Embodied Social AR with Project IRL

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Our vision for the future of Social AR is one where people come together in-person with their close friends and family members to hang out and use AR to foster playful interactions. In this position paper for the Future of Social AR workshop we present Project IRL: a suite of five applications we designed to explore novel ways of supporting playful Social AR. We propose to share our learning from designing and evaluating these applications with 101 participants. Finally we also propose to discuss *embodied social AR*, as an approach that centers the design of AR experiences around tracking and augmenting bodies, in an effort to support co-located interactions.

1 INTRODUCTION

Social AR (i.e *"the use of AR technology to initiate, support, encourage, or mediate in-person interactions of two or more people" [13]*) an inspiring design space that is rich in opportunity for novel human-computer interaction. Our vision for the future of Social AR is one where people come together in-person with their close friends and family members to hang out and use AR to foster playful interactions. We take a first step towards that vision by designing, developing, and evaluating a suite of five playful mobile AR applications we called "Project IRL," a tongue-in-cheek reference to the Internet slang for "In Real Life," use to refer to *"events, people, activities, and interactions occurring offline"* [23].

We embraced the recent call by Olsson and colleagues who drew attention to the gap in the literature and called for more work to focus on supporting co-located social interaction [14]. In our work we targeted our efforts to explore the playful side of Social AR because even within the co-location literature, the research community has focused more on supporting productivity scenarios [7]. In addition, we hope our work will inspire future technology designers and researchers to consider playful interaction, as means of facilitating positive in-person social interaction.

In Project IRL we chose to explore face-to-face interaction with AR using mobile technology because: (i) it has a strong support for embodied interaction [26][6], (ii) it could be grounded in the physical environment [22], (iii) it has the potential to support playful activities through surprise and thrill [2], (iv) it could facilitate exploration, e.g., Pokemon Go [15]), and (v) it could support social interaction [19, 22]).

In the Future of Social AR workshop, we will be able to describe Project IRL in detail and explain how we 'grounded' our designs to co-location, by enabling the apps through the tracking of physical entities such as pets (e.g., dogs), people's bodies (e.g., faces, feet, and whole-body), and household objects (e.g., a video on a TV). We will discuss results from evaluating the apps in a deployment study with 101 participants through surveys, interviews, and participant observations, and share our findings under four themes: (i) the quantity and physical configuration of digital devices, (ii) the physical entities used to trigger the experience, i.e., enablers, (iii) the affordances of the augmentations, and (iv) the strengths of co-located play. Finally we will also bring the idea of *embodied social AR*, i.e., proposing that AR experiences stemming from tracking and augmenting bodies foster co-located interactions, up for discussion with the rest of the workshop's participants.
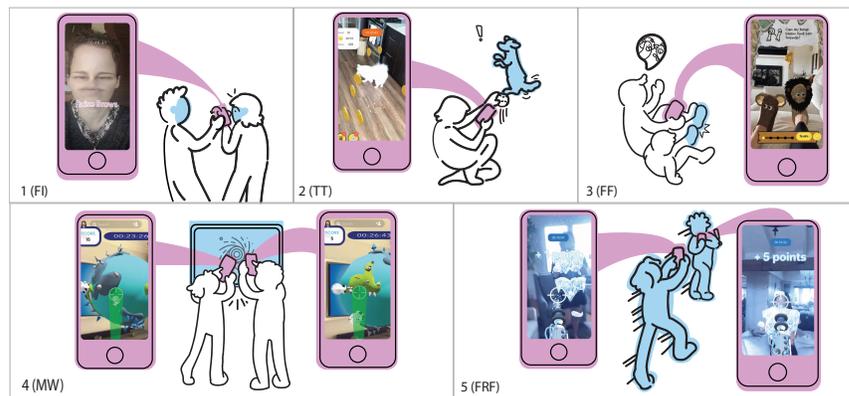

Fig. 1. Playful co-located mobile AR apps: (1) "Face It" (2) "Treasure Treat" (3) "Feeture Films" (4) "Milky Way" (5) "Freezing Frenzy." Physical device configuration is illustrated in purple, augmented enablers in blue.

2 LEVERAGING MOBILE AR

We surveyed the literature, and we identified the following five considerations for how and why Augmented Reality technologies might be particularly well suited to support playful co-located social experiences.

- **Grounded.** AR can cultivate the ambiance by stimulating a variety of senses, overlay content onto the real world environment [22], transform the world into a *"playground"* [2], and support exploration [15].
- **Embodied.** [6] AR can physically and socially facilitate social activities, imbue meaning through embodiment [5], and support novel physical interactions [26].
- **Playful.** AR can facilitate playfulness through experience design and content that is surprising, humorous, thrilling, or challenging [2].
- **Social.** AR can facilitate and enhance various types of social interactions, and relations [19, 22, 27].
- **Memorable.** AR interactions, like any digital experience, can easily be recorded and shared [22].

