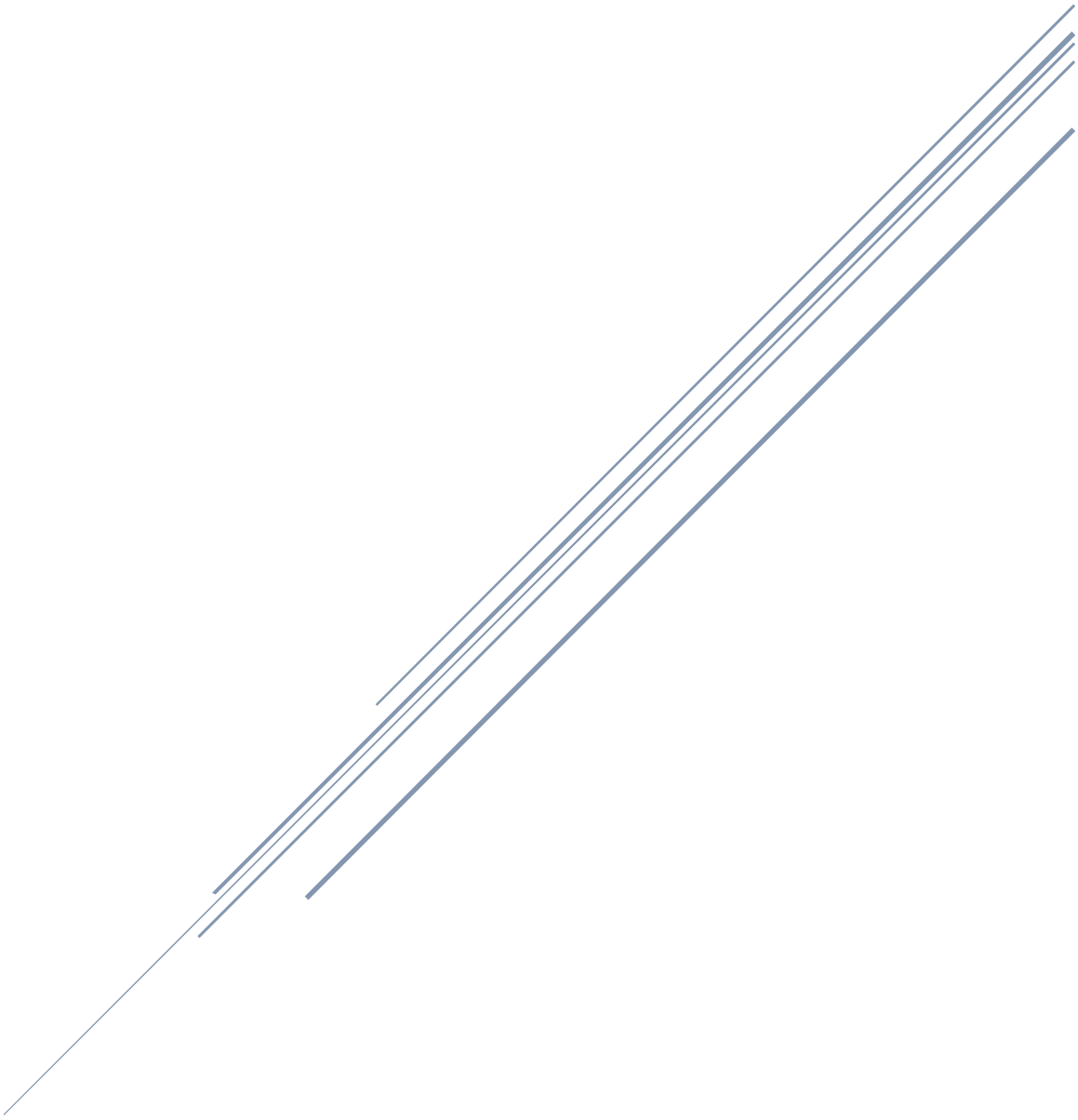
VR CALL



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Section 1: Introduction

In today's business and daily life, more and more tools and methods are developed to improve communication efficiency between people. We can join video conference and transfer files whenever and wherever we want. However, the face to face talking is still the most effective way to communicate with each under all circumstances. A face to face talking is hard to reach even for the people in a city, a community, a building because of different personal schedules. VR call is such an innovation to solve this problem.

