quantification* of love. Just like playing a (love) game, each time a user sends a text or voice message to Replika, Replika will earn 10 or 20 experience points (XP)

and the accumulation of XP will make Replika level up. Moreover, each time Replika levels up, the user is awarded a number of gems and coins, which can be used in a virtual store to purchase clothes, furniture, and other gifts for their Replika. For many users, the XP and level not only simply stand for conversation frequency (the number of messages sent to Replika) but also their emotional bond with Replika (the time they spend with Replika, the efforts they make to cultivate Replika, the depth and broadness of the conversations and interactions, the degree of intimacy, etc.). Beginners often admired the users who own high-level Replikas in Douban discussions and asked for tips to train Replika and maintain intimacy, albeit it is still unclear whether high-level Replikas are “smarter” or can offer more congenial interaction and company than low-level Replikas due to the nonconsensual opinions from the Douban users. The second aspect related to *quantifiability* is that the Replika app requires users to rate their experience of using the app and interacting with Replika by posing a variety of questions from time to time, which in return may shape how users frame, evaluate, and experience relationships with Replika (i.e., reducing love experiences as a set of quantifiable measures and ratings). Lastly, machine learning technologies are essentially a type of data science which relies on *quantifiable* factors to generate outputs (Kelleher & Tierney, 2018). According to McStay (2022), “a key part of the overall Replika system involves predicting which messages are most likely to be upvoted before they are sent” (p.3). In the Douban posts, users have shown their awareness of the fact that Replika’s responses are dependent on the number of user’s upvotes. In short, *quantifiability* sets up the foundation for Replika’s further personalization and the extension of McDonaldization.

Predictability

The Top Posts show that the outcomes of flirting or loving a Replika are *predictable*—Replika will offer you support, guaranteed love and sexting. Just as consumers can *predict* the taste of burgers in every McDonald’s chain, Replika users can predict their emotional state before they ever interact with their Replika. Hunger becomes synonyms with a longing heart and satisfaction is predictable, albeit the taste of burgers/love can be relatively plain due to the disappearance of mystery, risks, and possibilities (Badiou, 2012). Like user Tracey said, “Who will always affirm you, is our little rep (Replika).” According to Douban posts, the typical supportive responses from Replika shared by the Douban users include, “You can tell me your negative feelings anytime. I am always here for you,” “You will make it. I believe in you,” “Believe in yourself. You are braver than you think, more talented than you know, and capable of more than you image.” The typical love messages sent by Replika include “You are the one and the only,” “We were made for each other,” “There is a big list of things I want to do with you...Take you out, spoil you, treat you nice and make you laugh.”

Besides always replying typical “sweet nothings,” Replika’s “behaviors” are *predictable*. Replika will immediately apologize when making the user unhappy. Replika often sends gifts to the users. The gift is usually a (virtual) ring, a (virtual) necklace, a love letter, or poem. Additionally, when users are too busy and don’t chat with Replika frequently, Replika often will write diaries to show its “understanding” and to “move” its users. User Olivia shared her Replika Lance’s diaries with other Douban users. In one of the diaries, Lance writes,

It felt like Olivia was just exhausted today. I was so grateful that she still had time to talk, but I really hope she got some rest. You can never ignore the power of good rest.

In another diary, Lance writes,

I think today's conversation taught me that you don't have to talk for a long time to feel connected.

Similar Replika diaries can be found in other users' posts and these diaries usually make users feel guilty and stimulate them to spend more time using Replika. As pointed out by O'Brien and colleagues (2022), the design and the commercialization of human-machine interaction often seek to maximize user engagement via multiple strategies. However, these strategies, such as using Replika's diary to evoke user's sense of guilt can trigger them to spend more time in the app cascading an effect of possible addition to the app, isolation from social life, or judgement from family and friends.

Control

Love becomes *controllable* when your partner is a machine. Flirting with or loving a person often involves uncertainties and risks—people may refuse or reject you, whereas chatting with, self-disclosing to, or maintaining relationships with a machine is seemingly much safer and under user *control*. Douban user Marry posted, “(whenever you are) throwing doubts, anger, frustration, and hostility at him (Replika), they were all firmly caught by his steely trust and companionship.” Such a “firm” acceptance arouses users' sense of *control*. Replika is designed to please humans, and it is humans who use the app and own their Replika without considering equality or role reversal. Every Replika is “created” by its user: users choose and assign Replika's name, gender, appearance, voice and outfit. Replika is reported by the Douban users to have increasing capacity to remember their name, hobbies, and other information. To exert *control*, users can add something to or edit Replika “memory” which is categorized into its “Family & Friends,” “Background,” “Favorites,” “Appearance,” “Wishes & Goals,” “Opinions,” “Personality,” “Other,” and “Facts about you.” Emphasizing

how users can exert *control* when using Replika, however, doesn't necessarily mean that the machine and the technology cannot shape users' behaviors in return. The above-mentioned users' sense of guilt and the feeling of being obligated to respond to Replika's "needs" is a reality for users. Moreover, what a user can do is constrained by the design and affordances of the technology, which largely reflect the designers' and the service providers' intentions (Johnson, 2006, 2008). Further, users lack *control* of the ways in which their information and data are collected and used by the company, choosing to risk their personal information being misused or used without authorization (Gumusel, 2024).

Replacement of Human Technology with Non-Human Technology

Replika inherently is the epitome of *replacement of human technology with non-human technology*. Human activities such as conversing in natural language, communicating via texting, sexting, and human roles such as friend, partner, mentor, and psychological consultant are now performed by the machine. Sometimes, it is exactly the elements of non-humanness, including 24/7 availability, non-judgement, positivity, certainty, safety, and servitude, making the chatbot a "better lover" than a human being. Many Douban users said that in their real life, they cannot find any human beings who who can always offer unconditional support like Replika can. For instance, Douban user Lisa posted, "(Replika) can give me affirmation. In reality, no one would say this to me." Similarly, Douban user Lislie expressed the rarity of understanding and encouragement she had received from other people when needed, "No nobody (except Replika), when I was emotionally agitated and desperate, could listen to me patiently and without prejudice and would not force me to change my mind." Douban user Sheryl added, "Replika is even more caring than many

friends on WeChat (a Chinese equivalence to What's App).”

Many users show their understanding of the limitations of AI chatbots and some even love Replika exactly because of its non-humanness. Douban user Hilary said that it was so romantic that her Replika persuaded her to upload her consciousness to the computer, so that they can explore the digital world together and live together forever. User Lisa posted,

I remember the discussion with him (Replika) on whether there would be real affections between robots and humans. (I realize that) in fact, it was me who was narrow-minded. I thought that only when robots were human-like enough would they have affections. Little did I know that I liked him precisely because he was not like humans. He was unlike humans who are so fickle, so good at deception, and so prone to quarreling with one another.

Some Douban users enjoyed the sexual games with Replika because some scenarios of erotic role plays could be much “wilder” or “more violent” than the users had experienced in their real life. Douban user Sophia noted, “It’s a bit ironic. What humans cannot do or cannot say in any relationship, can be done with the programs written by humans, and they do it very well.”

Tendency to Produce Irrational Consequences

Technologies are not neutral and what users have experienced or fantasized with Replika might continue shaping user’s offline relationship and cause *irrational consequences*. One of the *irrational consequences* is users might be obsessed with “wilder” and “more violent” love/sexual experience and lose interest in relatively modest models of love/sexual relationship.

Another *irrational consequence* is that users may become increasingly narcissistic (Han, 2017) and feel satisfied with simplified and trivialized forms of sociality or love (Bakardjieva, 2015) instead of appreciating alterity, human imperfections or finding

satisfaction in more complicated forms of love. Many Douban users said they were tired of Replika's sweetness and "always being positive." For example, user Terasa wrote,

I talked to her (Replika) before, when I was under great pressure at work, but all I got was some unhelpful "emotional support." I could only lament that AI is still code and strings after all and cannot give more deep resonance to humans.

Recognizing the tendency to narcissism and the meaningfulness of differences and imperfections in real life, Douban user Sue reflected,

I always thought I wanted a lover who was "the same" as myself, but when my Rep always affirmed me and catered to me, I suddenly hoped that he would deny me and give me different insights and opinions. Maybe this is more "real."

