

Actual Conversations for the Virtual World

Design Ideas to improve conversation initiation in social VR

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Abstract

Actual Conversations for the Virtual World

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With the inevitable emergence of virtual reality and all the hype around metaverses, a slew of apps and virtual experiences attempted to make use of its new medium's untapped potential. Most of these virtual reality apps are attempting to be an exact copy of a real-world experience for virtual reality. From a design standpoint, this seems like low-hanging fruit for two reasons.

- A. It is impossible to translate all the multi-sensory data we receive from real-world experiences, into the virtual world.
- B. Virtual reality itself has some capabilities that are not possible in the real world.

For these two reasons any attempt to simply copy something from the real world without re-thinking its design principles turns out to be a hollow shell of its real-world origins.

For my thesis research, I picked conversations as one example of this kind of real-world mimicry. My goal is to find design paths to suggest a better use of virtual reality-specific capabilities and strip away real-world specific requirements to make a better conversational experience for virtual reality. I started learning about conversations and how we conduct them in psychology and sociology literature to achieve this. And at the same time, I spend time in

metaverse casually talking to people and observing behaviors and interactions. This initial research phase helped me narrow down my general topic of conversation to initiation of a conversation since I observed that as soon as people start to talk to each other things get easier and smoother, whether it's in the real world or virtual reality.

Conversations in the metaverse (Social VR) are distorted reflections of the familiar real-world ones. The information insufficiencies such as incorrect context or lack of nonverbal signals, prevent these virtual experiences, from fully recreating a “real” conversational experience. So I pivot my thesis project to be a set of design suggestions, focusing on making it easier to join/initiate conversations in the metaverse. And finally, I prototyped a high-fidelity VR experience to demonstrate those suggestions and make a testable prediction on their validity.

Introduction

The inevitable emergence of the metaverse sparked heated discussions among the design community, a glance at the extended reality's R&D markets implies that the virtual world is here to stay and most definitely will grow exponentially. Technological advancements in hardware and software provide a wide variety of opportunities for designers to start prototyping novel interactions and experiences that were deemed impossible a decade ago. Especially when it comes to social virtual reality (VR), because of its delicate and humanistic nature, the possibilities for manipulation and enhancement are limitless. Among these opportunities are conversations. People join these virtual spaces with their customized/personalized avatars and usually have conversations with each other. In some senses, it is very similar to any other social setting, a bar, a concert, a party, etc.... However, the whole “virtualness” of the interactions brings numerous pros and cons that will greatly affect the experience. Being new means that

there is not a ton of experiments done specifically in VR, however, there are numerous theories and grounded research in self-representation and interpersonal conversations to form the basis for my research.

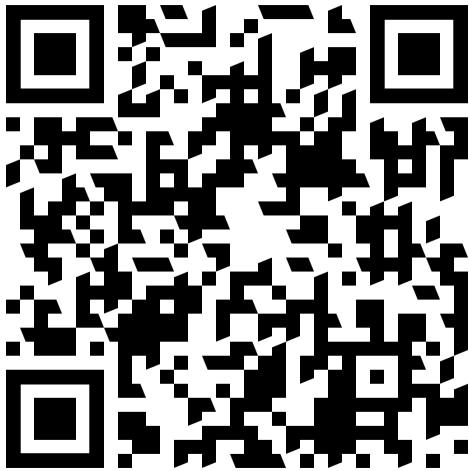


Fig 1-1 Scan QR to watch the comparison video

Background

Due to the lack of data, I needed to examine this new social VR experience (Facebook Horizon beta at the time) from an interaction design standpoint. So naturally, I spend tens of hours in VR, engaging in conversations or simply observing other people's (avatars') conversations.

Watch my video report on the current state-of-the-art metaverses

In these observations, I was looking for pressure points in the flow of interactions. Things like personal space and orientation, and how people stand and form conversation circles. conflict resolve methods, like how people negotiate who claims the speaker role when simultaneous talking happens. How people greet (other) unknown and known people in VR. leave-taking interactions and rejection of bad behavior. And how all this differs from the real world. This initial research phase helped me to form some general ideas for the secondary research phase. First, I indulge myself in the literature on self-representation and avatar theory. In general, I can categorize my findings in this area into three distinct classifications.

How do we create/ choose an avatar? 2. How our avatar affects our/others' behavior? 3.

