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An Real-Time Live Streaming Holographic Display using Android

Mrs.S.Vaishnavi , Preethi.C, Ramanathan.M , Srudhin. M, Subash.R ,
Department of Computer Science , Sri Eshwar College of Engineering

Abstract: *Hologram have always been a developing technology for more than decades. Since,various advancements of holographic display had been proposed, the concept of real time live streaming hologram was always been a concept that is yet to come into effect. We proposed an live streaming holographic display using an android. The idea is to create a 360 degree hologram by an app that display real time live streaming video. The hologram we generated is based on the Pepper's Ghost effect and Holographic Projection Pyramid.This is an portable device which is less costly and can be used by everyone who owns some kind of android display like smartphone or a tablet or android TV etc.*

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I. Introduction

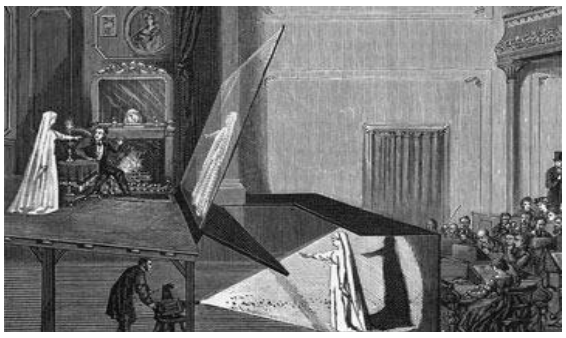
Holographic projection is an innovation that has enormous applications in different fields like science, training, workmanship and business among various others. 3D Holography is accomplished by a gadget called a holoprojector. A holoprojector utilizes the different optic standards to extend monster scope, high goals photographs onto fluctuated seeing surfaces at totally unique central lengths, from similarly little projection devices. Considering the latest films being seen in 3D, center lies around 3D holographic projections so that the review of 3D motion pictures might be conceivable without the need of 3D glasses.

Holography is the strategy we use to record examples of light. These examples are duplicated as a three-dimensional picture called a 3D image. While Hungarian physicist Dennis Gabor designed the multi dimensional image in 1947. The present new innovation gives some remarkable points of interest to not just ordinary buyers yet in addition enormous business partnerships and governments. Three-dimensional holographic projection innovation is founded on an procedure called Peppers Ghost, and the Victorian theatres across London was the first to utilize during the 1860s. Pepper's Ghost was ordinarily used to make ghostlike figures in front of an audience. Escaped the crowd's view, an on-screen character wearing a spooky ensemble would stand confronting a calculated plate of glass. The crowd would have the option to see the glass, however not the entertain legitimately.

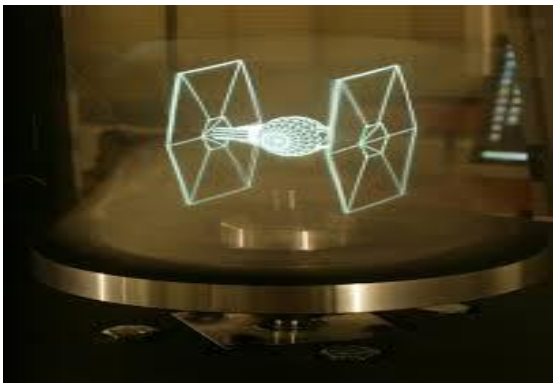
Types of Hologram

1.The Pepper's Ghost effect

The basic gadget utilized to arrange the delusion is an optical pillar splitter worked backward to consolidate two pictures towards the crowd's perspective. The pillar splitter component is normally a huge, level sheet of common glass. The picture of one scene is reflected from the glass surface towards the watchers, and the picture of a subsequent scene is transmitted through the glass. The stage lighting is controlled to specifically enlighten the scenes, however not simply the glass, which is imperceptible to onlookers. The joined picture is veritable also, not a figment.



2.Holographic Spinning Mirror Technique
Spinning mirror systems are generate a different view to each viewer depending on the angle of vision that takes over the screen. It is used to build interactive 3D holo-graphics and autostereoscopic to multiple simultaneous viewers around the screen.



3.Hologram Pyramid
The Hologram Pyramid is tech that permits you to see and make pictures from your telephone that seem to coast above it with the hallucination of a 3D holographic picture.

4.Fan type hologram
3D multi dimensional image fan show, 3D impact picture and video are delivered by turning drove fans. It can help shop proprietors spread and offer promoting content productively. It is a financially savvy answer for appear a holographic impact gliding.

II. Related Works

Holograms are the technological marvel that had and always have been the one to become a visual feast to everyone. As various authors proposed various implementation on generating holograms and implementing them. We came across some references from various papers and based on it, our concept of the holographic app is made. Themultimedia technologies have a great potential to support learning and teaching [1], as the 3D

images allow the student to understand the certain topic easily and intuitively [2] [3].Toimprove the presentation of teaching material in the classroom., the holographic pyramid is used to let the digital content to be shared in a group of people easily without the use of glasses and wearable devices.However, there are also some issues and challenges founding the current scenario.

The screen which causes difficulty for the user to view the content on the screenas the current AR application is displayedin a small screen of a smartphone where not many informationcan be displayed on [2].To view the virtual objects present on the device's screen, users also need to always hold their smartphones or tablets and target their devices to an image targe. [2].Socially separated user experience AR technologies are only available for only one user to view the AR object at a time [4].

