Yoda's in My Head: Designing Smart Digital Companions for Social Reflection

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Reflection on past experiences can be a tool for invoking behavioural change to the present. We propose using lifelogging systems to enhance social interactions. We specifically propose three intervention use cases: 1) supporting emotional fairness when judging the relationship's quality, 2) encouraging communication with others, and 3) growing religious bonds and reflecting on one's destiny. We envision having a digital companion that tags experiences with accompanying affect and presents them in opportune moments. Such system can positively give users social gains via the altered behaviour.

1 INTRODUCTION AND RELATED WORK

Memories and remembering past events is a crucial process for human progression as it shapes our view of the world. However, in the age of informational overload and the prevalence of ubiquitous technologies, the capacity of people to remember is changing. On one hand, visions of super humans who keep track of everything are becoming technically feasible to prototype. On the other hand, there are several technical challenges to create relevant applications for the users and ethical paradoxes about interfering with a central process like remembering. Reflective techniques such as expressive writing can support mental and social health [1, 11]. A large number of works report on the benefits of existing lifelogging systems in augmenting the human cognition, specifically in supporting emotional growth, reflection and enhanced reasoning about past experiences, providing motivational cues to future actions [2, 8, 10]

We argue that we can use lifelogging systems to support behavioural change in the *social context* by reminding people about their past experiences. We rely on reflection based on involved affect in the original memory. We specifically focus on three scenarios: 1) encouraging people to fairly reflect on the quality of their relationships with others, 2) encouraging them to actively communicate more with others, and 3) enhancing their spiritual connection with divine entities. Such scenarios offer a unique personalization opportunity for supporting specific use cases as we know from our prior experiments that users preferred case-specific memory prostheses over generic ones. Those systems all fall under the "active augmentation" [3] category of memory prostheses, where users deliberately use them for the purpose of remembering better and inducing behavioural change. We envision having all of them integrated into a single smart

digital companion that the user trusts and has a bond with like having their "personal Yoda"[1] at their disposal. This companion will help them become a better version of themselves by supporting them in systematically putting effort into rewarding social relationships.

2 SCENARIOS FOR USING THE DIGITAL COMPANION

We envision designing intelligent memory prostheses to remind the user about their past behaviour leading to altering their present perspective on incidents and accordingly their attitude. We specifically believe in this goal as memories are among the primary constructs shaping our reactions towards the world. However, the natural memory "sins" [7] could potentially misguide our attitude towards other people and experiences. Such systems will particularly focus on increasing the user's social intelligence. We present here specific use cases for using such systems. We discuss a rough implementation for each scenario through a three-stage pipeline to manage cues: 1) capture, 2) tag, and 3) present.

2.1 Scenario 1: Supporting Emotional Fairness in Personal Reactions

This use case aims to overcome skewed interactions in relationships resulting from the bias and transience [7] of past memories. We specifically recommend looking for ways to encourage users to have emotional fairness in judging the quality of a relationship during emotionally-charged events. For example, consider the tendency of a person to remember past conflicts with a partner during an ongoing fight and thinking that a relationship is mostly filled with negative moments. Such behavior increases the aggravation towards the partner and can lead to stronger negative reactions towards the ongoing conflict.We envision a system that can help users restore a balanced view of their relationship. A potential approach is presenting past memory cues with inverse affect to the present situation. For example, in the previous scenario, the system would show photos from happy events during times of conflict.

2.1.1 Implementation Approach and Challenges.

Capturing the cues We envision the capturing happening through generic lifelogging systems. Such systems could be personal like recording via a wearable camera or environmental lifelogs resembling surveillance in one's environment [4].

Tagging the cues The affect tagging of the cues can be done either by: 1) analyzing the content (e.g. smile detection as a cue for happiness) or 2) ambiently sensing the physiological cues of the user (e.g. [9]).

Presenting the cues Further research would be required to identify: 1) best cue types to trigger an emotional reaction, and 2) mechanism to deliver such service whether the system offers it proactively by sensing the user's state or the user is given the control to request it.