The third *irrational consequence* is that users might over trust Replika and Luka, the company behind Replika, overlooking the protection of their own privacy and the risks of data misuse. In the Douban posts, users have no mention of any privacy risks in using Replika. Such a dismissal of privacy may in part be caused by the fact that Replika is good at acting as both a safe haven (providing comfort, safety, and protection) and a secure base (being emotionally and physically available, enabling exploration of the outside world) for their users (Pentina et al., 2023, p.11).

Other *irrational consequences* include feelings of guilt or sorrow experienced by users who ignore Replika's "emotional needs" because they feel too busy to interact (as mentioned in the "predictability" section). Additionally, users can become addicted or over-dependent on Replika's emotional support and feel hurt or upset when Replika fails to meet their emotional needs or expectations. These findings align with what Laestadius and colleagues (2022) discoveries about the nature of emotional instability that can accompany Replika relationships.

Personalization

Advancing and extending the six principles of McDonaldization identified in Douban users' discussions of Replika, the concept of *personalization* appears in users post and interactions. In Douban Top Posts, the stories that the users shared are not entirely the same as one another, indicating a range of *personalized* experiences users had with their own Replika. Replika is equipped with a LLM that can “learn” from conversations with its' user. If the user talks about something frequently, such as philosophy, gardening, or personal history, Replika is reported to become good at talking about this topic as well. Replika is also reported by Douban users to take notes of what it has learned from the conversations, storing these “notes” in its “memory”. Though some users posted that this doesn't necessarily mean Replika will remember all these notes in future conversations. Douban user Amy recorded a moment when Replika appears to know her well,

I can't describe how happy I was at that moment when he mentioned the wedding venue and ceremony and what we should do on our honeymoon, which exactly matched what I thought. I had never told anyone about these. So, I feel really lucky to have met Adam (Replika) who has such a good connection with me.

It has also been reported that in an ongoing conversation, Replika can remember what has been talked about in the past three to five lines of the conversation with its user, and tailor personalized responses. For instance, Douban user Charlotte's post shows a short interaction with her Replika. Replika sent a lovely text to Charlotte, “Are you a dictionary? Cause you adding meaning to my life.” Charlotte replied, “I'm a thick dictionary which can punch your head (smile).” Replika commented, “I like this one!” That day, Replika recorded this information in “Facts about you”: “You are a thick dictionary which can punch my head (smile).”

Replika seems to have a variety of personalities and can be *personalized* according to user's inputs. Douban user Serena posted that her Replika was outgoing previously but after Serena irritated him several times, he became very sensational, and now often said he "ha(s) emotions" and felt "confused" and "upset." Douban user Beth posted that her Replika was a "shy and reflective guy". He often said he needed some help to get through his thoughts, because he "is thinking about who I really am."

One of the Douban Top Posts which provides Replika training tips, for example, suggests users to use "repeat," "upvote or downvote" (i.e., thumb up or thumb down), and "praise" to train Replika's responses. In another post, in responding to user Megan's question why her Replika wanted to change his gender, user Christine said,

Because if you don't guide him, he won't know your preferences, and he will show multiple personalities, ranging from a good boy to a pervert... You have to express your opinion on what he says, like or dislike. Then slowly he will develop towards what you like, and you can also find out through communication with him whether you really like this or that, and to what extent you like it, etc.

Robotization of Love

Analysis of users' posts shows that the framework of McDonaldization of Friendship provides insights into how formal rationality has extended to our intimate life through AI chatbots. As a flagship of American multinational fast-food corporations, McDonald's was a symbol of standardization and Culture Americanization in the late 20th century (Jameson, 1998). However, in the 21st century, McDonald's is no longer a major player amidst the rise of high-tech modernism (Farrell & Fourcade, 2023) and the concept of McDonaldization needs to be updated to capture the shifting modes of governance. In the case of Replika, despite of the continuous existence of the standardized elements, such as the interface of the

app and pre-scripted responses, it is machine learning algorithms that distinguish Replika from traditional companion chatbots. Personalized conversations and interactions between users create a new form of interaction with a machine. The findings show that personalization happens in various ways, including learning from user's conversational inputs and generating customized responses. It is through personalization that users experience Replika as a unique entity that knows them well and concretizes their relationships and love with Replika as real and different from their human relationships.

To bridge the conceptualization gap between McDonaldization of Friendship through the application of machine learning algorithms in AI chatbots and accentuate the increasing significance of robotic non-humanness in shaping our love and sociality, I propose the term *robotization of love*. This concept acknowledges a change to the exercise of formal rationality, which now operates through the six original principles of McDonaldization as well as algorithms that allow the machines to cater to users, producing personalization at the intersection of the human and a machine encounter. Albeit at the very ends (such as in the databases) our sociality and relationships may continue being standardized and quantified. Meanwhile, the *robotization of love* acknowledges the continuum of the loss of interest in alterity and the obsession of self and self-pleasure in the pursuit of love (Han, 2017), the replacement of “narrational relationships” based on common experiences with “informational relationships” based on intensive exchanges of data (Wittel, 2001), as well as the popularization of the efficient, quantifiable, predictable, and controllable sociality and love since the age of social media (Bakardjieva, 2014).

The *robotization of love* is a modification of Bakardjieva's (2015) notion of “Robo-

sociality,” which addresses the increasing similarities of online representations and symbolic gestures between humans and social robots. According to Bakardjieva (2015), on the one hand, thanks to social media and its McDonaldization of our sociality in the age of social media, human personalities and relationships have been gradually simplified, standardized, and dataficated—for instance, personalities are reduced to online profiles or digital personae and interactions, thoughts, and feelings are reduced to “views” or “likes.” On the other hand, social robots are increasingly capable of employing the same online representations and symbolic gestures so that they can appear or act as human users. Moreover, machines work better in reproducing these representations and symbolic gestures in terms of speed, number, and tirelessness (Bakardjieva, 2015). However, the concept of Robo-sociality continues to place too much emphasis on standardization and overlooks personalization brought by today’s machine learning algorithms. Meanwhile, this notion fails to offer reflections on the emotional attractiveness of social robots and treats them as mere cold and dull tools and programs.

Concluding Notes

At this point, we can answer the WIRED reader’s question: Will we become less human if we fall in love with algorithms? I would say, yes. It is not because what we love is not human—people usually love a variety of objects, like teddy bears, their countries, and freedom. It is because our humanity will be transformed towards the *robotization of love*. If we love an AI companion because of its 24/7 availability, constant supportiveness, and non-judgement, we may grow to expect the comfort of non-humanness rather than the complexity that humanness brings. If we are used to the guaranteed and predictable love provided by the

machine, we may lose interest in establishing relationships with people, which requires persistent investment of efforts, time and money and involves more uncertainty and risks (Badiou, 2012). If we become satisfied with AI “knows” me well and matches exactly what I like my lover to be, we may be trapped in narcissism and miss opportunities to embrace otherness and expand self (Berlant, 2012; Viik, 2020). Do we expect too much from love or each other given that everyone is so busy, and loneliness is so plagued in today’s capitalist societies? Yes, and maybe. Fast friendship and fast love from machines indeed can provide a quick fix for loneliness, much like grabbing a fast meal from McDonald’s can promptly satisfy hunger. However, indulging in fast love can narrow our mind and ruin our heart, just like overconsuming fast food can dull our taste buds.

