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WINGS TO YOUR THOUGHTS.....

Holographic Calling by Enhancing Video Call

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ABSTRACT: *The calling until was done using audio and 2D video. The video calling is a process of talking between two users face to face. It gave the ideology of transmitting the 2D set of image in sequence of frame which resulted in 2D video calling. It lacks ability of visualization. I.e. video calling cannot give real effect. Holographic calling is a process of capturing in 2D and representing through quadratic prismatic display. We have proposed such a system which is capable of capturing 2D video with the help of mobile camera and then displaying illusion over quadratic prismatic display. In short our system gives facility of enhancement in video calling. We have provided additional features like chatting module as well. The holographic effects can always give better performance and can give better experience of calling. It gives realistic effects. The future scope of our system will be enhancement of holographic projection into actual 3D effect.*
KEYWORDS: *Prism, Local Host Server, Datagram Socket, Web Services*

1. INTRODUCTION

Holographic calling [3] is a process of capturing in 2D and representing through quadratic prismatic display. The holographic effects can enhance the performance and can give better experience of calling. Hence we have proposed such a system which is capable of capturing 2D video with the help of mobile camera and then displaying illusion over quadratic prismatic display. This calling enhances the video calling [2] process. In short our system follows this approach; in the very first phase streaming of video from mobile cameras and audio from microphone over sockets. In second phase processing output stream with operations like translation, scaling and rotation and the 4 replicas are produced on axial co-ordinates on display. Prism assembly is placed on display and illusion is projected. Thus Receiver gets a video illusion at other end.

2. DEFINITIONS

2.1 VOICE OVER IP

Voice over IP (VoIP) [4] is a methodology and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. Other terms commonly associated with VoIP are IP telephony, Internet telephony, broadband telephony, and broadband phone service.

2.2 TRANSLATION

Moving an object is called a translation. We translate an object by translating each vertex in the object. Translation is the process of translation of object in desired motion.

2.3 SCALING

Changing the size of an object is accomplished by a transformation called scaling. To change the size of an object, scaling transformation is used. Scaling can be achieved by multiplying the original coordinates of the object with the scaling factor to get the desired result.

2.4 ROTATION

Rotation is a transformation that causes a point p to be moved relative to a central point, without changing the distance of p from that point. This transformation is accomplished by applying the rotation equation to each vertex of the object. A rotation is specified by providing an angle, B, indicating how many degrees of rotation are desired. This angle may be either positive or negative. A positive angle indicates a counter-clockwise rotation about the origin.

2.5 WEB SERVICES

Web service is a method of communication between two electronic devices over a network. It is a software function provided at a network address over the Web with the service always on as in the concept of utility computing. The W3C defines a Web service generally as, a software system designed to support interoperable machine-to-machine interaction over a network.

2.6 GOOGLE CLOUD MESSAGING (GCM)

Google Cloud Messaging (GCM) [1] is a free service that enables developers to send messages between servers and client apps. This includes downstream messages from servers to client apps, and upstream messages from client apps to servers. For example, a lightweight downstream message could inform a client app that there is new data to be fetched from the server, as in the case of a "new email" notification. For use cases such as instant messaging, a GCM message can transfer up to 4kb of payload to the client app. The GCM service handles all aspects of queuing of messages and delivery to and from the target client app. Google Cloud Messaging (GCM) is a fantastic push notification service for Android apps.
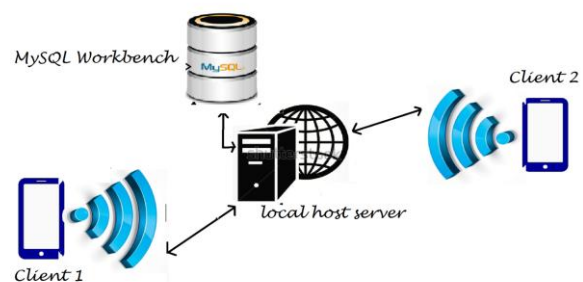
3. METHODOLOGY / SYSTEM IMPLEMENTAION

Figure 1: System Architecture

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Fig. 1 is showing system architecture which works as follows: It has mainly three components:
1] Client 1 (user 1)
2] Local host Server
3] Client 2 (user 2)
First of all the components should get connected to the same network i.e. Wi-Fi hotspot. Client 1 and client 2 installs Holo app on both the mobile phones and via this app both the clients register on the network using local host server. I.e. Login id and password for authentication purpose. MySQL database is attached with the local host server. This stores all the user registration details like Name, Mobile number, E-mail id etc. At the time of registration OTP is also generated which is used in case of forget password. Once user logged into system, he will see list of all the registered users. Then user can select anyone with whom he wants to call.   Once all components are in same network, then connection is established between two clients. This connection is established using well known technique Message Passing Handshake. This is shown in Fig. 2.
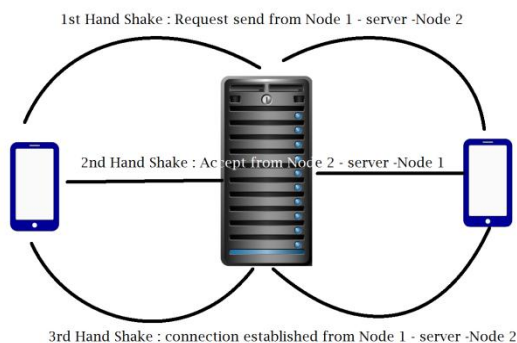

Figure 2: Message Passing Handshake

In this technique in first handshake client 1 sends the request to client 2 via local host sever. When client 2 accepts the request then it sends acknowledgement back to client 2 through server. After that in third handshake client 1 sends data and acknowledgement to client 2 via local host server, and connection is established as well between both the clients. After this connection establishment user selects the camera i.e. Front or rear and resolution as well. Operations will be performed on the video stream like Scaling Rotation & translation.