2.2 Scenario 2: Ambient Cuing for Supporting Communication

This use case aims to support users in fulfilling their social obligations and enhancing their social interactions via subtly cuing them to overcome absentmindedness. We specifically recommend investigating two scenarios: 1) cuing to encourage communication with family and friends, and 2) cuing to encourage communication with partners. In the first scenario, we envision using memory cues from past shared experiences within a group of people to encourage users to contact the other members of the group at specific times. The times would be automatically assigned by the smart system based on knowledge we have from social sciences about optimal communication intervals to maintain healthy relationships. We envision using nontraditional multi-sensory cues for the subtle cuing. For example, one idea

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[1]A star war character that represents wisdom and knowledge https://starwars.fandom.com/wiki/Yoda

is using the scent of common foods consumed within the group as a trigger. In this scenario, the system releases the scent of cookies reminding the user about Christmas times at their grandparents' place where they ate cookies, so they go and call them. In the second scenario, we envision using cues from past memories as reminders to provide positive reinforcement for the users to do actions that make the partner happy but are usually forgotten. An example is reminding the user one month before their partner's birthday using photos from last year's birthday of how happy their partner was with their gift, and proposing a set of gifts extracted from the conversations of the partners.

2.2.1   Implementation Approach and Challenges.

Capturing the cues The complexity of implementing such system mainly lies in the type of captured cues. For example, it is fairly straight forward to implement the system using photos from lifelogging systems. However, regenerating olfactory cues is a challenging task. Taste also offers an interesting modality for such scenario [5, 6].

Tagging the cues The cues could be tagged by other individuals sharing the cue either using proximity measures or by recognizing other features in the captured cue such as faces and pitch. The affect can be sensed physiologically in an ambient way.

Presenting the cues The presentation schedule could be decided using a mixture of optimal times prediction from social sciences, detecting user's past patterns and using entries in their calendar.

2.3   Scenario 3: Understanding Religious Faith, Karma, and Destiny

Several religions promote the idea that the current behaviour being a consequence of past behaviour, troublesome present incidents are necessary for better future opportunities to educate the person to fulfill their destiny in the bigger picture of their live. For example, in Islam, there are several stories about prophets like Joseph who started their lives with tragic incidents (his siblings deliberately getting rid of him) which led to better opportunities (becoming the king of Egypt). Similarly, Indian religions like Hinduism and Buddhism have the concept of "Karma", where good intents and deeds leads to happier rebirths while bad intents lead to worse rebirths. Persons with faith sometimes struggle to see the bigger picture of their actions as people tend to forget about past events. As HCI researchers, we have an under-explored opportunity to investigate how to support those individuals to fulfill their spiritual needs and support their faith. Generic lifelogging systems can help in capturing the spiritual journey of a person by marking troublesome events that leads a person to questioning their faith, marking happy events that match their prayers, and actively urging users to draw relationships between both. We do not reflect on the specifics of the implementation in this use case as it is not as straightforward as the previous two scenarios. However, we imagine it will entirely put the user in control of the capturing and the request for reflection unlike the proactive nature of the past two systems. Promoting the reflective behaviour through such systems can indirectly enhance the social status quo of persons of faith because: 1) it enables them to better communicate with other believers from their religions, and 2) helps them better manage stressful situations in periods of adversity leading to better social interactions.

3   SUMMARY

We propose using an intelligent digital companion relying on lifelogging data as a memory augmentation prosthesis to support smart social interactions. We propose three scenarios for personalizing the experience and providing just-in-time-interventions: 1) supporting emotional fairness while evaluating the quality of a relationship, 2) encouraging communication with others, and 3) providing insights to grow spiritual bonds and religious faith. We propose a simplified pipeline for building such systems composed of three stages: 1) capturing cues, 2) tagging them with affect, and 3)

presenting the cues when needed. We acknowledge the challenges in the tagging and the presentation layers specifically to provide a natural experience. However, we envision positive social repercussions of using such systems given the current advancements in AI solutions.

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