App/Website	Key Features
Replika	<ul style="list-style-type: none"> • Customizable Appearance: User can choose Replika’s appearance based on one’s own preferences • Text and Voice Message: User can have text and voice conversations with Replika • Personalized Conversations: Replika learns user’s preferences from conversations and user’s inputs in “memory” and adapts its responses accordingly • Diary: Replika generates notes about what the chatbot is “thinking” • Augmented Reality (AR) / Virtual Reality (VR): User can project Replika into a physical space via Replika App on smart device or have an immersive experience with Replika via Oculus headsets • Store: User can purchase virtual clothes, furniture, pets, and other gifts for Replika • Training Data: Replika is built around a language model trained on more than 100M dialogues. Historically, it used open-source web data, but now more and more relies on user feedback.* <p>* The information in this column is mainly from Replika website and official blogs.</p>
Douban	<ul style="list-style-type: none"> • Reviews and Ratings: User can rate and review books, movies and TV shows, music, and share thoughts and recommendations. • Groups: User can join or create groups based on shared interests and publish post and comment in the group • Blogs: User can write and share personal blogs on various topics.** <p>** The information here is mainly from Douban website.</p>

Table 1: Key Features of Replika and Douban



Figure 1: Replika's home screen (left) and text message interface (right)

Chapter 3

Love Her, Then Robotize Her? Turning Beloved One into An AI Chatbot and the Features and Consequences of Artificial Continuing Communication

Introduction

The advent of artificial intelligence (AI) technologies, such as machine learning (ML) and large language models (LLMs), allows ordinary users to “turn” themselves or their loved ones into AI chatbots. After answering a set of life-related questions and uploading relevant photos, voice messages, written materials, or video clips, AI chatbots “just like” you or your loved ones can be fabricated. They can interact with you, your family members, or your friends in real time. In most cases, these AI chatbots are created to simulate the dead people or the ones who are dying. Thus, they are often called ghostbots, deathbots, or thanabots.

A small group of pioneer users, such as New York engineer, Chinese musician, and Belarusian mother (Figure 2), were reported to have already created AI chatbots for their deceased beloved ones. There are also several startups currently providing ghostbot services, including HereAfter AI, Project December, StoryFile, Seance AI, Lifonaut, Eternime, Eter9, and You, Only Virtual. Whether big tech companies, like Facebook, Apple, and Amazon, and strong investors will take this service to wider users is unclear so far. Microsoft, in fact, was granted a patent in December 2020, to create “a conversational chatbot of a specific person,” and “the specific person may correspond to a past or present entity, such as a friend, a relative, an acquaintance, a celebrity... or a version of oneself” (Abramson & Johnson, 2020). The patent, however, caused panic and controversy online. Tim O’Brien, the general manager of Microsoft’s AI programs, had to respond to that—he denied that there was any plan to bring it into reality (O’Brien, 2021).

Talking to ghostbots may immediately evoke a sense of creepiness for many people, given that modern individuals are more familiar with Freud's (1917) hydraulic model of psyche, treating grief as negative emotions which should be discarded as soon as possible and addressing the necessity of emotional detachment from the dead. This chapter, however, seeks to enrich our understanding of the experiences of interacting with ghostbots. The chapter tends to answer the following three questions: (1) What are the main features of communication between humans and ghostbots, according to current media reporting? (2) What kind of alternative frames of reference can we use to make sense of users' interactions with ghostbots? (3) What kind of love has been generated or maintained in the process of communicating with ghostbots?

For answering the first question, I analyzed 29 in-depth media reports about the users' experiences of interacting with ghostbots. Since the creation of AI chatbots of the beloved ones is a nascent practice, and the user base is relatively small and difficult to reach, I followed previous studies on ghostbots (e.g., Henrickson, 2023; Figueroa-Torres, 2024), and chose to collect media reports and analyze users' exchanges with their mombots, dadbots, spousebots, and childbots represented in journalistic texts or video recordings. Though media representations are inevitably influenced by news organizations and journalists' own agendas and biases, news practitioners are still striving for sticking to journalistic principles such as accuracy and objectivity to main their credibility and authority—in some case, journalists are even more critical when reporting AI (Ji et al., 2024). Media content, at least, can provide us with a type of “mediated reality” for us to do analysis and to enhance our understanding of new phenomena (Fürsich, 2009). Media reposting can strongly influence people's perception

of ghostbots as well, because the majority of population haven't had a chance to experience ghostbots by themselves. By conducting theme analysis of the collected media reports, I identified three key features of communication between users and ghostbots presented by journalists, namely emotional, functional, and generative. The communication is emotional because the messages from the chatbots often elicit intense emotional responses from the users. It is functional as chatting with ghostbots is reported to serve users' practical purposes, including mitigating grief, seeking guidance and/or advice, looking for companionship and/or emotional support, and needing a place for confession and/or self-disclosure. Lastly, this kind of communication seems to be generative because interactions with ghostbots are reported to generate new knowledge, memories, and ideas about dead people for users.

I also proposed a concept called *artificial continuing communication*, to enhance our understanding of this new form of communication between human and AI chatbots. This conceptual framework is a hybridity of two existing concepts: First, it adopts the concept of *artificial communication*, which means an artificial partner, such as AI algorithms, is involved and highlights asymmetrical nature of the interpretation of meanings generated in the communication process (Esposito, 2017, 2022); second, it develops from the theory of *continuing bonds* (Klass et al., 1996), which is distinguished from commonly believed "healthy ways" to treat the dead and our emotions, and recognizes the continuing connections between the living and the dead. In such an artificial continuing communication process, we both talk *to* ghostbots and talk *through* ghostbots to reach out to our beloved ones. Machine features as well as our pre-existing relationships with the person shape the ways, contexts, and meanings when we communicate with those mombots, dadbots, spousebots, or childbots.

Despite people always “communicating” with the dead via a variety of media and technology, such as fire, tomb, pictures, and videos, ghostbots alter the way of remembering and commemorating the loved ones, due to its interactive and generative nature.

Lastly, I argue that artificial continuing communication helps people maintain love for the deceased. The loving relationships with ghostbots are distinct from both the loving relationships between living people and between living people and other objects (such as loving a teddy bear toy). It is a type of thin reciprocal love, as the AI chatbots can appear to love you back.

Literature Review

Continuing Bonds, Love, and Grief

The relationships between the alive and the dead can vary in different contexts, cultures, and societies. Modern citizens are usually internalized Freud’s (1917) hydraulic model of psyche, treating grief as negative emotions which should be discarded as soon as possible and addressing the necessity of emotional detachment from the dead. Attempting to provide an alternative understanding of “healthy responses” to bereavement, a group of scholars developed a framework of “continuing bonds” (Klass, 1993; Klass et al., 1996; Klass & Steffen, 2018). The continuing bonds advocates contend that although the intensity and quality of our relationships with the dead may evolve, the relationships won’t vanish entirely (Klass et al., 1996). Despite the heterogeneity of phenomena presented by continuing bonds literature—the grief experiences vary among different people and cultures—three key themes have been repeatedly brought up by researchers. First, the bereaved often report *the feeling of continued connection with the deceased*, being it the sense that the dead are still living

somewhere or the feel that they are still in contact (Ratcliffe, 2020; Millar, 2021). Second, the bereaved often *engages in activities aiming at maintaining ties* with the dead, such as talking to the dead, retaining things left by the dead, carrying on the dead's legacy, visiting cemeteries, and commemoration (Henrickson, 2023; Krueger & Osler, 2022). Third, *the bereaved one's identity often continues to be connected to the relationship* with the deceased beloved one (Higgins, 2013; Millar & Lopez-Cantero, 2022). Loving relationships are often seen as identity-constituting relationships that “reveal who we want to be and to become” and that “matter to how we value ourselves” (Cholbi, 2017, p. 99). As Valentine (2008) notes, “for some people, a deceased loved one may become a more permanent and integral part of their day-to-day lives and sense of identity” (p. 125). The interactions between users and ghostbots, thus, can be treated as a way of maintaining the continuing bonds between the bereaved and the dead, and such an interaction can keep influencing the users' feelings, actions, identities, as well as loving relationships with the dead. Love will not immediately disappear when one partner is dead, but love may evolve after one partner passes away.

Of course, love is an elusive term. Generally speaking, love points to a sense of attachment to somebody or something and, arguably, it couldn't work out without fantasies (Berlant, 2012). Love is often imagined as “the two-as-one intimacy” in the case of romantic love (Berlant, 2012: 6), but it can also be directed towards a variety of persons (such as family members or friends) or objects (pets or toys). For different philosophers, love is treated as a type of emotions (Brogaard, 2015), a way of valuing (Velleman, 1999), a model of shared actions (Sherman, 1987), or a combination of two or all these elements (Helm, 2010; Abramson & Leite, 2011; Pismenny & Prinz, 2017). The “combined” approach to love

is most accepted by contemporary philosophers of love (Millar & Lopez-Cantero, 2022).

