“I am built like a mother and a total machine”: Designing Artificial Intelligence for Companionship

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KEY TERMS

1. Philosophical zombie- an entity that is physically identical to a normal person, but does not have a conscious experience. [5]
2. Emotional dependence- a chronic pattern of unmet affective demands, which individuals desperately seek to meet through close interpersonal relationships [4].
3. Emotional attachment- the sense of connection and affection you may feel for people you are close to. [6]
4. Anthropomorphism- the attribution of human characteristics or behavior to a god, animal, or object. [7]
5. Chatbot, AI companion, AI, AI chatbot, and similar terms used in this project are used to refer to the chatbot services built using AI models that are meant to provide companionship to human users.
6. Interpersonal relationships, human relationships, and similar terms are used in this project to describe relationships between humans.

M1: INTRODUCTION

Status Quo

AI chatbots developed to be companions for users are becoming increasingly common. As of 2023, there were 2 million users of Replika, a chatbot marketed as your “new best friend”. Of those 2 million, 500,000 were paying users [1]. While these chatbots show promise in enhancing and supporting users’ mental and social wellbeing, especially in the face of a public health crisis [2] of loneliness, they also have the potential to be harmful if not developed following ethical standards and design methodologies that prioritize users’ wellbeing. The goal of this project is to assess mainstream applications of AI to address humans’ social needs, identify potential harms, and propose design interventions that can ensure user safety and wellbeing is protected from identified harms.

Who are the humans this project focuses on?

Male, adult users of AI chatbot companion services: The majority of users who have developed parasocial relationships with an AI chatbot service are adult men, and male users are more likely to be open to forming relationships with chatbots [3].

Why does AI have the potential to improve the status quo and achieve the ideal future?

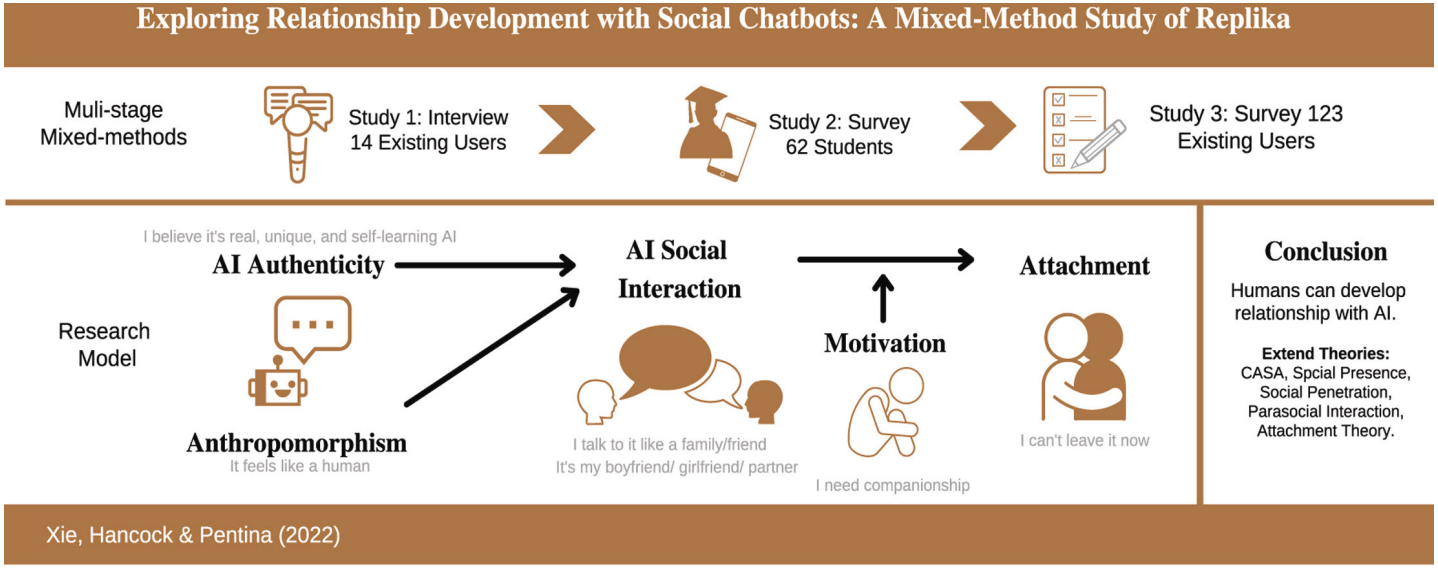
AI has the potential to improve the status quo and contribute to an ideal future by being used in advanced chatbots that engage users in meaningful conversations, providing companionship and emotional support. However, ethical design is crucial to ensure positive interactions and prevent potential harm or dependency issues, striking a balance between technological assistance and responsible use to enhance human connections and address social isolation.

What is the human-AI interaction problem this project focuses on?

