Social Superpowers in Social VR

Beyond Approximation of Face-to-face

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Social VR research and commercial applications tend to prioritizes approximation of the dynamics of face-to-face encounters. Instead, our approach focuses on new kinds of social affordances only possible in VR scenarios. We argue that the most transformative features of VR (and XR more broadly) may look and feel very different from social rituals we are familiar with from the physical world. Integrating insights from contemporary social VR experiences and building upon existing research on social augmentation, we advocate for an approach to social VR that emphasizes social superpowers over verisimilitude.

CCS CONCEPTS • Human-centered computing~Human computer interaction (HCI)~Interaction paradigms~Virtual reality • Human-centered computing~Human computer interaction (HCI)~Interaction paradigms~Collaborative interaction • Human-centered computing~Human computer interaction (HCI)~HCI theory, concepts and models

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1 INTRODUCTION

In the wake of COVID-19, social forms of Virtual Reality (VR) are poised to play a pivotal role in supporting telepresence interactions. As humanity turns to the crisis of climate change, social VR offers opportunities to reduce the carbon footprint associated with travel. We have argued that our field's vision of social VR needs to be rethought [19]. Social VR (and social XR more broadly) have an opportunity to unlock new social capacities *only* available through technological mediation. Revisiting Hollan and Stornetta [11], we contend that social VR meeting experiences could enable more radical departures from familiar social encounters, and should instead be thought of as an opportunity to expand the repertoires of everyday social life.

In many of the examples of contemporary social VR applications and research agendas, we identify a familiar—and seemingly knee jerk—assumption that meetings in VR should seek to replicate the experience of physical co-presence. Arguing against this tendency nearly three decades ago, Hollan and Stornetta made the case that communication technologies are transformative *not* because they recreate face-to-face encounters, but rather, because they offer new opportunities that go "beyond being there" [11]. This assumption is perhaps most readily observable in the mechanics and aesthetics of VR meeting tools (such as GlueVR, MeetInVR, and Spatial) with their nearly ubiquitous use of features like virtual whiteboards, virtual sticky notes, and meeting rooms that resemble familiar workplace environments, etc. [19]. While such familiar features may be necessary to ease people into a new opportunity through skeuomorphic scaffolding, the relentless push to approximate the experiential tropes of meetings in physical spaces (to make VR meetings "more realistic"), suggest to us a blind spot about just how weird and alien social interaction in VR (and XR) could become—and may need to become—as we learn to adapt to and take full advantage of the affordances of the medium.

2 RELATED WORK

Existing research on social interaction in VR, in particular Bailenson [1,3], has demonstrated how interventions in VR environments can shape social interaction. This approach "transforms (i.e., filters and modifies) nonverbal behaviors during social interaction" [1], for example, using VR as experimental arena to study the effects of altered proxemics in interpersonal interaction [2]. Bailenson et al.'s concept of transformed social interaction (TSI) [1,3] decouples visual feedback from the actual physical behavior of participants social VR contexts. More recent research by Roth and others explores social augmentations that manipulate or augment non-verbal social cues in VR [24–26]. The powerful effects of these sorts of interventions bolsters Hollan and Stornetta's stance that electronic media are best positioned to support new kinds of communicative affordances rather than "imitation of the mechanisms of face-to-face [interaction]"[11]. That said, existing work in the area of TSI and social augmentation in social VR has, thus far, focused largely on design interventions at the level of **individual** perception (i.e. individuals perceive differently which, in turn, impacts social behavior).

3 OUR APPROACH

By contrast, our approach emphasizes the transformative potential of social affordances [5,6,12,13,20], perceived **simultaneously by multiple participants**. Thus, despite the important contributions of the work above, we argue that these sorts of studies miss opportunities for more radical departures from familiar models of embodied communication. Our research on this topic [6,12,13,19,20] points to opportunities for novel social affordances to unleash new collective capacities. Here we build on established techniques for social augmentation in HCI [14,17,8,7,23,27,16,4] and adapt these approaches to take advantage of the unique affordances of social VR [9,19].

Gibson's concept of affordance models human perception in relation to the action capacities of an embodied subject in the physical world for an embodied subject [10]. Likewise, social affordances represent an ecological approach to social interaction whereby the interactive features of bodies, artifacts, and environments all become potential resources for social mediation. In the physical world, for example, we can conceive of the social affordances of whiteboards, projectors, microphones, name tags, sticky notes, and other props that can be passed from hand to hand (some of the very ones that current VR meeting spaces aim to mirror). Our aim is to create digital mediating artifacts that can operate as 'suprahuman' technologies [12], transforming the ways that humans can interact with one another and enabling new kinds of social coordination to emerge.

We see a promising opportunity to design social augmentations that take advantage of the unique affordances of VR by turning environmental and embodied features into visualizations of social data. Beyond replication of real-world props, we aim to leverage new embodied capacities, new social artifacts, and new environmental features in order to augment social signalling and unlock new social affordances—or what we have come to think of as "social superpowers"—in VR [19]. Along these lines, we identify areas where social cues can be heightened in ways not typically possible in the physical world. These include: (1) social data visualization as a living feature of the environment (see Figure 1), (2) alternative social geometries that expand our sense of embodied relationships in space (see Figure 2), and (3) new forms of embodied communication that facilitate unfamiliar social rituals (see [19]).

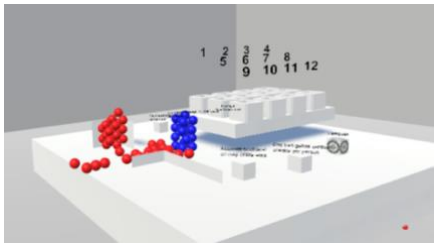

Figure 1: Conversational balance cues visualized in VR. As participants talk, colored balls spawn, providing a sense of how much each person is talking relative to others. A UCSC master's thesis [9] inspired by an earlier exploration [19,21].

Figure 2: Novel gaze feedback mechanics in Rec Room's Q&A environment. A giant cat NPC (upper left) sits on the stage and stares towards the microphone, so that audience members can track who is speaking at a given time.

Our research in this area has taken a two-pronged approach: (1) qualitative research focused on identifying novel social affordances from the emerging design ecology of social VR [15,20,22] and (2) Research-through-Design (RtD) explorations of novel social signaling mechanics in VR (for example, Figure 1 shows a VR interface that provides

feedback to meeting participants about conversational imbalances [9]). Using this two-pronged approach, we have proposed that richer social signalling can be achieved in VR by embedding novel social cues and feedback into the environment and the body [9,15,19,20].

4 REFLECTIONS AND NEXT STEPS

As researchers and creators envision possible social VR and XR futures, we suggest keeping in mind Hollan and Stornetta's embrace of technological mediations that transcend face-to-face interaction. We support the ambition of "Beyond Being There," as the path forward to widespread and creative adoption and use of technologies to supplement transporting our meat selves around the planet. We envision situations in which people may sometimes *prefer* to meet in social VR because they appreciate the way embedded social affordances of this medium make different aspects of social interaction possible. We are presently designing exemplars of these social affordances in VR and testing them against experiences without such affordances. In particular, we seek to identify which sorts of social affordances are most beneficial and to better understand how do they operate. We see broad alignment with the goals of others investigating social interaction in this space [18], and we are excited to discuss our approach with other workshop attendees. We are excited by the recent research paper authored by the workshop organizers [28] and are particularly intrigued by the implications of an alternative social proxemics associated with novel forms of locomotion such as flying and teleportation.

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