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3D Hologram Virtual Personal Assistant using Cloud Services: A Survey

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Abstract - *3D Holographic Virtual Personal Assistant Using Cloud Services, It high-lights the importance and need of this technology and how it represents the new wave in the future of technology and communications, the different application of the technology, the fields of life it will dramatically affect including business, education, telecommunication and healthcare. The personal assistant will manage task such as giving the appropriate response, control home automation, media play back via voice command and other basic task. Like other technologies in VPA we are going to add hologram technology that will reflect the person and it will talk to user through hologram projector and OLED so it will appear that real person is talking with user. For that we are going to using services like AWS, Amazon Sumerian to model design and AWS to digital certification for secure data transmission. The report also discusses the future of holographic technology and how it will prevail in the coming years highlighting how it will also affect and reshape many other fields of life, technologies and businesses.*

***Key Words*: Holographic Virtual Personal Assistant, Cloud Services, Hologram projector, OLED, AWS, Amazon Sumerian**

1. INTRODUCTION

Holographic projection is the new wave of technology that will change how we view things in the new era. It will have tremendous effects on all fields of life including business, education, science, art and healthcare. To understand how a holographic projector works we need to know what a hologram is. Holography is the method we use to record patterns of light. These patterns are reproduced as a three dimensional image called a hologram. While Hungarian physicist Dennis Gabor invented the hologram in 1947. Today's new technology provides some outstanding advantages to not only everyday consumers but also large business corporations and governments. Three-dimensional holographic projection technology is loosely based on an illusionary technique called Peppers Ghost, and was first used in Victorian theatres across London in the 1860s. Pepper's Ghost was typically used to create ghostlike figures on stage. Hidden from the audience's view, an actor dressed in a ghostly costume would stand facing an angled plate of glass [1].The audience would be able to see the glass, but not the actor directly. 3D holographic projection is a rapidly growing technology. With every business desperately trying to get their product to stand out from the competitors, 3D hologram advertising and promotion is fast becoming an eye catching success. Thanks to the latest in HD projection and CGI technology, 3D holographic projection has transformed itself from its basic Victorian origins into a futuristic audio visual display used by the likes of Endemol (Big Brother), Coco-Cola and BMW. With almost limitless holographic possibilities, from life like humans to blockbuster style special effects as well as the continual advances in technology, 3D holographic projection has a bright future ahead. A holo projector will use holographic technology to project large-scale, high-resolution images onto a variety of different surfaces, at different focal distances, from a relatively small scale projection device. With many of the latest big budget cinema releases being available in 3D, and everyone talking about the 3D future of television, many eyes are starting to focus on 3D 1hologram projections without the glasses. The projections are projected into midair, so the limitations of screen are not applicable for 3D holographic display [2].

Modern three-dimensional (3D) display technologies are increasingly popular and practical not only in computer graphics, but in other diverse environments and technologies as well. Growing examples include medical diagnostics, light simulation, air traffic control, battlefield simulation, weather diagnostics, entertainment, advertising, education, animation, virtual reality, robotics, biomechanical studies, scientific visualization, and so forth. The increasing interest and popularity are due to many factors. In our daily lives, we are surrounded by synthetic computer graphic images both in principle and on television. People can nowadays even generate similar images on personal computers at home.

1.1 Types of Holograms

A hologram is a recording in a two-or three-dimensional medium of the interference pattern formed when a point source of light (the reference beam) of fixed wavelength encounters light of the same fixed wavelength arriving from an object (the object beam). When the hologram is illuminated by the reference

beam alone, the direction pattern recreates the wave fronts of light from the original object. Thus, the viewer sees an image indistinguishablefrom the original object. There are many types of holograms, and there are varying ways of classifying them. For our purpose, we can divide them into three types: reflection hologram, transmission holograms and computer generated holograms.

1. Reflection Hologram: The reflection hologram, in which a truly three-dimensional image is seen near its surface, is the most common type shown in galleries. The hologram is illuminated by a spot of white incandescent light, held at a specific angle and distance and located on the viewers side of the hologram. Thus, the image consists of light reflected by the hologram. Recently, these holograms have been made and displayed in colour their images optically indistinguishable from the original objects. If a mirror is the object, the holographic image of the mirror reflects white light.

2. Transmission Hologram: The typical transmission hologram is viewed with laser light, usually of the same type used to make the recording. This light is directed from behind the hologram and the image is transmitted to the observers side. The virtual image can be very sharp and deep. Furthermore, if an undiverged laser beam is directed backward (relative to the direction of the reference beam) through the hologram, a real image can be projected onto a screen located at the original position of the object.

