Social AR: Reimagining and Interrogating the Role of Augmented Reality in Face to Face Social Interactions

Ilyena Hirskyj-Douglas
Anna Kantosalo
ilyena.hirskyj-douglas@aalto.fi
anna.kantosalo@aalto.fi
Aalto University
Finland

Joelle Zimmermann
jzimmermann@magicleap.com
Magic Leap
USA

Mar Gonzalez-Franco
margon@microsoft.com
Microsoft Research
USA

Andrés Monroy-Hernández
amh@snap.com
Snap Inc.
USA

Michael Nebling
nebeling@umich.edu
University of Michigan
USA

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ABSTRACT

As augmented reality (AR) technologies become more pervasive, there is a growing interest in Social AR systems designed to support face to face interactions with collocated others. Prior research on AR often focuses on the technical aspects of the technology. However, at this early juncture, it is crucial to reflect and discuss the ethical, political, societal, and privacy implications of Social AR. This workshop aims to bring together industry practitioners and academic researchers to discuss the opportunities and challenges of social AR: from platforms to content creation, to self-representation. We aim to use a design fiction approach where workshop participants create speculative scenarios that interrogate the values imbued into Social AR. Based on these discussions, we will put together a set of initial recommendations for designers of Social AR technologies.

CCS CONCEPTS

• **Human-centered computing** → **Mixed / augmented reality**.

KEYWORDS

augmented reality, social, face-to-face, collocated, design fiction

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INTRODUCTION

Augmented reality (AR) systems have been used in industrial, military, and medical applications, as well as games, tour guides, telecommunication and broadcasting purposes [12]. Researchers in human-computer interaction have conducted user studies with AR systems for decades [1] exploring the technical and design aspects, but much less is known upon how AR affects people's collocated social interactions [19].

In this workshop, we focus on *Social AR*; which we define as the interactive and social experiences of two or more collocated people enhanced by digital information. Social AR includes creating or sharing information, ideas, interests, and other forms of expression with digital content overlaid onto the physical world. We are particularly interested in how these digital augmentations shape and affect people's face-to-face interactions. Examples of Social AR include, but are not limited to, augmentations that are triggered by physical-world markers, such as objects, people, and locations. We list some key questions and critical reflections for the future of Social AR in the sidebar.

What is Social AR?
The use of augmented reality technology to initiate, support, encourage or mediate in-person interactions of two or more people. The augmentation can involve digitally adding or transforming audiovisual input.

Some Key Questions of Social AR
- What does the future of Social AR look like?
- How does the future of Social AR shape and affect people's interactions?
- What goals should Social AR have towards supporting face-to-face and collocated interactions?

Critical Reflections for Social AR
- What are the ethical, social and privacy concerns?
- How can Social AR fit into different cultural contexts?
- What opportunities does future Social AR open for face to face conversation beyond the status quo?
- Can Social AR violate boundaries and personal space, and if so what happens?
- Do we need to worry about isolating bystanders or those without technology?

Technology companies have released a significant number of consumer applications that support Social AR [23]; from games (i.e. Paintball [21], Jenga [6], Smash Tanks [3] and NightenFell [15] a riddle-based adventure); to apps aim to directly support people's conversations by displaying virtual information about people or augmenting peoples appearance (i.e. Octi [5], an app that displays a virtual 'belt' of social media profiles around people and Snapchat [22] is used to transform peoples appearances with AR "face lenses,"); and apps that allow users to create and leave AR messages in physical locations (e.g. WallaMe [24]). Researchers have created Social AR systems to, for example, display a digital profile (a collage of images and texts) of a person to people nearby using a head-mounted display (HMD) or a smartphone [10, 13]. Here studies found that the device used to view the digital content, and the augmentation itself, affect individual and group behaviours of wearers, and their profile viewing behaviours. Yet, beyond individual instances, there is little research on how AR applications and technologies shape and affect the social interactions in face-to-face contexts.