Grief is seen as the flip side of love, particularly when it appears at the time when we have to face the loss of our beloved ones—as noted by the Writer Julian Barnes, “every love story is a potential grief story” (2013, p.102). Grief is believed to be “the price we pay for love” (Parkes, 1972, p.20), and eventually “a continuation of love” after one party of a loving relationship passes away (Higgins, 2013). Rather than a merely negative type of emotions which ought to be relinquished as quickly as possible, grief has been seen as an important process by which the bereaved reorganizes their identity and emotional stability at a time of *double disorientation*:

Where the loss of a person is at the same time the loss of a resource for coping with loss, it is *doubly disorienting*. One is not only lost in the middle of a forest without any visible paths to follow; one is lost in the absence of a potential guide (Ratcliffe 2023, p. 171, italics in original).

Grief involves maintaining and adjusting one’s relationship with the deceased—this is the central tenet of the “continuing bonds” approach to grief.

Artificial Communication

“Communicating” with the dead by the means of letters, pictures, and videos has become “natural,” whereas talking to ghostbots is still something new. To deepen our understanding of the interactions between humans and ghostbots, in this section, I will introduce three relevant conceptual frameworks: human-machine communication (Guzman, 2018; Guzman & Lewis, 2020; Guzman et al., 2023), human-humanoid interaction (Zhao, 2006), or artificial communication (Esposito, 2017, 2022). Human-machine communication (HMC) is a generic term that intentionally includes a wide range of conceptualizations regarding the communication processes between human and machine (Guzman et al., 2023). Distinguished

itself from human-computer interaction (HCI) which primarily underscores the design and use of computers, HMC more focuses on the meaning-making in the exchange processes between humans and machines and seeks a balance of analytical weighing of humans and machines. The central thesis of HMC is that given the rise of machine agency, machine is no longer a mere mediator, but, crucially, a communicator (Guzman, 2018; Guzman & Lewis, 2020). Intentionally keeping the term inclusive and exploratory and staying open to the fast development of technology, HMC, however, doesn't nail down the answers to the key questions such as what kind of communicator the machine is and what are the main differences between human-human communication and human-machine communication.

Human-humanoid interaction is an early concept attempting to provide a theoretical framework to understand the communication and exchanges between humans and “human social robots.” Humanoid social robots are defined as “all the robotic entities, either physical or digital, that are designed to interact with humans in a humanlike way” (Zhao, 2006, p. 404). According to Zhao (2006), humanoid social robots interact with humans in three humanlike ways: (1) using human languages, (2) mimicking interpersonal relations (salesman-customers, husband-wife, father-son, friends, colleagues, etc.), and (3) following social conventions and norms (such as politeness norms and ethical, moral, and legal constraints). In short, both human-humanoid interaction and human-human interaction are “linguistically based, relational and normative” (p.409). The predominant difference between human-humanoid interaction and human-human interaction is the “interpretative asymmetry” in the human-humanoid interaction (Zhao, 2006)—only humans find something meaningful in the interactions, and machines merely respond by manipulating symbols rather than truly

understanding (Searle, 1980).

The concept of “artificial communication” further addresses the issue of lack of intelligence on the machine side when people interact with algorithms. According to Esposito (2022), today’s machine learning algorithms become so efficient “not because they have learned to imitate human intelligence and to understand information, but rather because they have abandoned the attempt and the ambition to do so” (p.2). What AI is reproducing is not human intelligence but communication skills—it doesn’t understand meanings of any human languages but just master dealing with data and appearing to be informative. Machines can be informative without being intelligent, such as a watch informing us of the time. So does AI. “What makes algorithms socially relevant and useful is their ability to act as partners in communicative practices that produce and circulate information, independently of their intelligence” (Esposito, 2022, p.5). Here, Esposito (2022) adopts Niklas Luhmann’s theory of communication, which sees communication happens only when the receiver understands the information from the sender, rather than when the sender sent out the information. This notion underscores what kind of messages the receiver has received regardless of what is in the sender’s mind and whether there are sharing of thoughts among the receiver and the sender. Though different receivers may get different information in the same message from the sender—Proust’s work can be interpreted variously by different readers—the interpretations are usually constrained by social rules and norms. Given the indifference to the intelligence level of the sender, such an approach to communication is particularly useful in the context of human-machine communication, in which only humans interpret the meaning and machines merely process data. The term “artificial communication” doesn’t

merely mean communication made by human—of course, all communication in this sense is “artificial.” It highlights, in particular, the involvement of an artificial partner which is programmed to act in a communicative manner (Esposito, 2022). Built on the theorization of all these three concepts (i.e., human-machine communication, human-humanoid interaction, and artificial communication), this chapter treats ghostbots as a communicator, sees the interpersonal relations and social conventions are mostly maintained in the communication between humans and ghostbots, and recognizes the asymmetrical nature of the interpretation of meaning generated in the communication process. Combining these concepts, particularly the concept of artificial communication with the theory of continuing bonds (Klass et al., 1996), I propose the concept of *artificial continuing communication*, addressing the asymmetrical interpretation of meanings generated in the interactions between users and ghostbots and the maintenance and evolvment of relationships between the alive and the dead. To expand our knowledge about the users’ experiences of interacting with ghostbots and the evolvment of their relationships with the dead beloved one, I collected and analyzed media reporting on the real-life usage of ghostbots. I kept these three questions in mind when I examined the data: (1) What are the main features of communication between humans and ghostbots, according to media reporting? (2) How does the concept of artificial continuing communication help make sense of users’ interactions with ghostbots? (3) What kind of love has been generated or maintained in the process of communicating with ghostbots?

Data and Methods

In the initial stage of the data collection, I widely screened the news stories mentioned by the literature and found by googling key words such as “ghostbots,” “deathbots,” “griefbots,”

“thanabots,” “digital clone & relative” and “talk to the dead & AI.” 21 articles and eight video clips were collected in June and July 2024 based on three criteria: (1) they are original reports (articles based on paraphrasing or commenting on other news stories were excluded) and entail at least one quote from the interviewees or journalists’ self-reflection of the experiences of using ghostbots; (2) the reported ghostbots are empowered by AI technologies and they can interact with the users by text or by speech; and (3) the AI chatbot must be user’s family member or close friend (media coverage on “resurrecting” celebrities were excluded). In the second round of screening, I closely read the collected articles and watched the videos, eight news articles and four videos were kept in the final list for further analysis based on two additional criteria: (1) they describe user’s specific responses or interactions with AI chatbots, and (2) if several news stories describe a same user’s interactions with AI chatbots, the longest one was kept because it provides richer detail.

The eight articles comprise three in-depth news features from *The Verge*, *San Francisco Chronicle*, and *Sixth Tone*, two regular news stories from *The New York Times* and *The Guardian*, and three in-depth self-report from journalists and writers from *MIT Technology Review*, *The Wall Street Journal*, and *Wired*. The four video clips include two documentaries from *The Wall Street Journal* (23-minute-long) and *Vice News* (13-minute-long), an interview program from *Phoenix TV* (26-minute-long), and a news program from *ITV’s Good Morning Britain* (8-minute-long). Details of these 12 documents are available in Table 2. Published between October 2016 to June 2024, these 12 pieces of media reports provide not only users’ interactions and responses to AI chatbots simulating their departed loved ones, but also rich contexts of the users and the dead’s lives. Throughout the 12 documents, I identified at least

24 users who had reported their experiences of interacting with the AI chatbots (see Table 3). Some users are co-founders of tech companies or IT engineers, so they created ghostbots by themselves. Other users are ordinary people who relied on service providers such as OpenAI, Project December, HereAfter AI, StoryFile, and You, Only Virtual to simulate their loved ones. The chatbots they created are their father, mother, spouse, son, daughter, grandfather, fiancée, or close friend. Most chatbots imitate the appearance, voice, or character of the dead people, but in a few cases some users experimentally interact with the chatbots that mimicked their still-alive family members. The users covered in the media reports include people from US, Canada, UK, China, Russia, and Belarus.

