Artificial Second Conscience: Augmented Living Research 2010-2020

Brennan Moore 12V6008

Living in the year 2020, we take for granted our JITIR (just-in-time information retrieval) displays and sensing devices that tell us what we need to know when we need to know it. But just 10 years ago, people had to manually look up information on their "cellular telephones" and "laptop or desktop" computers. How did people keep track of all of the things they had to do? People manually managed information existing across many applications and locations, making it impossible to easily figure out the best thing to do.

Ten years ago, I realized that there was the need for change. People were constantly bombarded with information from their newly connected environments. Faced with more choices and opportunities than they could manage, people overcommitted beyond their capacities, leading to a pandemic of unreliability, stress, and distraction. People needed a way to better organize their priorities, manage their time and attention, and to find a way to make effective use of the information that was flooding their lives instead of letting it sap their time and energy.

Given this situation, I sought to change the focus of personal information management as follows: rather than helping people accomplish tasks faster, my system helps them make better decisions about which tasks were important and how to accomplish them more effectively. In this essay I discuss the creation and use of this system, and my concerns and predictions for this system in 2030.

ASC: Artificial Second Conscience

From my first visit to Japan, I was struck by the value placed on introspection and understanding through self-reflection such as that achieved in meditation, the practice of seeking focus and simplicity within a chaotic lifestyle. In 2010, the "interrupt-driven lifestyle', multi-tasking in disrupted environments, had long been commonplace. The effects of this lifestyle, such as feeling stressed, disorganized and overwhelmed, were correlated with a lack of self understanding, suggesting a need for informed self reflection. To address these problems, I sought to create interfaces that enhance the user's self-awareness, decision making ability, and ease their cognitive load. Based on this philosophy I created the interfaces that make up ASC: Artificial Second Conscience.

Artificial Second Conscience, or ASC, began as my "Real Project" in 2010. The initial

concept was a tool that allowed users to customize displays of their personal activities. Rather than treating data feeds as simply public or private– ASC allows users to selectively share every facet of their condition and life activities with portions of friends and professionals. For example, many users share their location, web-pages, stress levels with their friends and may share their diet, brain and emotional records with their psychologist. In daily life, this allows for a much more adaptive assistive technologies such as context-reactive automation, user-knowledge aware information retrieval and cross informed relationship management. Later, I describe a scenario where we follow an ASC user, Patrick, through preparing for work, managing a personal relationship and reading the news.

My contribution to this project was architecting and building a way to interface with available data from persona sensors, friends and public data across many worn and otherwise personal devices. I worked with a team to bring my web-based implementation of this system to life as a multi-device interface. We combined heterogeneous activity tracking from life-tracking and social services, applied user customizable sense-making to this data and visualized this information in direct manipulation interfaces, allowing the display of this information adapt to the user's current information needs and psychological state.

Automation

By treating feeds from personal devices and social services as sensor streams, these feeds are used to drive simple adaptive, context-reactive automation, which can act to take care specified tasks without user supervision. This allows for users to offload mundane tasks like reminders, messaging and other device automation to lower their daily information overhead. For specifying rules, we began with a simple controlled natural language interface, "send me my grocery list when I am at the grocery store", which has grown to support shared rules and a variety of textual, spoken and by-demonstration input.

Recommendation

The capabilities originally envisioned by the MEMEX, a device in which an individual may store and easily reference their entire life history, have long become commonplace. Integrated ambient sensors provide the user with up to date information about their current condition with a comparative analysis against past conditions. For example, a user can ask the system to recommend lunch options based on their current nutrient deficiencies and caloric intake, and additionally, statistically weigh whether he/she will like the food based on past meals. ASC greatly extends from the MEMEX vision by also being able to access shared and public data to socially inform, evaluate and recommend items. For example when one is looking for an apartment, neighborhoods can be programmatically and visually compared based on user business reviews, climate and crime statistics and additionally this information can be filtered the user's social circle, stated preferences and other preferences inferred by activity records.

Information Retrieval

Personalized asisstive technologies, such as ASC, have lead to end user tailored content views– allowing for appropriate timing of information presentation, and less unnecessary information being presented overall. By keeping track of what the user "knows," commonly skims over or has been presented many times before, ASC is able to adapt the amount and method of information display in content such as lectures and news. Additionally, content is annotated with visualizations of peer and global point of view differences. The ASC display allows the user to receive information about what is going on in the world in a variety of a personalized, socially informed mediums– a personal automatic new anchor, informed textual display and audio, as well as unobtrusive device specific update mechanisms.

AIL vs Agents of the Semantic Web

Although the vision of the semantic web user agents– robots that automatically complete tasks on behalf of their user– has finally been realized, this direct inference and reasoning is rarely used except in highly specialized large scale sales. As we commonly see when we look for an apartment, even when consulting with an actual human being with perfect knowledge of the individuals preferences and the available options, the end user still makes the final decision. People are both good at and like making decisions if given the appropriate information. Unlike user agents, which make decisions for you, ASC merely makes the information layer more visible in daily life. The goal of ASC is simply to help people know what they need to know, when they need to know it by using linked-data feeds for social awareness, memory augmentation and informed decision making.