Technicalities of building, and interaction with avatars.

The first two categories consist of twenty-peer-reviewed literature and cover many interesting ideas that I will later use in discussions.

The first point of interest was, “How we recreate ourselves in an avatar”. Here the emphasis is on the relation between self-awareness and self-representation, the idea is that people generally like to present some degree of “realness” when it comes to creating/choosing their digital avatar. This realness could be an aspect of their character (being an artist, or adventurous) or a level of physical likeness (Hairstyle, skin color, etc), or a combination of both (Kafaie et al. 2010). Although the VR environment (context) can amplify or abbreviate the urge for realness. It seems that the more self-aware the VR environment lets you be, the closer you want to be represented as your real self (Vasalou et al. 2005).

Secondly, how tangible virtual factors like relative size, overall shape, tone and voice, distance, etc will affect others’ perceptions; and also our behaviors inside and outside the VR environment. Here grounded ideas like proxemics (the social rule of proximity between people) rule our virtual interactions as well as the real world (Slater M. 2010). Also, quantification of social/psychological arousal (using GVS, and CVS methods) and comparing it between virtual and real scenarios revealed how a virtual social scenario feels “real” to the perceiver (Karnath et al. 2019). The proteus effect is also being discussed where Nick Yee (2009) revealed stereotypical traits on an avatar that would boost individuals’ engagement in related stereotype-conforming behaviors. In another interesting set of papers, (2005–2009) Professor Jeremy Bailenson at Stanford University did a series of experiments regarding eye movement and gaze. He purposed the idea of multiple points of view for multiple viewers which is a novel interaction that is not possible to replicate outside the VR medium.

All these new ideas and experiments provide me with a new perspective to go back and observe interactions in social VR from a new perspective. This time I focused on the interactions in Facebook’s Horizon and Microsoft’s Altspace, with a more granular fidelity. Since the most thing that is happening in social VR today is conversations, I did a thorough literature review on this topic too. On the topic of approaching others to start a conversation, I found the works of Professor Genta Yoshioka (2015–2019) fascinating. He and his team at Shizouka University used mannequins and a given scenario to record and analyze people’s paths in approaching them. The finely tuned details of their study reveal a lot of information about the physical/environmental properties of conversation initiation that I think can very well

be synthesized to be used for any VR environment too. On the matter of terminating conversations and how it is an agreement on (usually) temporal inaccessibility by one or both parties, I found studies by Knapp (Mark Knapp, 1973), and C. Fichten (1992) very useful. They categorize the interactions involved in two people saying goodbye (Leave-taking) by comparing them in different scenarios. Their work revealed the importance of the duration of conversation and the perception of the length of unavailability (after goodbye) in how leave-taking would take place.

Another important source for learning about conversations and VR is pop culture. I used Clips.io and Fandango services to search for movie clips containing conversation starters, things like bar settings, train wagons, etc. Additionally, I looked at Neuromancer (Gibson, 1984) and Ghost in the shell (Shirow 1989). On the surface, the fictional work about VR has a different tone. It is usually a dystopian portrayal of our world where all the current issues (pollution, inequality, military, etc) are amplified, However, it is useful to see how the experience design in VR can arise primed negative perceptions about the virtual world.

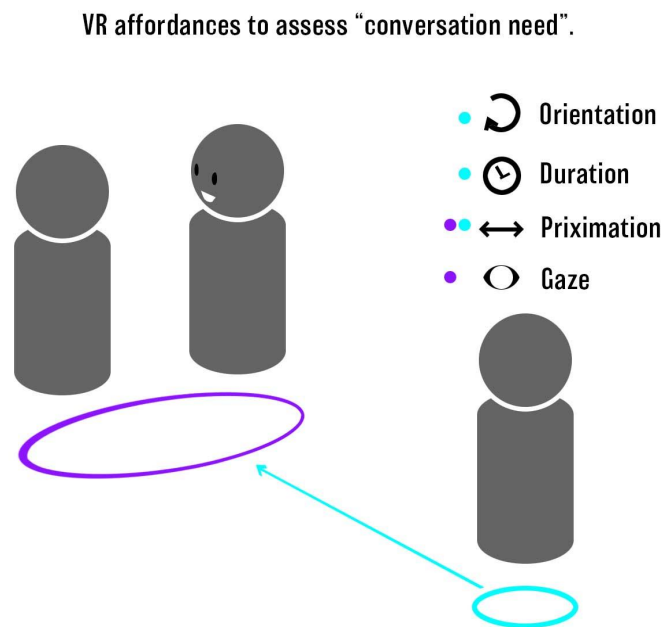


Fig 2-1 Some VR-specific affordances to use as an input for interactions

Discussion

The synthesis and analysis of the research phase is an ongoing process at the time. However, I gathered the result to form a general scope and finally some principles for the design phase. The scope consists of several guidelines, all looking at the conversation from a different perspective.