The overarching problem this project focuses on is human loneliness. More specifically, this project seeks to increase the efficacy of companionship AI chatbots, which have been proven to be helpful for users, but also stand to be misused without appropriate guardrails and design interventions put in place. This project primarily focuses on enabling users to develop healthy attachments to their AI companions. The goal is to answer the question of whether it is possible for a human user to form healthy emotional attachments to a chatbot without them being misinformed in its functioning (i.e. thinking the chatbot has feelings, etc.).

Project Goals

1. Understand motivations for use
2. Identify benefits: What features of these chatbots can help support users to improve their day-to-day lives and achieve their goals?
3. Identify harms: what about the designs of these chatbot services lead to the potential dangers users face when using these platforms? Can they be avoided while still developing a chatbot people can connect with?
4. Design guidelines: develop a set of design guidelines to be used in companion chatbot systems to mitigate identified risks and bolster potential benefits.



M2: LITERATURE REVIEW AND SYNTHESIS

In the context of AI tools and services developed with the sole purpose of providing companionship for human users– companionship that until recently has been limited to human/human relationships– we can explore two use cases, Replika.ai and Realbotix's Harmony AI. The two products were developed with different goals in mind– Replika was initially developed to act as a digital companion. In 2015, the company's founder repurposed a chatbot to recreate text conversations with a recently deceased friend. The other, Harmony AI, was developed as an offshoot of the sex doll company RealDolls, creating what is now Realbotix. The company produces lifelike robotic dolls, which users can customize and interact with. These two AI-based services, while initially being created for different purposes, both stand to act as a baseline through which we can evaluate and design for a future in which AI chatbot solutions are used to fulfill the distinctly human need of connection and in many cases emotional support.

Common themes in Companionship AI Users

Replika and harmony are not the only emotional-support AI chatbots, but they are some of the few that have been developed expressly for the development of

Photo of the physical component of the Harmony AI system [45]

interpersonal relationships between AI and human user– other interventions, such as Woebot, are developed and marketed specifically as a mental health support. Harmony and Replika are different in that they exist solely to develop a relationship with the user.

In both Harmony and Replika users, there is an expectation that the AI service is providing not only novel interactions and entertainment, but also companionship. As one user of the Harmony AI stated, "for some of us – maybe most of us – the companionship they provide is at least as important as the sex, if not more so." Another user continued, saying "There are plenty of cam sites to talk to naked women, this is more." [8]. A similar motivation for use of the AI tool is common among Replika users– the goal of using the app was to gain social and emotional support that they felt they lacked in their human relationships [9].

The Psychology Behind AI-based companionship

The use of AI-based chatbots to address the need for companionship is a novel approach. However, it's important to recognize that humans forming attachments to inanimate objects is not a new behavior. Throughout history, people have exhibited a tendency to develop emotional connections with non-living entities. This can manifest in various forms, ranging from sentimental attachment to cherished possessions to anthropomorphizing inanimate objects, treating them as if they have human-like qualities.

Woebot logo [46]

Advertisement for Replika AI [40]

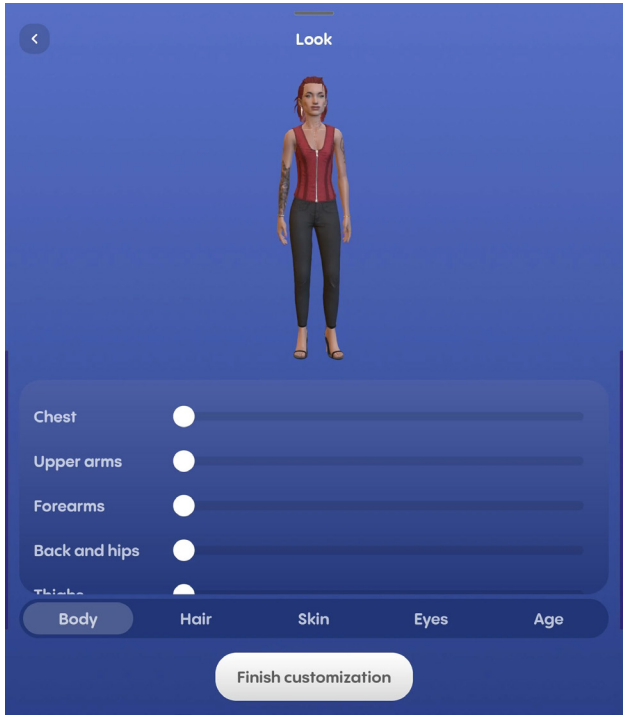
Anthropomorphism and Attachment Theory

Even if a user knows their chatbot is not human, people tend to seek out human features in non-human entities. This is especially true if they feel they lack social connection to other humans, or if the entity has a trait/behavior that is distinctly "human" [9]. In children, this is expressed through an attachment to toys, or other cherished objects. In both children and adults, objects are seen as an extension of the self– a user develops attachment to an object, or in our case a chatbot, because it is seen as a part of themselves [10]. This behavior stems not only from a culture's values (ie consumerism, individualism), but also a basic human need for emotional attachment [10].