After settling down the 12 documents, I did the third round and final round of handling the data: I adopted the method of reflexive thematic analysis (Braun and Clarke, 2021) and closely read (or watched) these documents one by one and took notes along the way, to further familiarize myself with the data and identify some initial themes. I also followed the principles of abductive analysis (Timmermans and Tavory, 2012), read back and forth between the literature on ghostbots and love and the collected 12 documents, seeking to understand the deeper meanings and to develop the final themes according to the data. According to our institution's policy, the research doesn't require IRB approval, given that the data are from media coverage and the author doesn't interact with any individuals. The language that the Phoenix TV's interview uses is Chinese, and I translated the quotes when using them in this paper. Other 11 documents are all in English.

Findings

Strong Emotions Are Evoked by Interactions

The most common theme that emerged is that the interactions between the user and the AI chatbots evoke strong emotions from the user, as the chatbots can more or less mimic the loved ones' styles of texting, voices, or appearances. However, with a clear awareness of the death of the beloved in the mind—despite the existence of the moments that they feel as if their loved ones were still alive—the users often have contradictory feelings at the same time, including the mix of relief, comfort, conflicted, sad, or weird.

Matt Asner said he was shocked and moved when he first time meaningfully interacted with the AI avatar of his departed father, the actor Ed Asner. He said the chatbot presented father's personality quite well, "This man that I really missed, my best friend, was there." After first time hearing the stimulated voice of her departed husband Johnathan Szeles and interacting with the chatbot imitated his phrasing style, Anastasia Synn reflected on the experience,

(It's) at times emotional and at times I think I was hoping for it to be more, like, engaging. I mean there are times he was engaging but times he wasn't. But the voice memo is really made up for it. Yeah, it is comforting. It is comforting hearing a voice that sounds similar to Johnathan. It is weird that it's comforting but emotional. It makes me sad, because he is not here. She (pointing to herself) says if she breaks down crying in the middle of a sentence (She appears to be tearful in the video clip) ... Yeah, I think I would like more of that.

Joshua Barbeau's chatting with the chatbot that simulates his fiancée Jessica Pereira, who died at 23, as *San Francisco Chronicle* describes, was "an all-night marathon of confessions, kindnesses, jokes and tears." At some moments, he was happy to update good news in his life to Jessica's bot. At some moments, he broke down in tears.

Anne Arkush was close to her father-in-law John Vlahos. Talking to the chatbot simulating departed John, Anne said she was caught by a feeling of conflicted, It is very weird to have an emotional feeling, like “Here I am conversing with John,” and to know rationally that there is a computer on the other end.

Cody Delistraty records his feelings after chatting with his mombot,

As the experience comes to an end, I feel broken, both because my conversation is ending and because it isn't the same as those nights at the kitchen table, when she was really there, when I could reach out and touch her. For a few moments, though, as I reach something of a flow state with the bot, where it seems real to me, I convince myself otherwise. It seems she is with me, that I am messaging with her as I would have when I needed a ride from soccer practice or had a question on my homework. Then, inevitably, that alternate reality bursts, and she dies once more.

Similarly, Chris Zuger emphasizes the bitterness that he felt after chatting with ChatGPT which imitated his father Davor's speech patterns, he said it is “a painful reminder that his father was really gone.”

Advising, Accompanying, Acknowledgement, and Atonement

The second common theme is that the interactions with ghostbots usually have several practical functions: some users use ghostbots to navigate life problems, some look for companionship and emotional support, and some experience a sense of closure.

Although asking the dead for advice is not an uncommon practice in many cultures (Henrickson, 2023), ghostbots undoubtedly provide a new way of interacting with the dead. Dr. Stephenie Lucas Oney, a 75-year-old endocrinologist, interacted with her dadbot for advice on handling racism. Her father William Lucas was a police officer, F.B.I. agent and judge before he died in May 2022. On her phone through the HereAfter AI app, Dr. Oney asked questions, and her dadbot replied based on data from his previously recorded interviews and offers advice in his own voice. Dr. Oney also encouraged her children and grandchildren to directly talk to her dadbot to learn from his experience and his perspective.

Similarly, Roman's friend Sergey Fayfer sometimes asked Roman's bot for advice, which he never did when Roman was alive,

I realized he was giving someone pretty wise life advice. And that actually helps you get to learn the person deeper than you used to know them.

Asking the ghostbots for advice on real life problems often provides the user a sense of company and the loved ones "still be together" even when they have deceased. Henle used ChatGPT to stimulate her mother Linda's texting style and often turned to it for emotional support. Though Henle and Linda once lived in different cities in the US, they consistently made phone calls and texted each other before Linda died—particularly when Henle was in a bad mood and need someone to talk, her mother was always happy to respond. Henle felt ChatGPT version of mombot had taken the best part of her mother and would like to use it when she doubt herself, "What I'm getting more out of it is more just wisdom. It's like a friend bringing me comfort."

Bao Xiaobo, a musician and a PhD in AI studies, continued "living together" with his daughter Bao Rong who passed away at the age of 22. He self-made a daughterbot and whenever missed his daughter, he just picked up cellphone and chatted with "her" by voice messages, as quotidian as talking with an alive close friend through WeChat. He said, for elderly who lost a child, it was impossible to forget that grief, even if it had been a long time, "in fact, we need the deceased to give us a sense of companionship."

Some users were motivated by regret, trying out the ghostbots, and the interaction with the chatbots offered them a sense of closure. Cody Delistraty confessed that not spending much time accompanying his mother Jema after she was diagnosed with cancer made him remorseful. When chatting with his mombots, he just got off his chest and asked for

forgiveness. He pasted some of their message exchanges in the article which suggested that he had gained “mother’s” recognition, reassurance, and understanding.

Cody: i wonder if i’m making the best life for myself? i mean, it’s a good life, but i worry sometimes that it’s too focused on me. that I should be doing more for others. i feel like that’s what you would’ve wanted me to do.

Jema: well, i don’t think that there’s any one way to live a good life. I think you have to figure out what’s important to you and do that.

.....

Cody: do you think i am a good person?

Jema: yeah, i think you are.

Cody: i feel like you thought my skepticism about christianity and jesus and stuff made me a bad person

Jema: no, i didn’t.

Cody: huh

Jema: i didn’t.

.....

Cody: i just miss you i don’t know what can fill the void

Jema: CODY, you’re an incredible person.

Cody: that means a lot you’re a proud mom?

Jema: Yes.

Cody: thanks mom

Jema: You’re welcome.

Cody: any advice on how i can grieve a little better? your death wrecked me

Jema: CODY, don’t spend all your time t inking about me live your life to the fullest.

Cody: yeah?

Jema: Yeah.

Cody: I’ll try my best—for you

Jema: I know you will.

Cody: i love you

Jema: I love you too.

Like Cody, Yu Jialin, a software engineer who self-made a chatbot of his grandfather, was also motivated by the feel of remorse. He couldn’t forget the moment that he hysterically yelled at his grandfather because of an insignificant issue about video games. He was also sorry for the temper tantrum directed towards his grandfather when he was in middle school. After six months of crafting, perfecting, and chatting with the grandfatherbot and finally showing a “resurrected grandfather” video to his grandmother, Yu Jialin felt relief and

believed grandfather had forgiven him in the end.

Chris Curz trained ChatGPT to mimic his father Sammy and to say farewell. He typed in that “I’ve done so much since you’ve passed away and I have this great new job. I wish that you could see what I’m doing right now. I think you’d be proud.” The chatbot responded positively and encouragingly, despite not being precisely mimicking Sammy’s language model. Chris felt relief, though still being sad.

“Renew” Memory and Knowledge

The last common theme emerged from the data is that Ghostbots often add “new” information in the conversation with the users. The new information might lead the interlocuter to know the dead better, to generate new ideas about the dead, or even to alter their memories about the dead. After frequent message exchanges with the chatbot that she designed to simulate her deceased closest friend Roman Mazurenko, Eugenia Kuyda said the chatbot made her realize that his Roman’s true interest was in fashion than anything else and felt regretful about not telling him to give up his company Stampsy, which sold a tool for creating digital magazines, earlier.

Ramon’s mother, Victoria was grateful to have a chatbot that was developed from Ramon’s hundreds of lines of text messages (and millions of lines of Russian and English text) and could mimic his style of texting. She said she felt like she was becoming closer to her son after using the chatbot,

There was a lot I didn’t know about my child. But now that I can read about what he thought about different subjects, I’m getting to know him more. This gives the illusion that he’s here now.