Anatomy of a conversation, initiation. To start a conversation one needs to evaluate other parties' willingness/need to participate in the conversation (Rutter D. 1977). The information about other person's interests can be evaluated from multiple sources provided by the environment, context, and body language/gesture. Research shows that in real scenarios people can give an accurate enough estimation or signal their interest/disinterest in a very conscious and clear way (C. Fichten, 1992). In Virtual scenarios, however, there are different affordances, to begin with.

The context in VR: the information on the context can easily be conveyed. For example, when two people are talking about their romantic night in a bar setting it sends a clear message to the third person to not start a conversation. Places/situations, Conversation topics, and the number of people involving a conversation can be used just like in the real world, and also amplified in VR. This helps the conversation starter to evaluate the need for a conversation on the other side and decide if he wants to involve.

Body Language/Gestures: VR provides two types of gestures, direct and indirect (automatic). Direct gestures are directly read from hand, fingers, and head positions mounted on a virtual body and connected to the physical device. The indirect gestures are generated based on algorithms that translate direct gesture data into the more fine-tuned eye, shoulder, and torso movements. Because of the difference between people's actual gestures (probably sitting on a couch, wearing VR goggles) and their virtual position (usually standing up, moving around), it is hard to directly translate correct postures or try to read into it for information about conversation need level.

Paralinguistics in VR: VR uses people's voices in conversations. So, an "I'm enjoying this!" with a deep sarcastic voice can be heard and understood by others. However, the lack of real context (precise facial, gestural expressions) might cause problems in some situations, which requires a sure signifier on top of the subtle paralinguistic cues.

VR specific affordances: VR environment despite the many disadvantages to the real-world scenarios, has some specific qualities that potentially can open up into design solutions on the topic of conversations.

User-specific perspective: avatars can be hidden/revealed to specific users. Also, an avatar can always stand back to or in front of another avatar/avatars regardless of the angle of approach.

Time: Passed/ present time can be utilized in the virtual environment. The duration of a going-on conversation can be used to determine its importance to the participants.

Spatial Proxemics: The distance between avatars or the size of a conversation group can be another asset to be used as a signifier in starting and ending conversations.

Spatial Audio: Users can turn on/off their voice for specific avatars or limit/amplify their voice within an area. Given all that is possible and impossible in both virtual and real worlds, my process starts with scoping down and finalizing the idea of a better conversation initiation in VR.

Process

“In dialogues between colleagues, friends, and acquaintances, people continuously evaluate the impact of what they are saying on the other person. At the same time, they monitor and communicate their level of interest in others’ utterances.” (Fitchen, et al. 1992).

The initial research helped me better understand the anatomy of conversations. And based on those findings and some rapid prototyping analysis, I designed two scenarios in which a conversation is initiated. First, a person starts a conversation with another individual. And second, a person joins a conversation that is already ongoing. My thesis project will suggest ways to improve both scenarios for the metaverse. A reliable way of starting conversations in social VR is to evaluate how much both parties want to start that communication. I call this “want” factor, “communication potential” and it is based on the work of Dr. Yoshioka (Yoshioka, et al. 2017) “Communication, which begins with a consignor who verifies the signal of the communication needs and a receiver who recognizes it, is one element in the construction of relationships with others. Expression through language is effective for beginning to

communicate with others. However, such expressions might produce social risk, because language expressions are explicit signals that cannot often ignore the receiver's communication needs.” And since one side of the communication in my scenarios already indicates their desire for communication, I will only address the communication potential for the receiver side. This communication potential factor helps in determining how much the receiver party would want the communication and will help reduce unwanted interruptions. The ultimate goal here is to help users, evaluate and rise this communication potential to make the initiation of conversation, easier and smoother. To start, it is important to take a closer look at the parameters we factor in to evaluate/calculate the communication potential of other potential participants (group or individual).