In this report, we will discuss our observation to current VR call and solutions to improve VR call in many aspects. Several points about how to improve VR performance and customer experience, innovation implement, strategy and development timeline as well as obstacles to overcome will be introduced in the next 6 section.

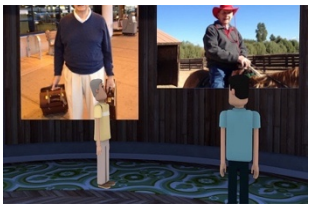
Section 2: Significance

Our team is attempting to develop a kind of VR devices together with the corresponding applications. By using these devices and applications, we want to finally reach our proposal of making a VR call. Whatever the medium of communication is, people always want and need to have a face-to face communication. That's the reason why a lot of people fly between cities every day. Noticed the demand of face-to-face talking, we want to develop VR call. As we all know, VR means virtual reality, which means a realistic effect. VR technology can be used to make our distant communications more like face-to-face ones. Virtue reality can provide not only videos and images, but a more immersive experience. VR phone call is not a replacement for the traditional audio phone call. It provides an option for people when they want to talk to someone in person from thousands of miles away. This technology is not just about meeting people's demands, but also creating opportunities for more people who have never thought about VR phone calls before. For anyone who is disturbed by the distance, VR call is a good choice for him. For couples and families far away, VR call can help them see others even hug others (virtually) like people in the flesh, thus strengthening their emotional bonds. For people unable to move freely, VR call can also help them communicate with others more easily, and they can even have a drink together in a virtual situation, which is not that convenient in the physical environment. Today's VR technologies only have virtual people and virtual environment and focus on sights and hand gestures about users, that's what their limits are. Compared with existing virtual reality technologies, our target is to make real people image in the virtual environment, which means we first need to store the users' image information and then use VR technologies.

Section 3: innovation

Nowadays, Virtual Reality is becoming more and more involved in our daily life. There are various VR devices and multiple VR applications, videos and games. With the development of the technology, VR can be part of our life. The innovation of the VR Calls can be mainly divided into 3 parts, VR performance, Devices and Communications.

VR performance: At present, there are some applications aimed at providing some features to allow people to chat with each other. However, the images of individuals are mainly in cartoon and are not so explicit. VR calls, however, can use 3-Dimensional Scanner to record the real images of people. Customers can talk with each other in the images of themselves. Meanwhile, the environments can simulate the real world views. People can choose the environments arbitrarily such as conference rooms to have VR meeting, classrooms to have VR classes.



Devices: although there are lots of VR devices on sale, they are complex and hard to use. Our VR calls devices have two main improvements. First of all, they are very convenient. Without The weight of the devices is limited and we can wear it just like wearing a pair of glasses. What's more, one-click operations help us get rid of the complex set-ups and devices are easier to use.

Communications: current VR applications are limited by the relatively large latencies. Users have to wait a long time for the response. To improve the real-time behavior of our VR calls, small latencies based on faster internet links are very crucial. Besides the small latency between devices, the response time between devices and users are also important. Machines can detect the users' actions, calculate the outputs and give out the responses more quickly.

Section 4: Approach: Strategy and Timeline

Software development:

- Virtual environment

  Virtual environment is a “place” for people to communicate with each other through VR call. By putting different kinds of 3D models into the virtual environment, the designer could create different virtual places for users to choose. Photos, music and videos could also be added into the virtual environment by users. In addition, the items in the virtual environment are interactable so that the users could play with something together while talking to each other.

- Virtual figure

  Body language is very important in the communication with others in person. The virtual figure of our VR phone call should be able to convey the body language. By using the camera on the devices, the users’ body movement could be captured and transferred into the movement of the virtue figure in VR call. With the body language of the virtual figure, the conversation will become more natural.

  Facial expression is also very important in communication. By using another camera or detector of the device, the users’ facial expression will also be captured and transferred to the facial expression of the virtual figure. With this function, you can just express happiness by smile instead of the saying the words or making a sound.

- Communication system

Since there is massive data among users, it is necessary to develop a more efficient method to compress the data so that we can transfer more information at the same time. Also, for the communication system, it is essential to make great advantage from 5G technology. By cooperating with communication companies, we could make the VR call with almost no delays and stutters.