This issue makes human-computer interaction difficult and hard to share digital content.The application of holographic pyramid is static and support for exhibition displays only, where user cannot interact with the holographic display[5]. Although there is some effort being made to improve the interactivity of holographic display, for example, the addition of a tracking sensor that allows the user to interact with the 3D objects using hand gestures [3] [6]. Besides that in, smartphones are used for the interaction[7].The authors have proposed 3D output generating systems taking input from Kinect 2.0 sensor for sensing the user and the skeleton movements made by the users are tracked and the gesture made in thin air is processed and the required action is performed. It is an excellent innovative idea for gesture controlling over the traditional methods used today. Although the framework is defined precisely, sensitivity and area defined for gesture movements are the two critical areas to be controlled according to the system requirements.[8].This paper tends to provide an alternative yet novelty option to allow the user to interact with the holographic display.

Department of Electronics and Communication4 UMIT, Mumbai, India proposed the working of 3D Holographic Display with gesture using Raspberry pi [9].An 360◦ rendering of colour holographic moving image, looking like a real object had been developed byKyungpook National University made by a table-top holographic display system which is in article of applied sciences[10].3D Holographic Pyramid for Interactive and Immersive Learning makes the virtual objects can display in thin air like a real object and makes the holographic effect more realistic and interactive, as the user can interact with the virtual objects using an image target in a conference paper dated November 2017 [11].

III. Proposed Implementation

System Specifications

Hardware Specification

Full HD Android Display
Speaker
Minimum 2Gb Ram
Uninterrupted Power Supply
Beam Splitter Glass
Metallic Outer Rig(Stand)
Connectors
Black Frame

Software Specification

Android 4.1(Jelly Bean) or Higher

The holographic projection without any medium is a technological advancement which is yet to be implemented.From its origin,the hologram that is generated always based upon a some sort of medium to projects the holograms.As,everyone in the world uses some sort of android devices like smartphones or tablet or even TVs , android had been impacting every industry.Our idea is to develop an app that converts the normal video call app into a holographic video call app.

This app combines the concept of video call with hologram.The app looks like a normal video call app. On the sender's side,the sender selects the person whom he/she wants to contact. As the received side,video appears natural on the holographic display when users are viewing through the Pyramid Prism in single viewpoint.

The app made specifically converts the live video call into a four directional video structure so that a 3D Holographic form in the receiver side based on the layout shown in Fig.1.

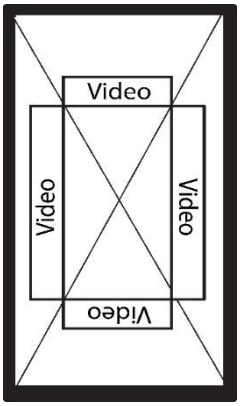


Fig: 1 – Hologram Layout

The holographic display is created by implementing the Projection Pyramid as shown in Fig 2. This technique requires a combination of two main hardware, an android display that is placed bottom with the projection pyramid placed on top of it. The display projects the video from the app and the video in the scene is reflected on the reflective surface at an angle of 45 degrees so that it shows an holographic video in it.

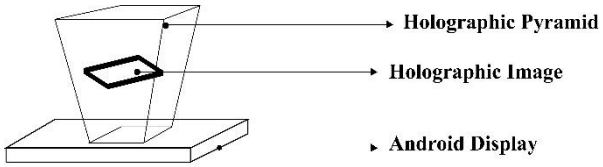


Fig: 2 – Hologram Projection Pyramid

The defined hardware are implemented as shown in Fig 3.The inside of block consists of androiddisplay(i.e, Smartphone,Tablet,Android TV,etc.) with the app installed in it. The display act as an holographic projector with an app helps in creating holograms.The metallic rig acts as a stand with black frame forms the outer surface with a single viewport which helps in viewing holograms with more accuracy.As the black outer frame blocks the outer atmosphere lights entering inside.

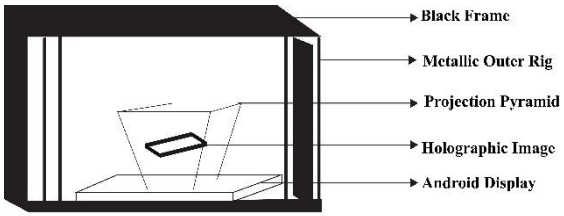


Fig: 3- Full Holographic Display

IV. Future Scope

The Real world uses of hologram application are endless.It ranges from Live stage shows to Military and space application.In 2012, Snoop Dogg closed out his headlining set by bringing out a "hologram" of the rapper Tupac Shakur which is astonishing as the rapper died in 1996.These kind of holograms helps in making a fantasy to reality.In Marketing, the holograms help in making advertising more realistic approach as it helps in attractive more people and helps in reaching business at greater heights.Holograms in Gaming makes simulation like experience without need of additional gadgets. Education field will be more impactful as holographic teaching helps in students to understand the concept more indepth gaining knowledge more faster and easier.The 3D experience are easily replaced when the holograms came into practice in terms of Entertainment field.Training like driving a car or accident test in car are easily simulated by holograms as it produces far more greater results than just numerical data.Medical practices from surgery to scientific experiments are more sophisticated and more accuracy of practices are done.Communication using holograms are greatly improved and helps in communicating as they are in person.Military and space applications from stealth on enemy borders to establishing a civilization on other planets are achieved using holographic technology without spending a lot of budget on it.From Star wars to Avengers End Game, every sci-fi movies

have some kind of holographic communication in it.As the development of holographic technology,makes this into reality.

V. Conclusion

As the future of this technology and its uses are limitless.The advancement in technology over the past decade is more immense.These development in technology helps in reaching an common people.We proposed an idea which makes holograms to be portable, cost efficient and used by everyone.Our idea maybe a tip of an iceberg which in development can revolutionize the world or not.We may never know what the future holds.

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