Our web-view page is divided into four angle original angles, 90°, 180° and 270°. We get 4 replication of particular Frame. The 4 replicas are produced on axial co-ordinates on display. Prism assembly is placed on Display and illusion is projected. Thus Receiver gets a video illusion at other end. In this system we have given additional feature of chat module as well. Chat module is implemented with the help of Google Cloud Messaging (GCM) technique.

PRISM CONSTRUCTION

We are using prism assembly to show holographic illusion of the calling user. Prism construction must be accurate in order to get enhanced view of the user. In optics, a prism is a transparent optical element with flat, polished surfaces that refract light. At least two of the flat surfaces must have an angle between them. The exact angles between the surfaces depend on the application. Fig. 3 is showing architecture of prism assembly.
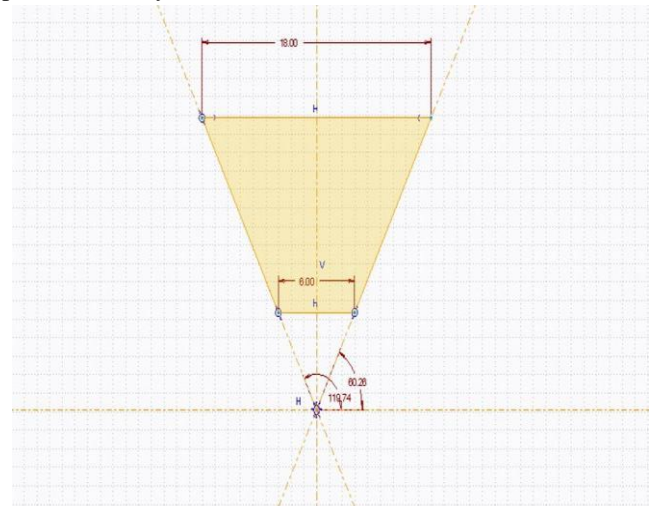

Figure 3: Prism Assembly

4.   ALGORITHM
Datagram Socket
SERVER:
1.   Create a Datagram Socket object DatagramSocket dgramSocket = new DatagramSocket(1234);
2.   Create a buffer for incoming datagrams byte[] buffer = new byte[256];
3.   Create a Datagram Packet object for the incoming datagram DatagramPacket inPacket= new DatagramPacket(buffer, buffer.length);
4.   Accept an incoming datagram dgramSocket.receive(inPacket);
5.   Accept the sender's address and port from the packet InetAddressclientAddress= inPacket.getAddress(); intclientPort= inPacket.getPort();
6.   Retrieve the data from the buffer string message = new String(inPacket.getData(), 0, inPacket.getLength());
7.   Create the response datagram DatagramPacket outPacket= new DatagramPacket(response.getBytes(), response.length(), clientAddress, clientPort);
8.   Send the response datagram dgramSocket.send(outPacket);
9.   Close the DatagramSocket: dgram.close();

CLIENT:
1.   Create a Datagram Socket object DatagramSocket dgramSocket= new DatagramSocket;

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2. Create the outgoing datagram DatagramPacket outPacket= new DatagramPacket(message.getBytes(), message.length(),host, port);

3. Send the datagram message dgramSocket.send(outPacket);

4. Create a buffer for incoming datagrams byte[] buffer = new byte[256];

5. Create a Datagram Packet object for the incoming datagram DatagramPacket inPacket = new DatagramPacket(buffer, buffer.length);

6. Accept an incoming datagram dgramSocket.receive(inPacket);

7. Retrieve the data from the buffer String response = new String (inPacket.getData(), 0, inPacket.getLength());

8. Close the Datagram Socket: dgram.close();

5. RESULT AND TEST CASES

TABLE I: Result and Test Cases

Test case Id	Test case name	Inputs	Execution Steps	Expected Result	Pass/Fail
TC01	Login	User Name & Password	Enter Valid User Name & Password Click Login	User Gets Logged In Application	Pass
TC02	Call Contact	Select Valid User For Call	Set App Permissions Select Settings Tab Choose Valid Setting Switch to connect Call & Send Request	Message Passing Handshake And Notification Of Call At Both User Video Call Starts	Pass
TC03	Audio Call	Audio User Tab	Select Audio User Tab. Create Connection	Audio Call Must Connect And Start	Pass
TC04	Chat Module	Select Message Tab	Type in Tab to Send Message	User Get Notification Message must be delivered	Pass

6. FUTURE SCOPE

Proposed system contains translation, scaling and rotation of the 2D image and video call is 2D call projected on quadratic prism. However there is future scope of adding a depth in the 2D visual to get an virtual 3D and other way the capturing can be done in 3D angular and 3 Dimensional cameras these can be used for capturing object in 3D and proposed system will help for conversion in regular call to virtual holography. Thus system can be enhanced for capturing in 3D and projecting in 3D for further enhancement of system.

7. CONCLUSION

The project undertook the development of a holographic calling, solution on an existing 2D video call. While there could certainly be demand for applications such as this, the development of such a system was complicated rather than anticipated. While developing video, audio streaming over socket, it was necessary to implement a processing side of a local host server as well as clients. Also, when implementing an Android application, the developer must make a choice. Either they can develop an application that will work on the majority of Android devices by working at a low API level, or they can simplify the problem by working at a higher level API. One problem of course is that to develop for a higher level API, the developer must have access to devices capable of running more recent versions of Android, and must accept that if they wish to sell their application, they will be selling to a more limited market.

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