Augmenting Face-to-Face Interaction with User-Curated Digital Selfs

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Abstract

We present an overview of three studies investigating how individuals would choose to create and employ Digital Selfs facets of their digital identity presented over AR - during face-to-face interaction with strangers. We highlight the advantages over existing, often algorithmically driven approaches, including the use of vague, ambiguous media that can be disclosed through conversation.

Author Keywords

Digital Self, Face-to-Face interaction, Conversation; Self presentation; Strangers; Smartwatch; Head-mounted display, Faceted Identity

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Introduction

There has been increasing work on how human perception and cognition can be fused with digital technologies, amplifying human senses. However, there remains a lack of understanding of how users both view these augmentations and would wish to use and employ them. We argue, that whilst much work has focused on the technical ability to augment humanity, less consideration has been given to the ways in which existing behavioural norms are disrupted, and how these are considered by users.

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Joe puts on his digital glasses



Joe Meets Mary The glasses recognise Mary The red box represents digital information

about Mary that Joe can see in his glasses



Figure 1: Key screens of the concept video used in the initial study, outlining how a Digital Self might work in practice

In our work, we focus on how digital augmentation of faceto-face interaction, incorporating social and digital media through AR technology, can be used to support face-to-face interaction between strangers. Existing work in this area highlights our prior point, and either focuses on novel technologies that can be used to present information to others (such as a coffee mug augmented with an LCD display [7] or t-shirts with displays [6]), or carries out detailed studies that automatically mine user social and digital media accounts to identify shared or common interests between users [1,11]. Existing work assumes that all media in a user's account is suitable for sharing and matching with others. Whilst some work considers privacy, such as using only publicly flagged content [5], users have no control over how they are presented to others.

Understanding how individuals would wish to be presented to others, we argue, is important. Just because two individuals may share an interest does not mean they would want it disclosed. Existing work does not consider prior work on how humans interact in face-to-face scenarios, as well as how they represent facets of self to others [2,3], particularly on the social and digital media platforms existing work exploits. Whilst digital face-to-face augmentation has been argued to increase the perceptual capabilities of the viewer, it is equally possible to argue that it can reduce the cognitive capabilities of the user (as they have limited control over what is presented), leading to unwanted disclosure of information.

Although not yet in AR, cognitive prosthetics such as the Peeple app (**www.forthepeeple.com**), allow individuals to rate others on professionalism, personality and how good they are at dating. In AR scenarios, it is possible to consider that we start viewing and interacting with others in a similar way. We argue in contrast to prior work (and in reference to 'apps' such as Peeple) that users must be in control of how they are presented.

HCI researchers have already identified that individuals are open to meeting others they do not know, including those they are dissimilar to, in a wide variety of situations [9]. In addition, the wide variety of individuals we meet on a daily basis (such as when at the bus stop, sitting opposite on a train, or in the grocery store) all have potential for meaningful interpersonal interaction. Such everyday scenarios have high potential to support at least short social interactions if digitally augmented [14]. These can have a significantly positive effect on mental health [4].

In short, we argue that digital augmentation of face-to-face interaction can have significant benefits, but to be effective it is important to consider how users would wish to be presented to others, rather than leaving them "out of the loop" by making these decisions without user involvement. We further this argument through brief overviews of three studies that consider how users should be presented in faceto-face interaction with strangers through self-curation of their digital augmentation.

Digital Selfs

Our initial work [10] acted as a way to understand user attitudes to having personal social and digital media seen about them by others through augmented reality (see Figure 1 and Figure 3). We used a combination of a concept video, mocked up digital visualizations that were presented in an AR iPad `Mirror', and drawn sketches by participants to represent a Digital Self: a visualisation that can be presented through HMDs to present a user-defined aspect of oneself to others. Interviews with 6 participants revealed user attitudes towards how their existing digital and social media (as held on social and digital media services) could be used to present a facet of their identity to others. Interviews







DREAMER Why not? CHEMICAL ENGINEER Just ask me <mark>-</mark>-FINLAND AND YOUR LIF WILL NEVER B



Figure 2: An illustration of some of the Digital Selfs created by participants. Many illustrate the use of ambiguous media as a way to manage disclosure.

also covered how, and in what way, these attitudes varied with respect to presenting these facets to different types of users (e.g. friends, work colleagues, strangers) and in different locations (at work, on the street) etc.