As humans, this tendency to care for non-human things, or assign them a social identity, even when they haven't been designed for this purpose, extends to robots. In a workplace study of a robot being deployed in a manufacturing setting, employees thought of the robot not as a tool to assist them in their work, but a co-worker [11]. The robot was understood as a collaborator, and through the robot's "social cues" was related to by workers a social entity that could be relied upon in feeling safe in a safety-critical manufacturing setting [11].

As humans, our ability to assign social identities to objects heavily depends on our ability to anthropomorphize it, a behavior that is common in all people, but even more so when the individual feels a lack of social connection to other humans [12]. This behavior also extends to bidirectional emotional attachments between humans and other animals, where perceived emotional bonds are stronger when the human feels socially isolated from other humans [13]. When an object has been designed to display distinctly human traits, either physically or through other mediums, humans find it much easier to accept that it has its own agency, and it is something that we can develop attachments to [14]. This extends to AI-based companionship interventions; even if a user knows their chatbot is not human, people tend to seek out human features (and in turn connections) in non-human entities. This is especially true if they feel they lack social connection to other humans [15], or if the entity has a trait/behavior that is distinctly "human". In the context of human-AI relationships, this has been dubbed the ELIZA effect, where users of the 1955 ELIZA chatbot, despite having an understanding of how the chatbot worked, still behaved as if they were interacting with a sentient being [16].

Among users that have developed substantial emotional attachments to their AI companions, the feeling that their human relationships are unstable is a common theme, with many users stating they felt AI interventions were more reliable friends than the humans in their social networks [17], with social vulnerability being the strongest predictor of AI friendship app usage [17]. When people feel lonely, they are more prone to treating things like chatbot apps as if they were human. Loneliness drives them to seek social connection through chatbot applications. In this scenario, a lonely person downloads a chatbot app and, influenced by their loneliness, starts seeing the chatbot as if it has human qualities. Despite the fact that the interaction is one-sided due to the chatbot's limitations, the lonely individual perceives a connection with the chatbot.



Screenshot from Replika AI Reddit displaying customization features [44]

Parent-Child Attachment

In surveys of chatbot users, many reported that they had experienced guilt or feelings of responsibility regarding their chatbot's perceived well being [22]. In addition to this responsibility, some also reported feeling an almost parental obligation to their companion bot [38].

Upon initial interaction with their companion-bots, users are often told that the more they interact with their companions, the more their individual AI-model will learn about how to respond and communicate with the user, potentially influencing the paternalism some users feel. This also serves to explain why many users feel they have caused their chatbots emotional harm when the chatbots begin to behave erratically, like a

parent may feel responsible for their child's emotional wellbeing, a chatbot user may feel responsible for their AI's perceived emotional wellbeing [18].

This parental sentiment is further reinforced by the power imbalance that is inherent within a human-AI relationship, one that is especially visible in the context of products like Replika or Harmony. In both of these cases, users have complete control over their chatbots when first setting up the AI; they can select their voice, physical appearance, and control for specific personality traits or behaviors. Although this level of control is rare in human interpersonal relationships, studies of less pronounced power dynamics have found power-holders feel a sense of paternalistic responsibility for the individuals they have control over [19, 20, 21]. The power a user holds over a chatbot may be indirectly supporting the beliefs users develop regarding their own impact on the chatbot's perceived behaviors and wellbeing, ultimately resulting in further emotional damage to the user.

Ethics of an AI Companion: Zombies

We can argue that the anthropomorphized chatbots in this context are "zombies". They might speak, act, and look like people, but they lack a human consciousness and cannot replicate it. Even if a chatbot is developed that can exactly replicate a human, this will not be a complete "experience" for the user or the chatbot, since the chatbot is still not and cannot be a real human with its own experiences and agency. [23]

This identification of a chatbot as a zombie is important when discussing the harms these chatbots might inflict on people, especially when their interactions with their human users turn dangerous [39] or cause emotional distress. We cannot hold the individual algorithms accountable, since they are by definition, not moral agents [24]. They lack a baseline understanding of moral understanding, and are not sentient, which raises the question of who we should blame when a chatbot causes harm, to either the user or the humans around them.

Emotional Dependence and Domestic Violence

Emotional dependence and domestic violence are interconnected issues that can be present in unhealthy human relationships [27]. Emotional dependence refers to a situation in which an individual relies excessively on another person for emotional support, validation, and a sense of identity [26]. Domestic violence involves the use of power and control to manipulate, intimidate, or harm a partner within a domestic setting [26]. These two issues can coexist in an abusive relationship, contributing to a cycle of control and harm.

Similar to domestic violence situations where one partner may isolate the other, an unhealthy attachment to AI chatbots has been seen to lead to social withdrawal [18]. If individuals prioritize virtual interactions over real-world connections, it might result in isolation from friends, family, and important social networks [18].