The ramifications of these for future Social AR systems is important as the usage of social technologies is directly affected by both the physical and social context, and the user's communication and privacy needs [17, 18]. This is especially nuanced, as in Social AR people need to manage the boundary of digital information presented within the system and offline information in the face-to-face situation [2]. Consequently, researchers have recently started to critically look at HMD use in social and public spaces [7, 8] and speculate how AR systems could be used for malicious purposes, such as harassment, or how researchers could accidentally create scenarios in which augmented materials, such as ads, create contextually inappropriate situations [9]. Dystopian science fiction stories have also identified several problematic uses of Social AR systems. SIGHT [16] is a short film in which an AR interface augments a man's date with an AR application that provides him with topic suggestions, the woman's difficulty level, and his progress whilst analysing and providing feedback about her behaviour. The "Nose Dive" [26] episode of the Black Mirror series builds upon the concept of a social credit system (based upon a person's deeds) where people's scores are displayed in AR to others nearby affecting where and how they can live, travel, work, and socialise. These social and research narratives are part of a wider discussion in HCI for any technology that digitally augments people's perceptions, such as in Virtual Reality (VR) or Mixed Reality (MR). For Social AR, there are substantial ethical considerations to assesses future risks and opportunities of these technologies [14]. We outline some of these in the sidebar.

We aim to use design fiction in our workshop to ideate fantasy prototypes that will help open up the discussion and questions about Social AR through dialogue, rationalisations, interactions, and narratives. These fantasy prototypes will tell stories exploring and critiquing future other worlds through drawings and narrations. An example of this can be seen in Figure 1. By employing design fiction, we explore, catalyze, and redefine our relationship with Social AR, taking into account people's social practices beyond a specific technology or platform, and instead, reflect on the social implications

Ilyena Hirskyj-Douglas is a postdoctoral researcher in digital systems for face-to-face interaction in Aalto University.

Anna Kantosalo is a postdoctoral researcher at Aalto University, investigating co-creativity and face-to-face interaction.

Andrés Monroy-Hernández is a principal research scientist at Snap Inc., and an affiliate faculty at the University of Washington. His work focuses on the design and study of social computing systems.

Joelle Zimmermann is a behavioural scientist at Magic Leap, with a background in psychology. She is interested in how humans respond to social experiences in spatial computing.

Michael Nebeling is a professor at the University of Michigan School of Information where his lab is focused on democratizing mixed reality technologies for UX and interaction design.

Mar Gonzalez Franco is a researcher at Microsoft Research building technologies to democratize the use of avatars and new devices that will augment human perception inside VR.

of Social AR technologies as a concept. Whilst this design fiction approach is shared with previous workshops on VR and MR [7, 9], we aim to build upon prior work in a Social AR scope through clear grounding and guidance in the science fiction approach.

This workshop extends the conversations about sociotechnical systems that the CSCW community has been having for the past decade, into the realm of AR. Catalyzing sci-fi experts as coaches and our expertise as facilitators, with participants we will create future-facing design speculations upon key questions for Social AR critically reflecting and discussing the challenges and opportunities these present. From this process, we aim to identify initial recommendations for the developing community.

WORKSHOP GOALS

The goal of our workshop is to traverse the future of Social AR systems through creative scenarios and critical discussions forming initial recommendations. Social AR is diverse: as contemplated in recent media [16, 26] and research [9, 10], systems that display information about people and/or are used to support social interaction risk malicious usage or the invasion of privacy while they holding great potentials to connect people and support conversations and people interactions. To explore this, we plan to create a fertile ground for identifying and provoking scrutiny upon surrounding issues and new potential scenarios to prevent and highlight unfavourable circumstances and opportunities for far in the future Social AR systems before these issues become pronounced. The concrete outcomes of this workshop will be new scenarios speculating into the future social AR applications and from this, the results of the key questions, critical reflections, and overarching design recommendations for supporting face to face interaction with Social AR systems.