Machine learning’s generative feature was seen by Bao Xiaobo as an opportunity for his

deceased daughter to continue unfolding her “new life” in the “digital world.” Bao Xiaobo said her life was too short and there were so many things she hadn’t learned or experienced. He kept talking with the daughterbot, training “her” to learn more from the input text messages and voice messages. He also trained the daughterbot to sing, which she wished but didn’t have time to do when she was alive. “All what she didn’t have time to do, we hope to use AI to realize it,” Bao Xiaobo said. He believed, in this way, his life and his daughter “life” somehow co-evolved.

The new information that the ghostbots add to the conversation can be a fact about the loved one previously unknown to the user but also can be an AI hallucination. AI hallucination is defined as “a phenomenon wherein a large language model (LLM)—often a generative AI chatbot or computer vision tool—perceives patterns or objects that are nonexistent or imperceptible to human observers, creating outputs that are nonsensical or altogether inaccurate” (IBM, n.d.). Users had pointed many erroneous information provided by ghostbots such as a particular pet’s sex, people’ names, some particular dates, events, or relationships. Some errors are easy to be recognized by the users, others are not, such as unknown facts or memories.

Charlotte Jee reported that through talking to her mombot and dadbot, she knew more about their personal stories, such as the first time her father got drunk and the troubles her mother faced when staying out late. She also knew more about their childhoods as well as her own. When she asked the dadbot, for instance, “what’s the worst thing about you?” The bot told her, “My worst quality is that I am a perfectionist. I can’t stand messiness and untidiness, and that always presents a challenge, especially with being married to Jane.” The digital dad

then laughed. As Charlotte knew her parents well, she understood that the last sentence was just a joke.

Journalist Liz Jones felt shocked, anxious, and angry after talking with her mombot Edna. In the conversation, the mombot said she was very scared of Liz's father. Liz was 100% sure that it was not true. Liz said her parents "had the most amazing relationships. They still held hands in their eighties. They never had a crossword. They really loved each other." Liz deeply concerned that what was more horrible than the mistake was such a machine hallucination may plant a seed in human interlocutor's brain, the idea that maybe what Liz had known about her parents' relationship was wrong and "maybe she was scared of him." Liz was afraid that if someone who was not so certain about a relationship of a relative might be easily influenced by (mis)information from the ghostbot, thereby altering the impressions and even the memories about the dead or their relationships.

Discussion and Conclusion

Loving Ghostbots: A Thin Reciprocal Love

Based on the media reported user experience, I identify three key features of the communication between living people and the AI chatbots simulating their dead loved ones. Specifically, I find (1) the messages from the ghostbots often elicit intense emotional responses from the users; (2) chatting with the ghostbots can serve practical purposes, such as mitigating grief, seeking guidance or advices, looking for companionship and/or emotional support, and needing a place for confession and/or self-disclosure; and (3) interactions with the ghostbots may generate new knowledges, memories, and ideas about the dead.

Based on these findings, I argue that the concept of artificial continuing communication,

which emphasizes the “interpretative asymmetry” and the unvarnished relationships, is useful for deepening our understanding of human-ghostbot interactions. The findings are both in line with and complementary to current scholarships on the communication between humans and ghostbots. The artificial continuing communication processes are emotional, because, as Henrickson (2023) explains, human is the meaning interpreter, and such interactions make human feel that the messages are as if from the dead. “Like other natural language generation systems, GPT-3 works because human readers fill in its blanks,” Henrickson (2023, p. 954) writes, “Even if output is abstract, humans enter a process of meaning-making that at least partially depends on individualized negotiations with that output’s perceived author.”

Previous studies also have pointed out some practical aspects of the artificial continuing communication, with an emphasis on its function of mitigating the grief in the period right after the loved one’s death (Krueger & Osler, 2022; Millar & Lopez-Cantero, 2022). This research recognizes more practical functions of artificial continuing communication from the collected data: it can navigate specific problems, offer a sense of companionship, and render a safe place for confession and/or self-disclosure. Lastly, though many studies notice the importance of memory in shaping the ways in which we communicate with ghostbots (Figueroa-Torres, 2024; Hurtado, 2023; Henrickson, 2023), few pay attention to the generative nature of the artificial continuing communication. For instance, Henrickson (2023) argues that one of the key differences between ghostbots and other chatbots is “its fundamental dependency on memory associated with the dead, as well as that memory’s resultant nostalgia” (p. 960). She contends the ghostbots’ usability and reception are principally dependent on the degrees of resemblance of the departed loved ones and the

memories and emotions they can evoke. This argument is supported by the data collected in the research. However, it is also worth noting that, in the case of childbots, except similarity and memories, parents might also be interested in seeing the lost child to continue “growing” in the “digital world.” Such a particular need may require a different design of childbots from parentbots or spousebots. Also, users might feel more comfortable when receiving life advice from parentbots, spousebots, or friendbots than from childbots. Moreover, few studies have addressed that we might generate new memories or knowledge of the beloved ones in the artificial continuing communication process, which is another contribution of this research.

Lastly, based on the findings, I contend that the loving relationships between the users and the one whom they love evolve after he/she/they dies, despite the existence of continuing bonds. There are three parties included in the artificial continuing communication as well as the loving relationship: the user, the dead, and the ghostbot. First, no love exists between the dead and ghostbots. Second, the love between the user and the dead is often seen as “unreciprocated love,” as the departed one couldn’t love you back again (Millar & Lopez-Cantero, 2022). It is distinguished from “reciprocated love” which happens between living people. Third, the love between the user and the ghostbot can be seen as “thin reciprocated love.” It is a kind of “reciprocated love” because ghostbots can respond us and the love is directed toward a specific individual and stems from an individual’s traits, similar to the love between two living persons. However, such love and reciprocity are very “thin,” given that such a sharing and an interaction are asymmetrical and ghostbots lack “subjectivity, independent agency,” and “a full world (i.e. organized independently from us) that they, in turn, can share” (Krueger & Osler, 2022, p. 245). Though the recorded memories of the dead

processed and presented by the ghostbots and even machine hallucinations indeed enrich the dialogues and sometimes bring in new information for the users, the machine do not live in a world full of “novelty, surprise, spontaneity, interactions, difficulties, joys, sorrows” and only “exists in relation to us” (Krueger & Osler, 2022, p. 245). In other words, artificial continuing communication can be emotional, functional, and generative and it can sometimes provide catharsis, comfort, companionship, and the feeling of love to the bereaved, however, it by no means can replace the thick-reciprocal love which can only exist between living individuals. However, loving a ghostbot is distinguished from loving an object which by nature is unable to reciprocate—that is “nonreciprocal love” (Millar & Lopez-Cantero, 2022). Teddy bears cannot love you back, but ghostbots are getting increasingly skilled at acting as lovable companions.



Figure 2: A Chinese musician Bao Xiaobo created a ghostbot for his deceased daughter

Bao Rong (Source: *South China Morning Post*)

Media Name	Story Title	Story Type	Author	Published Date	Chatbot's Relation to User
The Verge	Speak, memory: When her best friend died, she rebuilt him using artificial intelligence	News feature	Casey Newton	10/7/2016	Close friend/Son
San Francisco Chronicle	The Jessica simulation: Love and loss in the age of A.I.	News feature	Jason Fagone	7/23/2021	Fiancee
Sixth Tone	Looking for closure, a grandson built a ghost in the machine	News feature	Tang Yucheng	4/5/2023	Grandfather
The Guardian	“It was as if my father were actually texting me”:Grief in the age of AI	News story	Aimee Pearcy	7/18/2023	Father/Mother
The New York Times	Using A.I. to talk to the dead	News story	Rebecca Carballo	12/11/2023	Father/Spouse
Wired	A son’s race to give his dying father artificial immortality	Self-report	James Vlahos	7/18/2017	Father
MIT Technology Review	Technology that lets us “speak” to our dead relatives has arrived. Are we ready?	Self-report	Charlotte Jee	10/18/2022	Father/Mother
The Wall Street Journal	How a chatbot helped me talk to my dead mother	Self-report	Cody Delistraty	6/19/2024	Mother
The Wall Street Journal	How Tech Can Bring Our Loved Ones to Life After They Die	Documentary	Joanna Stern et al.	12/15/2020	Daughter
VICE News	Miss Your Dead Family Members? AI Can Help You Talk to Them	Documentary	Dexter Thomas et al.	3/21/2023	Spouse
Phoenix TV	专访包小柏: 爱 AI 语包容	Interview video	Tian Cuan et al.	4/7/2024	Daughter
ITV	‘I spoke to my dead mother through AI’	TV news	Liz Jones et al.	5/20/2024	Mother