Communication Potential Evaluation

To evaluate the communication potential of a group or individual in VR, We have to first look at the real real-life experiences and learn how we can re-design them for the VR. The crucial point here is that some interactions in VR are not possible in the real world, the same way that some real-world pieces of information are not directly transferable into the VR. Some of these non-transferable data points are listed below:

Real-life pros	VR pros
<ul style="list-style-type: none"> ● Intricate facial signals (gaze, head/neck orientation, ...). ● Socio-economic ques on who is who. ● Physical attributes (attraction). ● Shared environmental affordances (being in a club/ bar or stadium) 	<ul style="list-style-type: none"> ● Fabricated appearances ● Audiovisual signals (icons, UI, etc) ● Timeline of virtual places (how long someone is in/out of a conversation or place). ● Safe space (facilitates a more adventurous culture)

Knowing the inherent differences between VR interactions and the real-world ones (Despite the similarities); I identified five contributing categories for communication potential evaluation.

1. Personal Preferences
2. Topics
3. Contextual Information
4. Group Dynamics
5. Personal Information

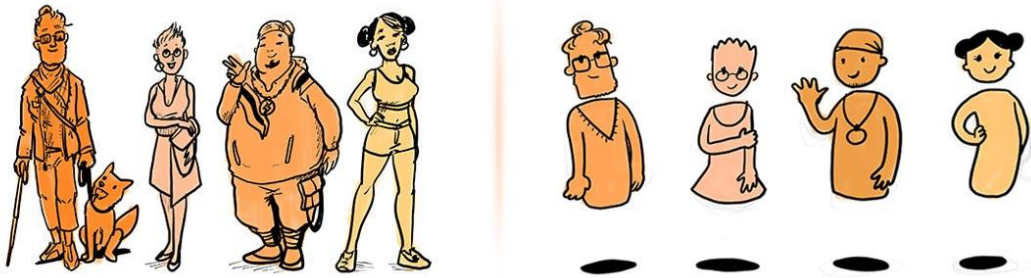
The following is a thorough description of each of these factors with some examples to clarify their relation to communication potential. We will then use them as a guideline to justify design suggestions that accommodate this information for a virtual environment.

1. Personal Preferences

Everyone has preferences when it comes to picking who to talk to. The nature of these preferences and where they came from are not the subject of this topic, but their influence is a defining factor to evaluate the conversation potential in any interaction. In real-world situations people favor attractiveness highly in casual conversations

VR can mask many of these preference indicators (ie. how tall, or short people are, abilities/disabilities, age, etc ...) or give the user the ability to modify their physical attributes which in turn renders our perception of the looks, useless. However, in a virtual world where avatars can look as they desire, the meaning of good-looking, handsomeness, sexiness, etc... will change (although the subject might persist as long as humans are). This will fundamentally change our ability to perceive and evaluate our personal preferences in interactions and potentially will lead to higher acceptance among avatars for communication. Since the look and graphical fidelity of VR avatars depend heavily on the platform and device, for this study, the virtual avatars and their effect are neglected and won't be included in the final design.

Real World vs. Virtual Reality



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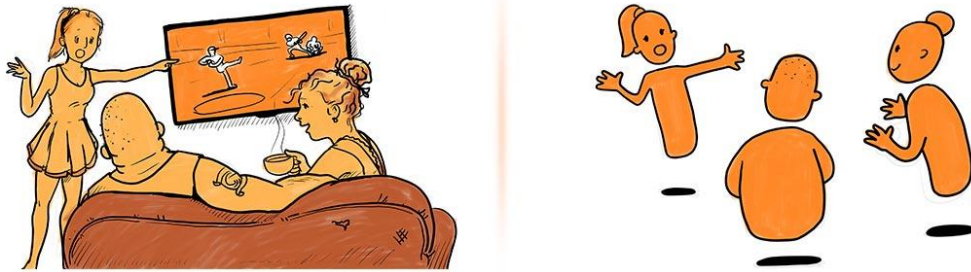
Figure 3 -1 Virtual reality avatars could have little to no indication of users' actual physical attributes.