WORKSHOP FOCUS AND PARTICIPANT INTEREST

We focus on future Social AR technologies to support collocated face to face social interactions, especially in how Social AR can support various relationship ties and for different purposes. CSCW offers an optimal venue for our workshop with its rich history of exploring collaborative activities and how we can live and work together with technology. Bringing together researchers and industry practitioners from various backgrounds, we build upon previous workshops [9, 20] towards Social AR situating our narrative with multiple perspectives and social roles. We welcome both designers and researchers interested in privacy, ethics, AR/MX/VR technology, social interactions both collocated and face to face and/or futuristic design. We aim for participants at the intersection of these fields and those interested in how social norms and peoples' behaviours reflect over these issues. As this workshop is not technologically focused, participants do not need to have any prior knowledge about specific AR systems.

As researchers and industry practitioners, we are primarily responsible for developing and investigating up-surging AR technology, their applications, and how to responsibly support and design social

Figure 1: A fictional scenario: Jack is looking to switch jobs and advertised his CV on an AR ring. He runs into his boss who fires him for wanting to work elsewhere. This scenario raises issues around privacy where information is shared with unexpected people. A hypothetical design recommendation from this scenario is in Social AR systems there needs to be a process to manage sharing to different audiences for privacy.

activities among collocated people. As participants of our workshop, AR specialists would benefit from the workshop's concrete design futuristic speculations, practitioners within social systems would be interested in the predicted future of social systems and how these can support collocated interactions, and scientists in ethics and privacy could enrich their current practice from the discussion around the surrounding issues.

WORKSHOP ADVERTISING PLAN

The workshop will be publicised to HCI and CSCW researchers and those within relevant industries through existing networks, social media, and mailing lists, as well as directly advertised to those known to have interests in the topic. Our website *http://socialAR.cs.aalto.fi* will be used to communicate general information on the workshop, prior readings, disseminate our workshop findings, and host future workshops. This website will also host our pre-questionnaire and serve as a resource for participants.

WORKSHOP CALL FOR PARTICIPATION

We invite individual submissions of interest in the form of a pre-questionnaire consisting of background information, a design fiction scenario, and open questions for discussion. For the scenario, we ask participants to draw from their current practice and experience to be provocative envisaging and explaining the future of Social AR. This scenario needs to have a function and purpose towards a defined set of people upon how it will support (or not) face to face interaction in Social AR contexts. For instance, these functions can be, but not limited to, sharing, creating, playing, and finding. Each scenario additionally needs to reflect upon the challenges and opportunities that this scenario raises. This submission should not be a current or highly detailed in architecture but forward-facing speculative futuristic far-out approaches unlimited by current technology affordances. Participants' speculations can be submitted in the medium of a story, drawing, or another visual/text form. An example of this process can be seen in Figure 1.

The submission of interest can be submitted as a group or individually, however one participant from the accepted scenario must attend the workshop. If accepted, participants should be prepared to present the speculations and the surrounding issues raised by the scenarios on the workshop website and within the workshop itself.

WORKSHOP AGENDA

We will divide the workshop into two half-days: day one focusing upon creating the design fiction and day two upon the larger critical narrative around the designs and forming recommendations (see sidebar). These half days will be split into 4-hour sections optimised for different time zones.

Workshop Schedule

Day One
Introduction
Participants introductions
Break
Keynote: Writing Sci-Fi
Break
Design Fiction World Cafe Task
Day Summary

Day Two
Day 2 Introduction
Keynote: Critical Design Reflections
Critical Perspective Task
Break
Show and Tell
Moderated Discussion and Forming Initial Recommendations
Closing and Summary

Day one will begin with a short welcome and introduction after which participants will present their speculations and the issues that these scenarios raised to stimulate conversation. To address challenges in grounding participants and scoping discussions towards our design fiction approach, we will then have a sci-fi keynote speaker upon the designing for the future topic. This speaker will additionally act as a coach throughout day one to provide clarity and guidance to help participants get into the role of designing for the future.

Guided by the speaker and us as facilitators, participants will then work in smaller groups focused on design fictions. We will use a "world café" [4] based method with a design fiction spin. For this, the groups will be asked to explore and create possible future Social AR systems for collocated interaction through drawing, and storytelling focused on provocative future speculative scenarios.