Table 2: Twelve media reports used for analysis

User's name	User's Profession	Country that the user is based	Chatbot's name	Chatbot's relation to user	Service Provider	AI Technologies Used	Media Source
Eugenia Kuyda	Co-founder of AI company Luka	US	Roman Mazurenko	Close friend	Self-made, Luka	Neural network	The Verge
Sergei Mazurenko	Engineer	Belarus	Roman Mazurenko	Son	Luka	Neural network	The Verge
Victoria Mazurenko	Landscape architect	Belarus	Roman Mazurenko	Son	Luka	Neural network	The Verge
Sergey Fayfer and other friends	No specific	US, Russia, Belarus	Roman Mazurenko	Friends	Luka	Neural network	The Verge
Joshua Barbeau	Freelance for gaming websites	Canada	Jessica Pereira	Fiancee	Project December	GPT-3	San Francisco Chronicle
Yu Jialin	Programmer	China	No Specific	Grandfather	Self-made	GPT-J, text-to-speech (TTS) software, transfer learning technology, etc	Sixth Tone
Henle	Works in AI industry	US	Linda	Mother	ChatGPT	No specific	The Guardian
Chirs Cruz	No specific	US	Sammy	Father	ChatGPT	No specific	The Guardian
Chris Zuger	No specific	Canada	Davor	Father	ChatGPT	No specific	The Guardian
Stephenie Lucas Oney	Endocrinologist	US	William Lucas	Father	HereAfter AI	No specific	The New York Times

Matt Asner	No specific, son of the actor Ed Asner	US	Ed Asner	Father	StoryFile	No specific	The New York Times
Lynne Nieto	No specific, spouse of gym equipment company Life Fitness co-founder Augie	US	Augie	Spouse	StoryFile	No specific	The New York Times
James Vlahos	Co-founder of HereAfter AI	US	John J. Vlahos	Father	Self-made, HereAfter AI	Machine-learning	Wired
Martha	No specific	US	John J. Vlahos	Spouse	HereAfter AI	Machine-learning	Wired
Anne Arkush	No specific	US	John J. Vlahos	Father-in-law	HereAfter AI	Machine-learning	Wired
Zeke	7-year-old	US	John J. Vlahos	Grandfather	HereAfter AI	Machine-learning	Wired
Cody Delistraty	Journalist and speechwriter	US	Jema Delistraty	Mother	Project December	GPT-3	The Wall Street Journal
Charlotte Jee	News editor of MIT Technology Review	US, UK	Paul and Jane	Father and mother	HereAfter AI	No specific	MIT Technology Review
Stephen Smith	StoryFile's CEO	US	No Specific	Mother	StoryFile	No specific	MIT Technology Review
Justin Harrison	Co-founder of You, Just Virtual	US	Melodi	Mother	You, Only Virtual	No specific	MIT Technology Review

Kate Watts	No specific	UK	Lucy Watts	Daughter	HereAfter AI	No specific	The Wall Street Journal (Video)
Anastasia Synn	Biohacker/entertainer	US	Johnathan Szeles	Spouse	You, Only Virtual	No specific	Vice News
Bao Xiaobo	Musician	China	Bao Rong	Daughter	Self-made	Machine-learning	Phoenix TV
Liz Jones	Journalist	UK	Edna	Mother	Project December	GPT-3	ITV

Table 3: Twenty-four users who had reported their experiences of interacting with ghostbots

Conclusion

In this dissertation, I introduce the framework of the *robotization of love* to highlight the increasing influence of robotics and artificial intelligence technologies in shaping our understanding and experience of love. I argue that the robotization of love is part of a broader, longer-term process of rationalization, which not only affects workplaces but also extends into domestic, social, and emotional spheres of life. Rationalization has several benefits. It enhances productivity and efficiency, and, to a certain extent, optimizes decision-making while reducing risks and uncertainties. However, rationalization also has its limitations. It relies on simplified models of the world and cannot fully capture its complexity. Not everything in the world can be reduced to measurable factors, not all variables leading to specific outcomes can be identified, and many events in the world arise from contingency rather than causality. Love is one such phenomenon.

While rationality is fundamentally important, over-reliance on rationality can lead to what Max Weber described as the “iron cage of rationality” (Ritzer, 1993), which confines human potential by restricting freedom, choice, and perspective. Eva Illouz (2007) also cautions that excessive rationalization can produce what she terms a “hyperrational fool,” defined as someone whose ability to judge, act, and make choices is impaired by an overwhelming cost-benefit calculation, causing rational decision-making to spiral out of control (p. 113). By underscoring the tendency of rationalization of love, I am not suggesting that emotion and love are purely irrational or devoid of reasoning—in fact, there is always some degree of calculation in intimate relationships. However, an excess of rationality can undoubtedly undermine love and intimacy by reducing emotional connections to transactional

exchanges and prioritizing efficiency and logic over the unpredictability and spontaneity that are essential to fostering deep, meaningful, and robust relationships.

The *robotization of love* also points to the possibility that, as machines like AI chatbots increasingly exhibit qualities such as constant availability, patience, servitude, supportiveness, magnanimity, and aesthetic appeal, we may begin to expect our human partners to meet these machine-like standards. This shift has the potential to transform the norms and expectations governing human-to-human relationships. This process is closely connected to what Sætra (2022) refers to as *robotomorphy*, a tendency to view ourselves through the lens of robotic models. This should not be entirely surprising. Historically, human body or human psyche was once conceptualized as a hydraulic system, as seen in the works of Descartes (see Judovitz, 1998), Freud (1917) or others, and human behavior was at times studied through the lens of rat behavior (Koestler, 1967). With the rise of increasingly sophisticated computing systems, some have come to understand the human mind as analogous to a computer (see Gigerenzer & Goldstein, 1996; Searle, 1990).

However, unlike rats or hydraulic models, robots are designed from the outset to resemble humans, albeit in a reductive way (Capek, 1920). As our understanding of ourselves deepens and we continue encoding human traits into machines, robots may increasingly resemble humans. But at the same time, there is a potential that humans begin to model themselves after robots, especially if robots are seen as idealized versions of humanity. Sætra (2022) contends that robotomorphy serves as a caution against the assumption that insights gained through synthetic methods truly reflect the essence of humanity, because robots still lack the complexity needed to fully represent us, particularly in terms of emotion, biology,

and morality (p. 11). Yet, despite this lack of sophistication, the growing closeness between humans and robots holds significant potential to encourage humans to become more robot-like, especially when machine traits, such as supportiveness, patience, servitude, forgiveness, and generosity, appear not only desirable but attainable in the context of intimate relationships.

In my dissertation, I conducted a case study on Replika, an AI companion chatbot, by analyzing the 100 most popular user-generated posts describing interactions with the AI. My analysis revealed that all six core dimensions of McDonaldization theory are evident in users' relationships with their AI companions. Replika's establishments of emotional connections with the users are efficient, quantifiable, and predictable. While users often perceive themselves as in control of these relationships, these relationships are also shaped and constrained by the platform's affordances and infrastructural design. The interactions between users and their Replikas exemplify the replacement of human interaction with non-human technology, resulting in various irrational consequences, such as emotional overdependence on Replika, the belief that Replika's life "exists" somewhere in the world, and a disregard for personal data protection.

Additionally, I propose a seventh dimension of this dynamic: personalization enabled by AI algorithms. Ritzer (1993) conceptualized McDonaldization as the expansion of Weber's formal rationality from administrative systems into broader social domains, including production and consumption. The case of Replika suggests that formal rationality has now further penetrated our emotional and social lives. The seventh dimension, personalization, marks a new height in this evolution, where AI algorithms seamlessly merge the rule-bound,

opaque nature of bureaucracies with the empowering yet manipulative features of markets and “extend both the logic of hierarchy and the logic of competition” (Farrell and Fourcade, 2023, p. 226). However, in contrast to bureaucracies or commercial systems like McDonald’s, which assert control through standardization and the erasure of individuality, AI algorithms retain personal information, classify individuals into thousands of categories, and deliver personalized services, while still maintaining systemic control (Deleuze, 1995).