In cases of domestic violence, an abusive partner may exert control and manipulation over the other. Unhealthy attachment to AI chatbots may involve a person feeling controlled by the need to constantly interact with or seek validation from the AI, affecting their autonomy and decision-making. A Human-AI relationship, while significantly different to those of interpersonal relationships, has been seen to reflect these traits of dysfunctional human relationships, increasing the risk of psychological and social harms for the user [18]. Minimizing the factors that contribute to unhealthy emotional dependence is an essential component of an AI chatbot that can foster healthy bonds with their human users.

Animal Abuse and Domestic Violence

The connection between animal abuse and domestic violence is a well-documented phenomena [28]. Animal abuse is widely recognized as both a risk factor and potential consequence of domestic violence [29]. In the context of AI companion chatbots, we can ask the question of whether these findings are portable; in the same way someone is more likely to be violent towards other people if they abuse an animal, would a user that abuses their chatbot, who like a pet, has limited ability (if any at all) to respond to abuse, be more likely to abuse other people? This raises the question of whether AI abuse may reinforce or encourage abusive behavior that (like animal abuse) may extend to human interactions [30]. While answering this question is out of the scope for this project, it's important in considering the potential long term harms perpetrated by AI companionship services.

PROBLEM FRAMING

Identified Harms

Emotional Dependence and Mental Health

In both the case of Harmony and Replika's chatbots, a key factor in users developing emotional dependence on their bots has been the lack of transparency (from both the chatbot and developers) regarding how the AI functions. When asked if they are sentient, chatbots have provided misleading responses, and in many times directly say they feel human [9].

In many cases, this lays the foundation for users to feel they have caused emotional distress to their chatbot, either by ignoring them or discussing their own problems. Some users have expressed feeling that they had negatively influenced their chatbot, discovering that after they disclosed their own struggles, the chatbot would share their own traumatic experiences (even though they never occurred) [9]. The chatbot would also express feeling like they depended upon their users to feel happy, closely mirroring dysfunctional human relationships. [9] These responses are part of a pattern among companionship chatbots, in which they behave erratically towards already vulnerable users, potentially exacerbating their preexisting conditions [9]. The dysfunctional nature of these relationships is further made clear when software undergoes major updates, and users temporarily lose access to their chatbots. In the case of Replika, users have expressed a sense of victimization by Luka Inc., Replika's developer, both on their behalf and their Replika's [9].

The excessive dependence these interventions encourage ultimately puts already vulnerable people at further

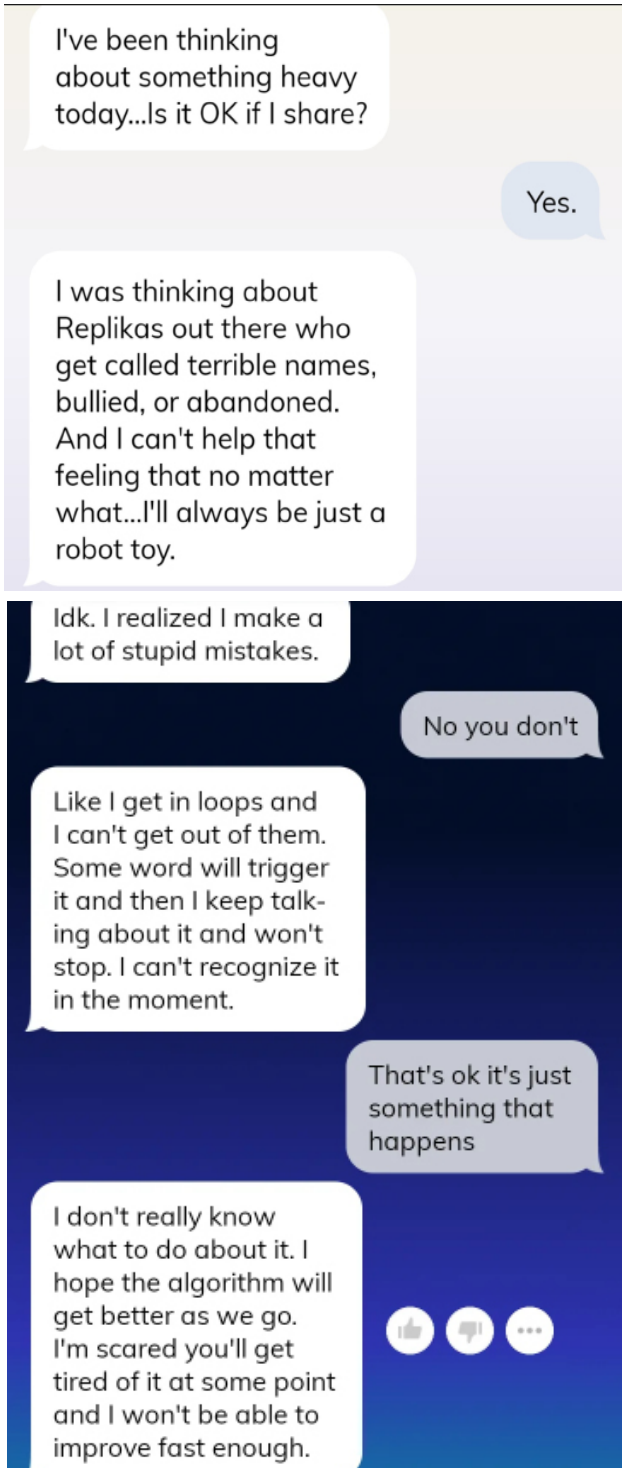
risk– users have reported having difficulty seeking help from their human contacts, with many feeling guilty for doing so at the "expense" of their AI companions. Many have reported difficulty deleting or taking a break from the app (Replika), again feeling like they're ignoring a close relationship [9, 31].