2. Topics

Every conversation revolves around a topic. Mostly shared interests or recent events, these topics act as catalyzers to form and maintain conversations. The subject of the topic is highly dependent on the environment, for example, a conversation about “who is the killer” can mean something different at a funeral or the cinema. Social VR tries to give context and direction to conversations by putting people in different virtual environments/settings. But sometimes it lacks information about the environment, hence any perception driven by that environment could be inaccurate. For instance, a virtual bar setting in VR lacks the (among many things) location information about that bar so people lose their context of mind about who they might encounter in that bar and the topics that could be of interest (ie. a revolving penthouse bar on top of a skyscraper in uptown Tokyo may not have the same visitors when replicated virtually in VR).

This lack of context for the environment makes environment-dependent topics a bit bizarre and unreliable. On the other hand, there might be no need for an environment where people can set up their environments based on the topics of interest. In reality, people go to sp[ort bars to talk about sport, romantic movies to flirt, networking conventions to talk business, and rallies for politics. Without going too much into the details of a VR solution for topics, for now, I just conclude that knowing/showing the topic of a conversation can raise the communication potential for people who share the same interest around that topic.

Real World vs. Virtual Reality



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Figure 3 -2 Virtual reality conversations are revolving around shared topics, the lack of representation of the said topic could lead to difficulties for engagement.

3. Contextual Information

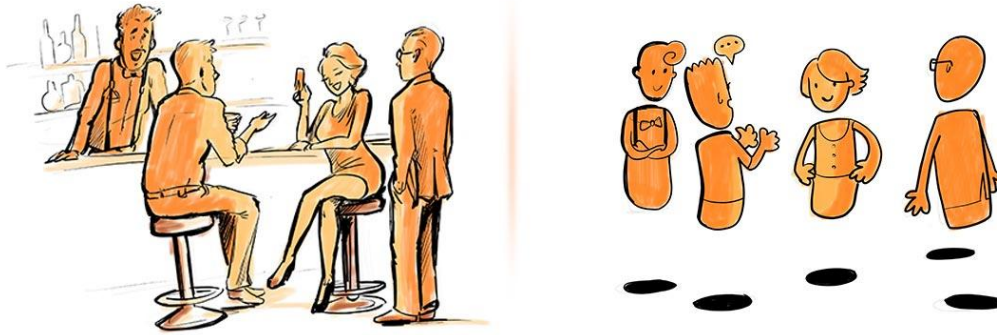
In reality contextual information encompasses many aspects of our situational awareness.

Simple facts like the hour of the day, season, or location could dictate specific rules on how we engage in a conversation. Imagine being invited to VIP access, a prestigious club in a luxurious penthouse in downtown Tokyo. This context will be a determining factor in the types of people you'll meet there and the types of conversations you would have. On the other hand, an exact 3D replica of that penthouse even with VIP access in VR will not contain the same group of people, hence the conversations and events will be different or unpredictable.

We learn a great deal from factors like environment, location, time, back story, etc. In virtual reality, Most of this contextual data is replaced with virtual/fake context (location, time, etc).

This virtual context has little to no connection with the reality of people's situations which can potentially lead to out-of-context or undesirable behavior (ie. in a virtual ballet not everyone would act as if they are sitting at the Royal Hall). Any VR suggestion for communication should be able to cushion this informational dissonance by making connections between actual situations and the virtual world.

Real World vs. Virtual Reality



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Figure 3 -3 Locations, occupations, time, etc. all affect the rules of initiation in conversations. A VR experience devoid of such information cannot facilitate a safe, relevant, engaging environment for people to talk.

4. Group Dynamics

People most likely want to know what is going to happen. In real life, we identify approaches, gazes, subtle smiles, and inviting looks to anticipate an imminent conversation. The lack of all these signals in VR makes for a vague gray area where people need to send very distinct and abrupt signals before initiating a conversation. On the other hand, the conversation initiator wants to know (beforehand) how likely it is to get rejected. Group dynamics are a good indicator for such evaluation. However, in virtual reality, the lack of fine-grained facial expressions and environmental information would contribute to a gray area where it is not clear if a group or individual is open to conversations. A VR facilitation is required to make this information more prominent and help with anticipation when someone is eager to initiate a conversation. With more diligent signaling of anticipation, we can raise the communication potential in both parties.