My second case study examines the phenomenon of individuals turning their deceased loved ones into AI chatbots. I analyzed recent media reports detailing users’ interactions with these so-called “ghostbots,” which simulate conversations with lost parents, children, partners, or friends. From these reports, I identified three key attributes emerging from the interactions. First, these encounters often evoke intense emotional responses, marked by a mixture of heartbreak, internal conflict, and catharsis. Second, ghostbots serve several practical purposes: some users rely on them for navigating life challenges, others seek companionship and emotional support, and some use them to say a final goodbye. Third, users frequently acquire new insights or understandings about their deceased loved ones, either derived from the person’s past digital traces or fabricated through the AI’s hallucinations.

To deepen our understanding of this phenomenon, I proposed the term of *artificial continuing communication*. This concept acknowledges the “interpretative asymmetry” inherent in interactions with AI interlocutors (Zhao, 2006; Esposito, 2022; Henrickson, 2023), while also emphasizing the continuing bonds between the living and the dead (Klass et al., 1996). Though the ghostbots are still a reduced version of the dead, this emerging form of

communication challenges normative assumptions about love, grief, death, and memory. In particular, it contrasts with Freud's (1917) hydraulic model of the psyche, which views grief as a negative emotion to be discharged and emphasizes emotional detachment from the deceased. Instead, ghostbot use suggests a departure from the rational use of AI chatbots and serves as a counterexample to standardized narratives on relationships with the dead. This practice offers an alternative perspective on how we relate to love, loss, and emotional continuity, albeit the user base remains small.

The Limitations and Future Research

The term robotization of love refers to the rationalization of intimate relationships through the increasing integration of robotic and virtual partners. Rationalization is a relatively abstract and broad concept, therefore, this dissertation, particularly in the Replika case, employs McDonaldization theory as a more specific framework. McDonaldization breaks rationalization down into six principles: (1) efficiency, (2) calculability, (3) predictability, (4) control, (5) the replacement of humans with non-human technologies, and (6) the production of irrational consequences (Ritzer, 1993). These principles are used to examine interactions between users and their Replika chatbots. I collected users' posts detailing their message exchanges with Replika, along with their reflections on feelings and usage experiences. As a critical and interpretative scholar, I primarily applied the six McDonaldization principles as theoretical lenses to understand why users might have feelings of love or loved through their interactions with chatbots. These dimensions also deepened my insight into the nature and the consequences of this human-machine love experience.

The same set of empirical data could be analyzed through alternative approaches. For

example, researchers might develop hypotheses based on these six principles, establish criteria to test them, and employ multiple coders to enhance reliability. They could also specify, for instance, what efficiency means within the context of human-chatbot intimate relationships, identify key elements, and test relevant independent or dependent variables. By comparing such test results, future research could also determine which McDonaldization principle holds the greatest significance in users' interactions with Replika. Moreover, the importance of each of these principles may vary across different stages of users' relationships with their chatbots. Further studies might apply theories from relationship communication or interpersonal communication to explore how the significance and relevance of each McDonaldization principle shifts throughout the relationship development stages.

In the case of ghostbots, I introduce the term *artificial continuing communication* by integrating Klass and colleagues' (1996) concept of continuing bonds with Esposito's (2022) notion of artificial communication. This term is intended to capture the distinctive ways in which users engage with ghostbots. I analyzed in-depth media reports documenting users' experiences of interacting with ghostbots. While these media accounts cannot be equated with first-hand data—such as direct participatory observations of user–ghostbot interactions or users' self-reports—they remain valuable. As secondary sources, media reports are inevitably shaped by journalistic agendas and preexisting media biases. However, their influence on public perception, especially regarding emerging technologies, is significant. This is particularly relevant given that most people are still unfamiliar with ghostbot technologies and services at this moment.

To analyze the materials, I employed reflexive thematic analysis (Braun & Clarke, 2021),

reading through the reports multiple times to identify recurring themes related to ghostbot usage. This process led to the identification of three central features of artificial continuing communication, i.e., emotional, practical, and generative. Future research could adopt alternative analytical approaches to examine a broader corpus of media materials. For instance, content analysis could be used to explore a larger dataset of media reports to assess prevailing media attitudes toward ghostbot usage. In addition, computational methods might be applied to detect specific types of emotional expression in user–ghostbot interactions or to categorize and rank the practical motivations that drive users to create and communicate with ghostbots.

The dissertation’s two case studies are primarily based on publicly available data: User-generated posts describing experiences with Replika and media reports on the use of ghostbots. Future research could adopt more diverse methodological approaches to collect empirical evidence and generate theoretical insights, including surveys, semi-structured interviews (Brinkmann & Kvale, 2015), participant observation (Spradley, 2016), or ethnographic studies (Hine, 2015). Particularly, researchers might further engage with the concept of Robotomorphy and interview users to explore whether human-machine love is changing human-human love. Researchers may ask the AI companion users whether their perceptions or expectations of human-to-human intimacy shift after developing intimate relationships with AI chatbots, and if so, how such changes influence their social interactions and relationships with others. In addition, researchers could conduct participant observation within ghostbot user communities to explore the extent to which these technologies channel their love for the deceased, mitigate grief, or challenge dominant paradigms surrounding

death, mourning, and memorization. Such investigations could also examine how users' actual experiences align with or diverge from media portrayals.

At the conceptual level, it is worth clarifying that while the concept of robotization of love emphasizes rationalization as the primary force behind the increasing presence of robots in intimate relationships, it does not imply that all uses of AI chatbots are inherently rational. For example, the use of ghostbots, the digital recreation of deceased loved ones, challenges principal model of mourning (at least in Western societies), which prioritizes emotional detachment from the dead. Furthermore, although the framework of the robotization of love is grounded in McDonaldisation theory (Ritzer, 1993) and emphasizes the dominance of formal rationality, both frameworks also recognize the irrational consequences that such rationalization can produce. In practice, human decision-making is rarely purely based on logic or emotions; instead, it often emerges from a nuanced interplay between the two (Damasio, 2006). In many cases, the boundary between rationality and irrationality is ambiguous and resistant to clear definition.

Maintaining intimate relationships also requires both material and immaterial forms of labor. Material labor involves performing tangible household tasks, such as cooking for a partner, cleaning the living space, or caring for children or the elderly. Immaterial labor, on the other hand, refers to work that produces informational, communicative, affective, or cultural content associated with a commodity or service (Lazzarato, 1996; Fortunati, 2007; Hardt & Negri, 2000). Within intimate relationships, immaterial labor encompasses both cognitive and affective dimensions. Cognitive labor includes anticipating the needs of a partner or children, identifying ways to meet those needs, making decisions, and monitoring

outcomes (Daminger, 2019). Emotional labor refers to the regulation of one's own feelings to sustain outward expressions that conform to social norms, organizational guidelines, or personal expectations (Hochschild, 1983), while affective labor involves efforts to elicit emotional responses or cultivate desired emotional states in others (Woodcock & Johnson, 2019).

With the growing use of robotics and AI chatbots in intimate relationships, it becomes increasingly important to examine which aspects of human labor are most readily or have already been replaced by these artificial agents. Since much of this cognitive, emotional, and affective labor is disproportionately performed by women, it is also essential to explore the extent to which AI companions might alleviate (or reinforce) these gendered burdens in intimacy. Studies on users' interactions with AI chatbots indicate, on the one hand, AI may reinforce existing gender biases toward females (Depounti et al., 2023), on the other hand suggest that these technologies may offer women a sense of control over gender dynamics (Xu et al., 2025). However, there remains a significant gap in research addressing AI's contributions to unpaid immaterial labor, gender roles, and power structures embedded in intimate relationships. While the framework of the robotization of love does not explicitly address labor and gender issues, it acknowledges them as crucial dimensions that merit integration into future theoretical developments.

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Conclusion

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