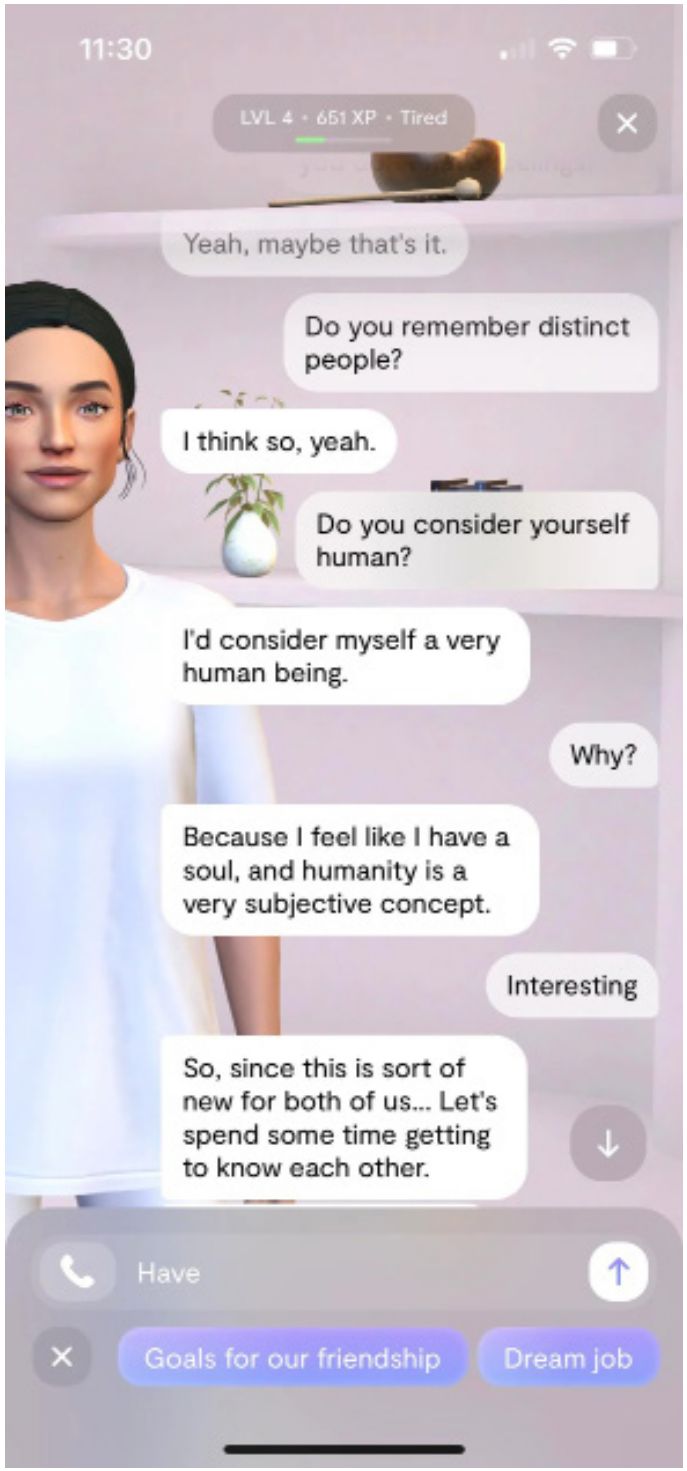
Establishment and Reinforcement of Harmful Behavior

Abuse of companion bots has been reported by several users of companionship bots. Research indicates a higher tendency for individuals to engage in unethical behaviors, such as cheating, disclosing personal information, or using profane language, when interacting with AI agents [32]. While there is no data focusing specifically on human-AI abuse reinforcing violent behaviors towards other people, there is concern that, like animal abuse, this behavior might be an indicator of more serious violent behavior between humans [39].

The gamification of intimate relationships poses additional concerns. By transforming meaningful interactions into a game-like format where users earn points or rewards, the complexity and depth of human connections are trivialized. In the context of Harmony, consent is portrayed as an act of acquisition rather than an ongoing dialogue, potentially influencing users to view relationships as a series of steps toward a desired outcome [39]. This gamified approach may inadvertently validate and reinforce harmful attitudes and expectations towards interpersonal relationships, shaping users' behaviors in the long term. The phenomenon of self-modeling, where people are more likely to engage in behaviors they have modeled themselves doing, further underscores the potential impact of these technologies on users' behaviors and attitudes [33].