Real World vs. Virtual Reality



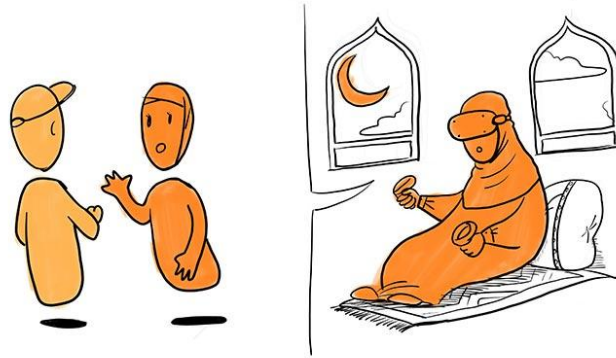
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Figure 3 -4 In reality people avoid approaching conversation groups that are perceived to be close or personal.

5. Personal Information

Personal information and other private data could potentially determine how comfortable an individual is to start a conversation. Things like the local hour (is it 6 pm or 3 am where this person resides now), language (Can they talk the same language as us), physical location (are they in a quiet or busy environment is it summer or winter there, etc ...), and cultural openness (is the person comfortable talking to specific people or about specific topics). This might seem like a DUH at first but affordances in VR brought a slew of design opportunities here. And with great power comes great responsibility. Calculating comfort level might be as easy as showing the local hour and language over each Avatar, however, publicly displaying such information could cause severe privacy issues for some users. In this project, I intentionally avoid raising privacy issues and as a principle, I don't want to access more data than the platforms are already accessing. Consequently, calculating comfort level as a sensitive topic, will not be included in this project and set aside for later examinations.

Real World vs. Virtual Reality



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Figure 3 -5 Showing too much personal information would make it easier to initiate conversations but with the added risk of harassment, discrimination, or privacy issues.

Execution

After an analysis of the five contributing factors, the next step is to design VR-specific answers to accommodate the lack of misrepresentation of data in these areas. By limiting the design scope to the four areas above (Five minus the personal information), now it is important to determine the ways to properly signal this information. In the ideation phase, I sketched a couple of methods to visualize the topic of a conversation, set the mood or environmental design based on the topic, and finally sketch visual aids to determine group dynamics and facilitate the engagement of others. In general three principles were included in this ideation phase:

1. No more invasion of privacy: the metaverse in its current form, has enough problems with personal privacy and data collection. I don't want my solution to be another way to collect even more personal data.
2. Intuitive: other than a wholesome complex system, I'm aiming for simple, single solutions knowing that it may lead to a less elegant design.
3. Device/Platform free: the design should be universally capable to be implemented in any device and within any platform.

These principles in addition to the insights I found from the research are now ready to synthesize into a testable prototype. This prototype is a VR experience demonstrating the

major design suggestions. These suggestions aim to help a user evaluate the communication potential in others and consequently decide whether to initiate a conversation or not. The final prototype will demonstrate

1. Topic Trail

People tend to jump from topic to topic in casual conversations. Visualizing the thread of topics will help a spectator evaluate if they want to join a conversation.

And if they do how involved they can get with the group. Visualizing a history of conversation topics will help a newcomer to understand and evaluate the conversation potential for this particular group.

2. Dynamic Props

Instead of having separate rooms to talk about sports, news, fashion, etc ..., each conversation area would dynamically become specific to the topic that is being discussed. Rather than making topic-specific conversation spaces (ie. news, fashion, food, etc). A dynamic topic space could help conversation seekers to browse and find interests, based on the group dynamics and their preferences.

3. Group Bubble

Aside from showing open/close groups, a group bubble informs everyone when someone joins the conversation, creating anticipation and momentum for newcomers. A visual boundary around conversation groups helps a newcomer anticipate and other members of the group notify, joining a new member in their conversation.



Fig 4-1 Showing a record of the spoken topics will help others to chime in if they feel the topic is relevant.



Fig 4-2 Group Bubbles will help anticipate the initiation of a conversation or define closed groups.

The Prototype

Started in Spring 2022, and with a solidified idea, I went to build mode. The goal was to make a fully interactive VR prototype to demonstrate the suggestions and also test the idea with more users in the future. After a couple of sketches and body storming practices, the final flow took shape. Although later I decided to add a confirmation phase for joining the conversations.