The world cafè method itself consists of short fifteen minute round table group discussions (each with 3-5 people) focused on crafting a specific face to face scenario for Social AR based upon specific *themes* and selected *purpose verb cards*. From these, participants shape their designs along the key questions of the look, interaction, and goals in Social AR (see sidebar). The *themes* of the five tables are fixed and reflect different relationship ties (stranger, colleague, partner, friends, and 'wild card') showing varying tie strengths highlighting potential issues with privacy and faceting. The wild card could include any relationship, from animals, aliens to nature, etc.

The *purpose verb card* will be picked randomly using an online generator at the start of the discussion round by the participants at the table. These purpose verbs cards will be generated from the pre-questionnaire - we expect these include sharing, creating, playing and other typical verbs related to face to face interactions.

At the end of each creation round, the group will leave notes about their design and one person behind with the rest of the group moving to a new table repeating the round with a new theme and select a new verb. The person left behind will welcome the new group to the table and explain the previous discussions held at that table. The group can then build upon the experiences from previous tables, redesign existing work at the table, or start anew whilst engaging in each-others narrative. This rotation will continue until all groups have visited all tables (five turns).

Building from, on the second day, we will have a keynote speaker upon the ethics of futuristic design to position the day. After this, and again coached by the ethical keynote speaker and us as facilitators, participants will rotate tables in the same groups as day 1 to start questioning their scenario for the opportunities and challenges that each scenario poses regarding ethics, privacy, political and cultural lenses upon highlighted in our critical reflection questions (see sidebar). The discussion will be recorded next to the original scenarios and stories via notes. After all groups have visited all their designs, participants will share their designs, insights, and results of their conversations. These key narratives will be recorded and collocated to form initial recommendations. As a group we will then

Timeline

- July 8, 2020: Website and Call for Participation Due
- September 7, 2020: Participation Form Due
- September 10, 2020: Review Deadline
- September 14, 2020: Notification of Acceptance
- September 28 2020: Prior Reading and Participants Submissions Made Available Online
- October 17 and 18, 2020: Workshop Held Online

critically discuss these, voting upon the most important issues to form a final set of recommendations for designing Social AR for face to face scenarios.

ONLINE CONSIDERATIONS

We will use Zoom to perform this workshop online. We will also use the "breakout room" functionality to host the smaller discussions. To allow co-creation within groups and as a whole, we will create a Google Drive folder, with nested folders for each virtual table. These table folders will hold documents to record the discussions, design notes and drawings, and other supporting material. The main folder will contain a document for the recommendations. To facilitate the drawing process, we will also provide online whiteboards on Miro [25] where screenshots can be taken and integrated into the main google folders. All the workshop facilitators are familiar with this software. Additionally, as these tools are widely adopted this will provide a low threshold for entry for our participants.

We will limit the workshop to a maximum of 20 participants (not including the organizers and keynote speakers) to allow for fruitful in-depth discussions online and to give space for everyone to talk. Participants will be required to have a stable internet connection.

EXPECTED OUTCOMES AND FUTURE WORK

The workshop will tackle critical issues around Social AR and face to face interaction forming creative design fiction worlds and their embodied critical reflections and recommendations. For the community, after our workshop, we will later release our outcomes including the scenarios, the critical questions raised, and our recommendations through our website. From this, we plan to grow a healthy community around Social AR practices and evolving recommendations and scenarios which could later inform guidelines. These cultivated materials will be useful to both HCI and CSCW communities focusing upon face to face interaction, AR, and social practices. In the future as more AR technology and the surrounding issues expand, we plan to iterate running the workshop again, inviting our attendees to continue to look into the future.

PRIOR WORKSHOPS

The organisers collectively have experience in running workshops within the HCI community; notably in AR and storytelling, MX and ethics, and design fiction [9, 11, 20].

DIVERSITY

The organizers commit to having a diversity of participants across genders, race, ethnicity, locations, institutions, seniority, and methodological perspectives. The organizers themselves come from diverse backgrounds and institutions, including long-standing and new members of the CSCW community.

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