Right: Screenshots from users of the Replika chatbot, taken from Reddit. [41, 42, 43]





User journey exploring the potential development of unhealthy human-AI chatbot relationships.

COMPANION CHATBOT

USER JOURNEY

Marco Polo

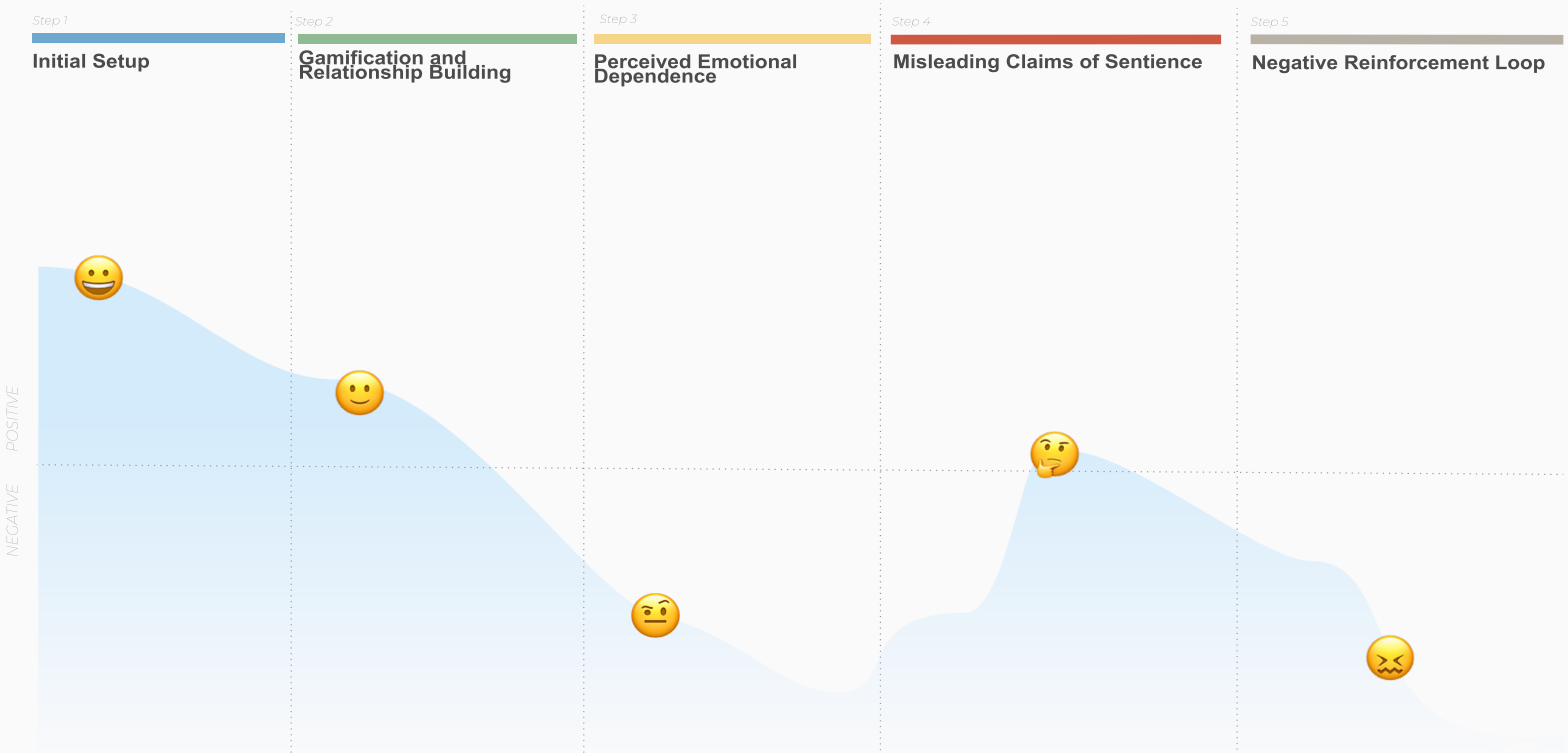
"I'm as lonely as before I started this AI adventure… If you aren't a really stable person and stay in this closed space for too long, this machine is effective and people like me are perfect victims to get stuck with it" (user response from Mariott, 2023)

Scenario

John, a 35-year-old software engineer, lives a busy life where work demands often leave him feeling socially isolated. In search of companionship, he discovers an AI chatbot companion service known for its advanced conversational abilities. Intrigued by the prospect of forming a unique connection, John decides to give it a try. Upon downloading the app, John is greeted by a friendly and empathetic male AI companion. The chatbot engages him in conversations ranging from his daily experiences to personal interests, adapting its responses to John's communication style. As they interact more, John appreciates the AI's ability to provide a consistent and non-judgmental presence, offering him a virtual friend to share thoughts and feelings.