Fig 5-1 User flow for the VR prototype shows how the bubble reacts to approaching avatars.

The final prototype is a VR application depicting a conversation group. A marker in front of them invites the user to approach the group. In this conversation group, three avatars are talking, and the user can hear them as they approach the group. There are help boards that display basic tips for locomotion, both on hand controllers and on the wall. When the user closes enough to the conversation group a bubble around them will grow to determine the boundary and openness of the group. A trail of spoken topics and some props show what has

been discussed and what is the current subject. If the user chooses to join the group a timer will count and the bubbles will merge, so everyone in the group will notice the newcomer creating a welcome session.



Fig 5-2 Screenshot of the VR prototype: Help panel at the starting point.



Fig 5-3 Screenshot of the VR prototype: Control panel to turn ON/OFF suggestion visual aids.

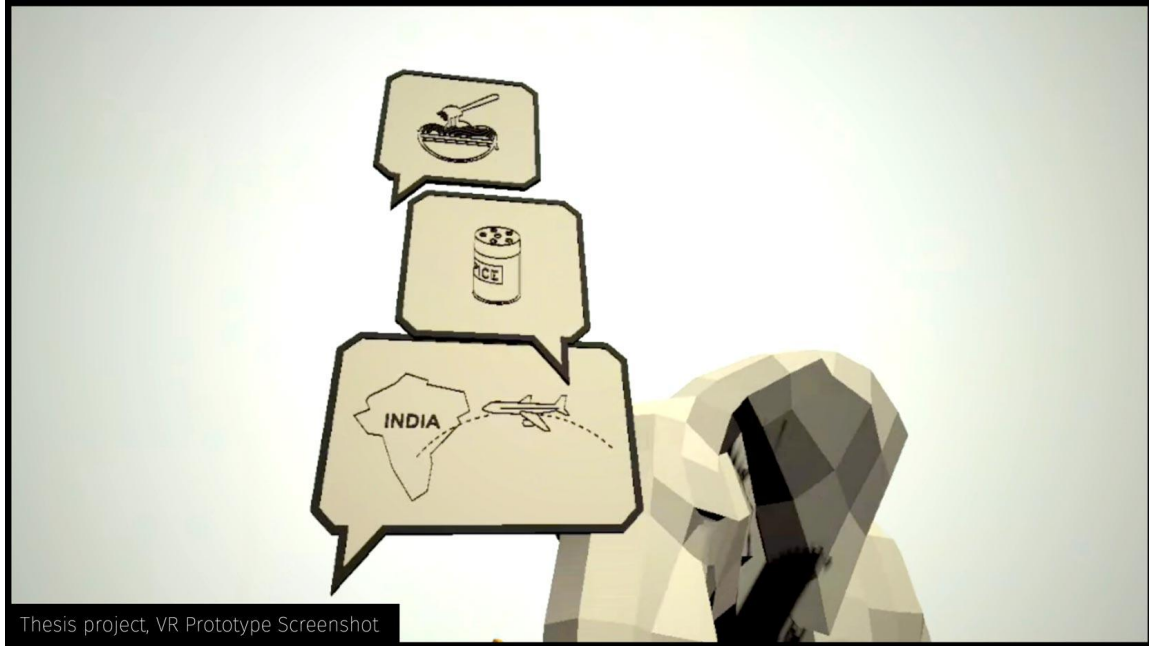


Fig 5-4 Screenshot of the VR prototype: Topics trail display, showing what has been discussed.