Although still an under-explored and not widely adopted technology, there are some inspiring examples of experimental mobile AR designs that support co-located interaction to varied degrees. For example, researchers explored co-located mobile AR in regards to interfaces for group collaboration [21], co-creation [8, 17], communication [18], and shared-world gameplay [3]. There are also a number of research projects on mobile AR game experiences designed for synchronous and co-located interaction, e.g., [12, 28]. Beyond research, there are some commercial mobile AR apps that can be used in co-located interactions as well [10, 16, 25].

However, the co-located interaction is secondary for most of these systems, which is why in this work we decided to focus on co-location as our primary design goal. With this prior work as the backdrop for our research, our goal is to explore ways of facilitating playful co-located experiences by experimenting with mobile AR's social affordances. We aimed for Project IRL to help us learn what people enjoy and value, and identify friction points or challenges, and to do so we took an exploratory and interpretative approach [20].

3 PROJECT IRL: A SUITE OF FIVE MOBILE AUGMENTED REALITY APPLICATIONS

We guided our design process by continuously asking ourselves *"what makes this design work only when people are co-located?"* and *"why is it meaningful to use it with others together?"* This approach proved to be generative in keeping our brainstorming sessions focused on co-located social experiences. Furthermore, we set ourselves a constrain to focus on AR experiences that, although foster a *shared experience*, do not require network connectivity. We drew inspiration from prior work that emphasizes *experience first, technology second* and choosing the best enablers to support it (i.e., *"choosing tracking wisely"* [22].

Across the five apps, we explored a diverse *physical device configurations*, such as passing a device around, and simultaneous use of multiple devices triggered by a shared third device. We also explored distinct *enablers*, i.e., entities in the physical world that served as triggers and the focus of the augmentation, such as pets, people's bodies (e.g., faces, feet, whole-body), and large shared screens people might already have in their environment (e.g., TVs). The apps explored playful interaction through physical movement, and by augmenting bodies.

We were inspired by Mueller and colleague's work on movement-based games [11], and built on interactions that are already available and familiar to many. For example, we drew inspiration from existing games, e.g., "Fetch"[1] or "Tag"[24], and social activities people already engage in, e.g., storytelling. We experimented and iterated on the phone configurations and different interaction modalities of AR, as well as the visual augmentations common in AR to transform infuse existing experiences with surprising elements supported by technology.

In the Future of Social AR workshop we will explain in details the user experience in each of the apps, the *enablers* that trigger them (i.e., markers for camera detection), and the associated attributes (See Fig. 1 and Table 1 for an overview). We built the applications using Lens Studio [4], an authoring tool to create AR "lenses" for people to open in Snapchat [9] [1].

4 CONCLUSION

In this position paper for the Future of Social AR workshop, we present Project IRL, a suite of five apps designed for co-located playful interaction using mobile AR. Project IRL is an exploratory implementation towards a future vision of Social AR, as we imagine it will be used also in playful interaction, and in-person by close friends and family members.

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[1]The applications can be anonymously downloaded by scanning the codes in Appendix using Snapchat on Android and iOS.

Table 1. Design attributes for each of the AR apps

Attributes	Face It	Feeture Films	Treasure Treat	Milky Way	Freezing Frenzy
Device Configuration	One phone	One phone	One phone	Two phones, one TV or laptop	Two phones
Enabler	Face	Feet	Dog	Video on TV	Full Body
AR Face filters or lenses	Sock puppets	Dog's silhouette, environment coins	3D planet	Ice on body	
Interaction Type	Competition	Storytelling	Cooperative Game	Competition	Competition

We will discuss our learning about the affordances of mobile AR to enhance social experience for players when they are together in the same space, based on our experience of designing the apps, and deploying them with 101 participants.

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APPENDIX

A   APP ACCESS CODES

The co-located AR apps developed for IRL can be accessed using Snapchat [9], you can follow the instruction on Snapchat's official documentation.

(1) Open Snapchat
(2) Point the camera at the images provided on Fig.2
(3) press and hold your finger on top of the image
(4) Select unlock for 24/48 hours

(FI) Face-it!   (TT) Treasure Treat   (FF) **Feet**ure Films   (MW) Milky Way   (FRF) Freezing Frenzy

Fig. 2.   *"Snapcodes"* for Face-it!, Treasure Treat, *Feet*ure Films, Milky Way, Freezing Frenzy