Hardware development:

- Camera and microphone:

  To get the real images of people, cameras are very important. First, cameras should have relatively high resolution, since high resolution can produce high quality of photos. Moreover, cameras should also have functions as 3D scanners, because when only this kind of scanners can produce 3D images which are the main elements to form VR images.

  To guarantee the quality of the voice, VR devices should record the sounds and send the sound completely. For recording, there are some technology like Hi-Fi which can provide the high quality of voice records. However, how to send them completely is a difficult question. We need safer internet with less interference.

- Processors:

  Since VR call requires high-speed, real-time data processing and transmitting, high-performance processors are essential to our VR device. Different processors are responsible for different functions. We can work with the chip companies and ask them to customize the high-performance processor we need. The custom processor should include baseband for 5G

communication, graphic processor for creating the virtual environment and the video and audio processor for processing and compressing the data.

- Portable VR device:

  The VR glasses nowadays can only detect the users' body movement by joysticks held in users' hands. And the size of the glasses is too large to carry. Our VR device is based on the design of the VR glasses. But all the cameras and processors are highly integrated and embedded in the frame of the glasses. Building a device like this requires not only the industrial design, but also new types of lightweight materials. In addition, to make this device comfortable for most people to wear, we also need to collect different people's facial structure and test the prototype's comfort level for different people. There will be an adjustable structure on the device as well.

Timeline

now-2021. With the development of 5G, internet of high speed and security can be mature.

2021-2022. Combination of 3D scanners and high-resolution cameras can be realized

2022-2023. High quality and portability VR devices can be invented.

2023-2024. VR calls can be developed and become popular among people.

Section 5: Team (and Support Team)

Virtual Reality (VR) is a brand-new practical technology developed in the 20th century. Virtual reality technology includes computers, electronic information, and simulation technology. Its basic implementation is that the computer simulates the virtual environment to give people a sense of environmental immersion. It uses a computer to generate a simulated environment that immerses the user in the environment. Virtual reality technology is the use of real-life data, electronic signals generated by computer technology, and combining it with various output devices to transform them into phenomena that people can feel. It can be expressed through a three-dimensional model. These phenomena are not what we can see directly, but the real world simulated by computer technology. If we need to develop our proposal, we need to cooperate with a lot of companies in different fields. First company we want to cooperate with is google, which has a lot of technologies for software development, and we can develop software and systems according to our demand and devices. We also want to cooperate with Sony, for its intelligent video and audio technologies. Sony has already had their own VR devices, but the devices are for VR games. We can cooperate with them to develop a kind of new device to make VR call possible by using their VR devices technologies and audio and video technologies. We need real-time communications, as a result, enough network is necessary. With the development of 5G technologies, it's more possible for us to make a VR call. Qualcomm is a company which has developed a lot about 5G technology, we also want to cooperate with them to provide enough network for our users to give them a more fluent communication experience. These are the 'dream team' members of our proposal. With the cooperation of them we can make our VR call possible to the public.

Section 6: Potential obstacles

Today's smart cell phone might be powerful to create virtual figure of VR phone call because of its powerful CPU for machine learning and artificial intelligent. The frontside camera is enough for facial expression capture. However, the backside camera often cannot be placed in an appropriate place to capture the user's motions even with a good 3D scanner. A set of extra equipment might be needed to connect to the user's phone and assist to form dynamic picture if we want to implement a motion interactive VR call.

The VR call need good support of hardware and a good combination of hardware and software, which means that it might need relative huge investment compared to other common software. The employee needs to hire both hardwire development engineer and software development engineer and let them cooperate well. Only big company with adequate money or star start-up company with enough investment could do so.

Even the software and hardware are successfully implemented, the customers might cannot accept such a new and expensive thing rapidly. A glass device is expensive enough for a user who just want to have VR phone call. This might be the reason with most of VR call products now are designed in cartoon style and need equipment as few as possible. It is a balance between technology and market. Therefore, the company tele-meeting is a relative better entry point to popularize this new product because the company is more willing to invest money in improve communication quality within company.

Section 7: Conclusion

The VR call is invented because of the demand of interactive video phone call. Even though there are serval companies have issued their products with specialty, the users still do not accept them widely. Some innovation points above could be done to improve the user experience wholly. Even there might be some obstacle in implement the product successfully, we have corresponding solution. However, one thing we must to remember, we need to pay more attention to how to make the VR call succeed in market. Because the market is the rule to measure whether customers are satisfied with the product or not.

Section 8: Reference

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