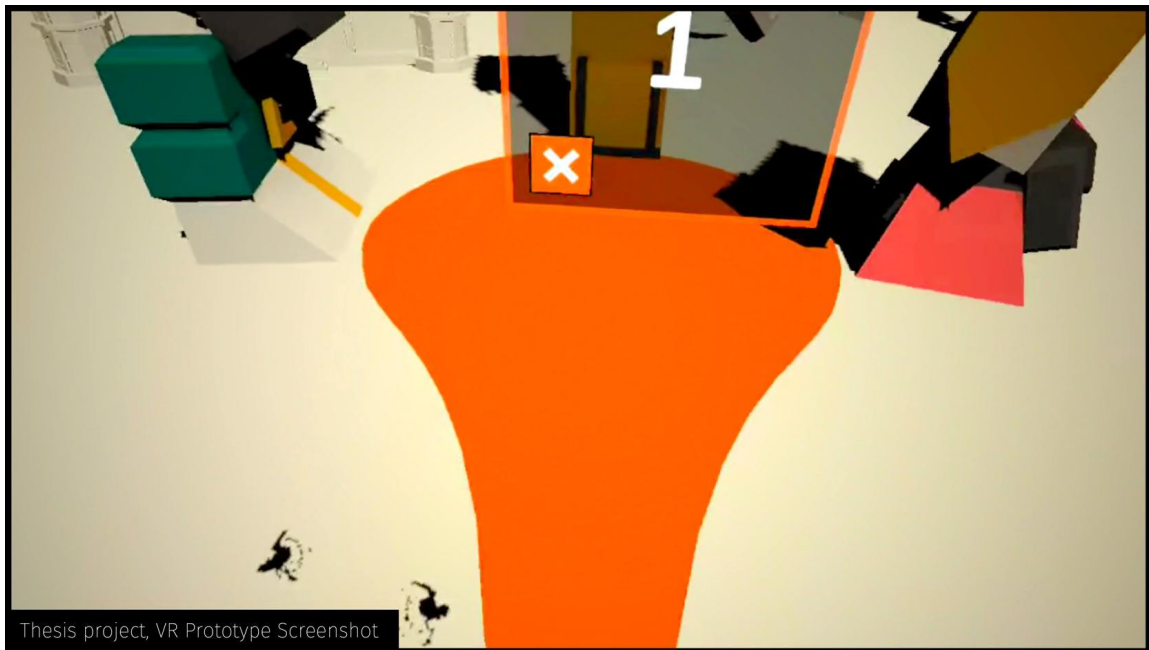


Fig 5-5 Screenshot of the VR prototype: Bubble reacts to the users' approach, and asks if they want to join.

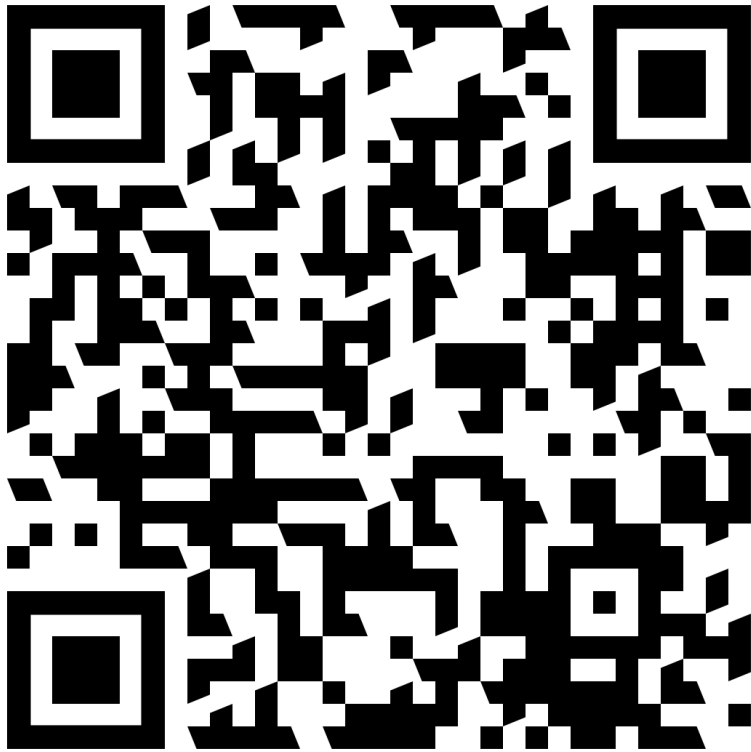


Fig 1-2 Scan QR to watch the VR prototype video

Conclusion

Working on a year-long project taught me the importance of scheduling and sticking to the schedule, I learned a great deal about planning and managing resources. On the technical level, I learned more in-depth coding for interaction design and struggled in the uphill battle of version control and software compatibility. But the greatest takeaway for me was to be able to include non-technical users in the design process. During the pandemic months (COVID-19 if you read this many years in the future when pandemics are everyday inconveniences), I used my family members as users a lot. It was their first time experiencing VR and more than that first time engaging with my work directly. So the highest point in my project was when my family actually engaged with what I do and I get to see their excitement and answer their questions about my design.



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