Scenario: Morning Routines

While eating his breakfast, Patrick brings up his AIL "Today" interface to help him prepare for the day. In his home the display appears as a light show at first glance– everything from the photos on his wall to floor beneath him is visually annotated with information from his life-log. The IAL interface uses his life-log in combination with feeds from his friends and his work to inform him of any changes to his schedule or places where there may be conflicts. The visualization shows his upcoming challenges and past history cross-informing each other and integrated into the world around him, enabling Patrick to visually see his work and personal life in balance. While exploring progress on the days actives, he notices that some of his colleagues are out of work due sickness and decides to activate a "sickness spotter" which uses these feeds to identify if he may be prone to sickness based on local disease reports, friends and lifestyle changes. IAL reveals that he has a 3.2% sickness likelihood as his morning exercise and tea consumption has helped keep his immune system strong.

Assisted Communication

While making tea, Patrick asks for a ranked list of personal todos which ASC has prioritized based on Patrick's stated goals. At the top is a "message Evelyn: concert - hair." He says "message Evelyn" and begins dictating a message, the ASC display

shows system her ideal actionable message length, 167 characters, recommended level of formality for the message and a compatibility analysis of interests and dislikes. Within the music compatibility listing, ASC show upcoming performances by compatible artists and highlights an upcoming concert by a band they both like. Patrick uses this information invite her to the concert with a personal note about liking her hair and "send message". ASC manages both the medium and timing of his message and chooses a wrist text during her lunch break to minimize interruption and get passed her ASC's attention filter.

The Morning News

Patrick is one of his only friends who prefers to *read* his news. Most of his friends have their own personalized news avatars that dictate events alongside interactive videos with annotations, content adjusting to their emotional sensitivity, and presentation adapted to their level of understanding of the subject matter. Patrick likes politics and feels that video lacks the ability to effectively display contrasting opinions. As Patrick sips his tea, ASC notifies him that there are updates to the identity theft policy debates he has been following. He unfolds his pocket screen to display a summary of the regulations and a bullet point list of changes. Alongside this news article, is a visualization of point of view differences, annotated with highly shared key points from each side. Many of Patrick's online, work and personal contacts appear as their small icons on this map according to their beliefs. As he reads, the document is subtly updating in real time with opinions, like a collective conscious continually evaluating and updating the story before his eyes. The visualization allows Patrick to quickly sees that two of the oppositions arguments share contradictory views and he begins annotating the article to point out this out. As he is making finalizing his statement, his wrist begins to glow orange, notifying him that he has 60 seconds to leave the house or he risks missing the train for work. Patrick quickly posts his response to his friends as he plans to add revisions before making the post completely public and would appreciate feedback from his trusted peers. He swipes the screen to his earpiece and continues listening to ASC dictate updates as he makes his way to work.

Problems with AIL in 2020

Today many unforeseen and unusual problems have arisen in people's personal lives as a result of being able to achieve greater self understanding. While most people seem to lead more informed lives, some, such as performance gluttons, use the system to over-saturate their lives with "todos" now that they can now more effectively manage and make decisions on widely different tasks. Additionally many people tend to live alone, as when living with others many of the niceties of a highly adapted home are lost in the need to support many individuals. These problems suggest that although the system is capable of helping people greater understand themselves, it may encourage people to over focus on this need and become reclusive. Moving forward we will develop IAL to encourage both self and social awareness, as peer encouragement and feedback could greater inform one-self understanding and life choices.

Predictions for 2030: Hyper-Personal

By 2030, it is likely that our devices and real world interactions will only adapt more significantly and accurately to our every need. I am concerned that becoming too reliant on these devices will have major implications for the individual: it may reduce uniqueness, one may loose skills such as information seeking and problem solving, and there may be a large gap between those who use such systems and those who don't.

It is likely that the large amount of public and shared private data will greatly improve IALs ability to automate tasks and recommend courses of action for the user. For example, individuals may be able to hyper-target potential mates and jobs– sometimes rapidly changing occupations or being promoted with real-time performance based analysis. Although some people will choose to automate more personal and traditionally enjoyed tasks, most use of will help people focus on want they want to and enjoy doing.

A negative consequence of too much public data is that people may need to fight off hyper-targeted advertising by adopting dramatically inaccurate personas when leaving home. With knowledge of a user's wants and desires, advertisers could use retina projected images, targeted audio and sensory triggers to create a nearly automatic purchase response. They may also combat individuals avoidance mechanisms by adapting entertainment content to display per-person targeted content, often integrating products and ads across an individual's viewing choices and mediums. In addition to these advertising issues, other exploitative mechanisms such as people altering life-logs to pass compatibility and experience tests also encourage the pursuit of greater privacy controls and the ability to revoke shared data.

Back in 2010, the loss of a cellphone seemed nearly as traumatic as loosing a close friend and this problem has only magnified since. By 2030, it is likely that we will not be physically able to remove our personal devices. With an interface like IAL, I hope to help people become more self-sufficient than technology dependent. No matter how easy to use an interface becomes or how quickly it can process requests the human mind's capabilities for creativity and intuition are unsurpassed. Through enhancing, augmenting not replacing our cognitive functions will we be able to greatly succeed, know that these devices have improved us, not only our ability to do things.