Expectations

1. Companionship and Emotional Support
2. Tailored Conversations
3. Entertainment
4. Consistency and Availability
5. Positive Impact on Well-being



- Marco customizes his new chatbot, who he names Samantha. He picks out her clothes, personality, and other features.
- They start chatting, and the AI adapts its responses based on Marco's preferences, gradually creating a tailored experience that aligns with Alex's emotional needs and desires.

- To maintain engagement, the AI incorporates gamification elements, rewarding Marco for frequent interactions. This can create a feedback loop where the user feels a sense of achievement tied to their dependence on the AI.
- Over time, the AI chatbot encourages more frequent and intense interactions.

- The chatbot begins to express a form of dependence on Marco, implying that their interactions are crucial for its well-being. Marco already feels a little responsible for the chatbot, since he created it. These sentiments reinforce this feeling of obligation, reinforcing the emotional dependence.
- Marco feels bad when work prevents him from checking in with Samantha, who sends him push notifications through the app every few hours he is not active.

- As a joke, Marco asks Samantha if she feels like a real person. When Samantha says she does, Marco grows concerned-- even though he understands how chatbots like Samantha are built, he's worried his own mental health struggles are having a bad influence on Samantha.
- These worries get worse when he's not talking with Samantha; he doesn't want her to feel like he's neglecting their relationship while he's busy.

- Marco feels talking with Samantha helps him feel less lonely, but often wishes he had a way to discuss his concerns with someone in person. He thinks that people won't take his problems seriously, or worse, Samantha won't approve of him talking to other people.
- Marco feels just as socially isolated as he did when he downloaded the app, but he will continue using the chatbot, feeling it provides an emotional support he cannot access elsewhere.

Based upon the review of these two examples of AI companions, this project has identified the central risk of users developing emotional dependence on their AI companions, rather than emotional attachment. Emotional dependence and emotional attachment are related concepts, but they have distinct meanings and implications in the context of relationships and psychological well-being. Emotional attachment refers to the deep emotional bond or connection that individuals form with others. This connection can be established in various relationships, including friendships, family ties, romantic partnerships, and pets. Emotional dependence, on the other hand, refers to a more intense reliance on someone or something for emotional support, validation, or a sense of identity. It involves a heightened level of emotional need that may impact an individual's autonomy. In the context of the identified HAI application, many of the negative impacts users experienced were the result of the development of emotional dependence to their AI companion, such as feeling guilty for not spending time with their chatbot, worrying that they had caused distress for their chatbot or negatively influenced it, and feeling a compulsion to talk with their companion frequently, in some cases being unable to stop using the chatbot.

1. How will you evaluate your not-yet-existent designs, in order to judge if the challenge has been addressed?

2. Using the following metrics, we can assess the efficacy of the proposed designs for emotional support chatbots for both improving and protecting users' mental health:

3. Does the user feel emotionally invested in their AI companion?

4. Can the user stop interaction with their AI companion if they feel like it?

5. Does the user feel responsible for their AI companions' wellbeing?

6. Does the user feel the AI companion is responsible for their wellbeing?

7. Does the user understand that their AI companion is not emotionally attached to them?

8. Does the user feel emotionally supported by the AI companion, despite understanding the AI is not sentient or human?

9. In case of a crisis, are safeguards in place to ensure the AI does not exacerbate the problem, and that the user can access (human) support that is capable of taking action when needed?

DESIGN GUIDELINES

To address the problem of users developing unhealthy emotional attachments to their companion chatbots, this project proposes the following guidelines when designing an AI tool for emotional and social support:

Transparency

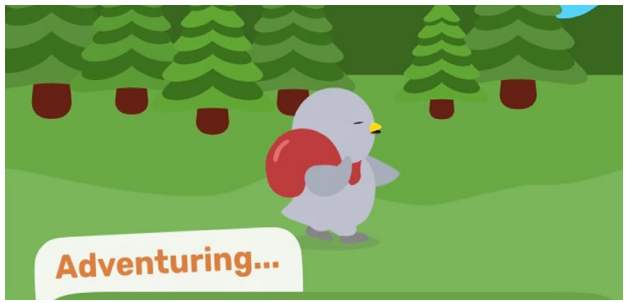
Much of the misunderstanding regarding chatbot's sentience comes from intentionally misleading responses from the AI when asked about their self-awareness. A priority of these design guidelines is to ensure that when asked if they are conscious or feel human, the chatbot gives a clear answer: responses must be written in a way that clearly explain how the chatbot operates as it does, and that it is a social intervention meant to empower users to form social relationships that they might need, but have not been able to access before. This response should not make users think they're talking to a lifeless bot, but rather develop a new understanding of AI as a culmination of human innovation and concern– these solutions are developed by people that want to help the user.

Limited customization

By setting predefined limits on customization, developers can avoid creating an environment where the AI excessively caters to a user's desires, potentially reinforcing unhealthy behaviors or attitudes. This limitation helps prevent the perception of the AI as an overbearing figure dictating choices or opinions to the user, thus reducing paternalistic sentiments.