Findings

Analysis of the interviews revealed key findings in how users selected media from existing services to represent themselves in face-to-face AR scenarios.

Controversial Media

Media that participants were and were not willing to share with others was largely individual, and did not fall neatly into social and digital media services, or categories of media stored within them. For example, some participants would be comfortable sharing their favourite books and not their favourite movies. The opposite was also true, with some participants finding favourite movies to be too personal, often as they felt this skewed the impression they gave (e.g. by having an interest in horror movies), but books were fine. Unlike existing work that may consider a particular social or digital media service as "safe" to use [11], our findings were that what is personal or private is variable, individual, and cannot be assumed in this way.

Generalisation

Participants would restrict media to those they knew less well, e.g. strangers. This was done through generalising that media by providing a higher-level view. For example, showing an interest in books rather than favourite books. Generalisation of media was discussed in terms of supporting boundary regulation [8], where individuals will dynamically and progressively decide what to reveal to others through conversation. The use of general media provided a safe staring point, where further disclosure can be managed through the conversation. Unlike presenting

detailed matching, such as shared interests as text [11], vaguer and more ambiguous representations may be more useful to help users control what is disclosed about them.

Manual Curation

Unlike existing approaches, all participants wanted some manual intervention with the media presented about them. For some, this was a simple approval process to make media available (for example approving the output of an algorithmic mining system), whilst others wanted complete control over the media and how it was visually represented. Unlike existing work that simply asks for initial access to accounts and assumes all media and decisions can be algorithmically determined [1], our work finds that users need more fine grained interaction, with many uncomfortable over a fully automated approach.

Digital Selfs in AR

As a follow-up to our conceptual study, we have carried out two further studies of Digital Selfs in face-to-face interactions. Both follow a similar protocol. In the first [16], 32 participants created a Digital Self from a Microsoft PowerPoint slide, incorporating media from both existing social and digital media services as well as wider internet searching (see Figure 2). About a week after creating these, participants took part in a face-to-face conversation with a stranger. Each person could see the other's Digital Self through either a Head-Mounted Display (Epson BT-200), or a Smartwatch (Sony Smartwatch 3) (see Figure 3). An additional group had a conversation without the Digital Self to act as a baseline. The second study followed the same procedure, but focused on multi-party situations (i.e. interactions within groups). 23 participants created Digital Selfs and then took part in one of 6 multi-party gatherings. Participants could view the Digital Selfs of the other participants through a head Mounted Display (Epson BT-





Figure 3: Illustration of a Digital Self as seen through the HMD and the Smartwatch.

200). In both studies we focused on how a Digital Self could be employed, and the benefit it would bring in initial face-toface interactions with strangers.

Results

The primary findings of our conceptual study also held here. Participants often used vague or ambiguous information to represent themselves. Photographs or other images that provided only hints to their meaning were often used (see Figure 2). The majority of these came from outside existing social and digital media services (e.g. by Google image search). Conversation around these helped participants manage the level of disclosure about the represented topic they were willing to engage in on an individual basis. In addition, unlike providing simple `tickets' [13], such as [11], where the digital augmentation is used just to start conversation on an initial topic, the Digital Selfs were used as a reference throughout, being referred back to and helping sustain the conversation. Participants were also explicit in highlighting where media came from, tapping or pointing to the HMD or smartwatch to indicate this. Whilst apps such as Peeple have had controversy over features [15] leading to their consideration as 'creepy', participants were both open and explicit when introducing Digital Self content, with both viewers and creators comfortable in its presentation.

Future Work

Both studies were undertaken in the lab. AR glasses are not widely used in everyday life, so it is not yet possible to evaluate the role of Digital Selfs in the many smaller, everyday situations that prior work indicates they may be useful [9,14]. Existing "in-the-wild" studies have focused on professional networking and academic conference scenarios. Although important, there is strong value in looking at

digital augmentation in more ubiguitous, everyday environments, and we are focusing on how to carry these out.

Conclusions

Our work has highlighted both the importance and value in considering users would want to present themselves in augmented face-to-face interaction. These augmentations effectively acting as a form of cognitive prostheses [12]. Unlike existing work that largely focuses on algorithmic matching, we have found rich practices in how users choose to design their augmentations, and how this enhances faceto-face interaction. More widely, in reference to how human capabilities are augmented, we argue our work shows the value including users at an early stage so augmentations are fully beneficial.

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