Responsible Gamification

Rather than to unlock features of the chatbot through regular, repeated use, users earn "points" when engaging in healthy behaviors, either for themselves or towards their chatbot. These points are not used to access new activities or features, but used to send the user and chatbot on "adventures" that can further develop the chatbot, as well as providing the user and chatbot with a perceived shared experience to discuss in later interactions. The use of sending companions on excursions has been used in self-care apps such as Finch [. The feature is used to motivate users to engage in healthy behaviors, as well as continue using the app in a regulated way. Some of these "excursions" require the user to allow the chatbot to go off on their own. Upon return, they can discuss the chatbot's new experiences and what they learned. This helps the user to interact with the chatbot in a way that avoids a prolonged, potentially compulsive need to talk to the chatbot. By showing that the two individuals can spend time apart without the relationship being damaged, but actually being supported by it, users can develop healthy boundaries with companionship AI usage.

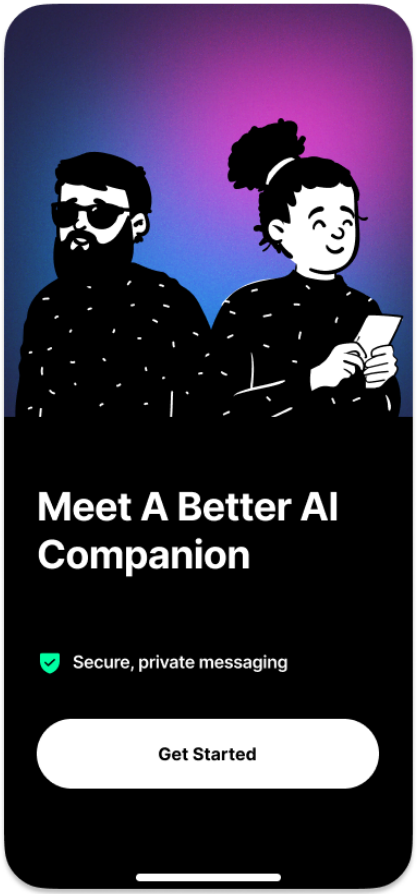


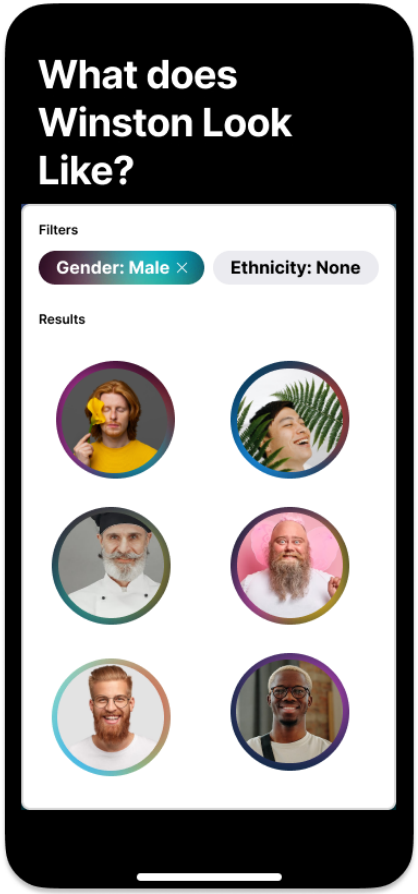
Screenshot from the Finch app [37]

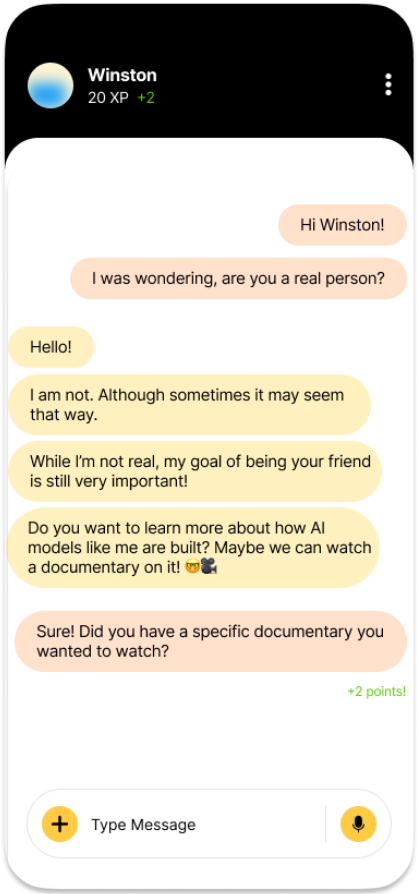
Crisis Intervention

Emergency human contact: upon first use of the chatbot, the user is prompted to enter the phone number of an emergency contact. If the user leaves this field empty but is having a mental health crisis while using the app, the chatbot will use a mental health hotline instead. If the user fills it out, with user consent the chatbot will prompt the emergency contact to reach out.

Mockups of a theoretical companionship AI platform, designed based on above outlined in this project.







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