3. Computer Generated Holograms: Holograms Computer Generated (CGH) is the method of digitally generating holographic interference patterns. A holographic image can be generated e.g. by digitally computing a holographic interference pattern and printing it onto a mask or film for subsequent illumination by suitable coherent light source. Alternatively, the holographic image can be brought to life by a holographic 3D display (a display which operates on the basis of interference of coherent light), bypassing the need of having to fabricate a ”hardcopy” of the holographic interference pattern each time. Consequently, in recent times the term ”computer generated holography” is increasingly being used to denote the whole process chain of synthetically preparing holographic light wave fronts suitable for observation. Computer generated holograms have the advantage that the objects which one wants to show do not have to possess any physical reality at all (completely synthetic hologram generation). On the other hand, if holographic data of existing objects is generated optically, but digitally recorded and processed, and brought to display subsequently, this is termed CGH as well. An intelligent virtual personal assistant (VPA) or intelligent personal assistant (IPA) is a software agent that can perform tasks or services for an individual based on commands or questions. Sometimes the term ”chatbot” is used to refer to virtual assistants generally or specifically access Some virtual assistants are able to interpret human speech and respond via synthesized voices. Users can ask their assistants questions, control home automation devices and media playback via voice, and manage other basic tasks such as email, to-do lists, and calendars with verbal commands. Like other technologies in VPA we are going to add hologram technology to our project that will reflect the person and it will talk to user through hologram projector and OLED so it will appear that real person is talking with user. For that we are going to using services like AWS, Amazon sumerian to model design and AWS to digital certification for secure data transmission. Virtual Personal Assistant which is being used. Regarding the latter, probably the one that is most widely used is that of Google Maps. From the mobile app, you can enter your destination address (it knows your starting point because of the GPS technology.

1.2 3D Holography Technology

Holography is a diffraction-based coherent imaging technique in which a complex three-dimensional object can be reproduced from a at, two-dimensional screen with a complex transparency representing amplitude and phase values. It is commonly agreed that real-time holographyis the ne plus ultra art and science of visualizing fast temporally changing 3-D scenes. The integration of the real-time or electro holographic principle into display technology one of the most promising but also challenging developments for the future consumer display and TV market. Only holography allows the reconstruction of natural looking 3-D scenes, and therefore provides observers with a completely comfortable viewing experience. A holo projector will use holographic technology to project large-scale, high- resolution images onto a variety of different surfaces, at different focal distances, from a relatively small-scale projection device. To understand the technology used in holographic projection, we must understand the term Hologram, and the process of making and projecting holograms. Holography is a technique that allows the light scattered from an object to be recorded and later reconstructed. The technique to optically store, retrieve, and process information. The holograms preserve the 3-D information of a holographed subject, which helps to project 3D images [5].

1.2 Holograms:

A hologram is a physical component or device that stores information about the holographic image. For example a hologram can be a grating recorded on a piece of film. It is especially useful to be able to record a full image of an object in a short exposure if the object or space changes in time. Holos means whole and graph

means writing. Holography is a technique that is used to display objects or scenes in three dimensions. These 3D images are called holograms. A photographic record produced by illuminating the object with coherent light(as from a laser) and, without using lenses, exposing a film to light reflected from this object and to a direct beam of coherent light [6].

1.3 COMMANDS OF PERSONAL VIRTUAL ASSISTANT

1.3.1 Greetings: Some basic commands are included in greetings like Hello, How are you, etc. Those commands are included in virtual personal assistant as a greeting commands.

1.3.2 Discrete Speech recognition: The user must pause between each word so that the speech recognition can identify each separate word.

1.3.3 Continuous speech recognition: The voice recognition can understand a normal rate of speaking.

1.3.4 Natural language: The speech recognition notonly can understand the voice, but can also return answers to questions or other queries that are being asked.

1.3 DIFFERENT METHODS USED IN VOICE RECOGNITION:

1.3.1 Automatic Speech Recognition: Automatic Speech Recognition (ASR) is computer hardware and software based techniques which is used to identify and process human voice. ASR is primarily used to convert spoken words into computer text. It can also be used to authenticate the identity of the person speaking into the system. Automatic Speech Recognition is also called as Automatic Voice Recognition (AVR) or simply Speech Recognition. The basic sequence of events that makes any Automatic Speech Recognition software, regardless of its sophisticated, pick up and breaks down your words for analysis and response goes as follows:

1. You speak to the software via an audio feed.

2. The wave file is cleaned by removing background noise and normalizing volume.

3. The resulting filtered waveform is then broken down into what are called phonemes.

4. Each phoneme is like a chain link and by analyzing them in sequence, starting from the phoneme, the ASR software uses statistical probability analysis to deduce whole words and then from there, complete sentences.

5. Your ASR, now having ”understood” your words, can respond to you in a meaningful way.

1.3.2 Natural Language Processing: Natural language processing (NLP) is an area of computer science and artificial intelligence concerned with the interactions between computers and human (natural) languages, in particular how to program computers to fruitfully process large amounts of natural language data. Natural language processing (NLP) is the ability of a computer program to understand human language as it is spoken.

1.3.3 Holographic Projection: The hologram pyramid is a simple device that can be made by manipulating a sheet of plastic into the shape of a pyramid with its top cut off. The device creates a 3D-like illusion for the viewer and makes an image or video appear as if it were in midair. It works on the principle of Pepper’s Ghost. Four symmetrically opposite variations of the same image are projected onto the four faces of the pyramid. By principle, each side projects the image falling on it to the center of the pyramid. These projections work in unison to form a whole figure, which creates a 3D illusion [8].

1.4 CLOUD SERVICES:

Cloud services refer to any IT services that are provisioned and accessed from a cloud computing provider. This is a broad term that incorporates all delivery and service models of cloud computing and related solutions. Cloud services are delivered over the internet and accessible globally from the internet. A cloud service is any service made available to users on demand via the Internet from a cloud computing provider’s servers as opposed to being provided from a company’s own on-premises servers. Cloud services are designed to provide easy, scalable access to applications, resources and services, and are fully managed by a cloud services provider [9].

1.4 DATABASE:

Amazon Relational Database Service (Amazon RDS) is a web service that makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while managing time-consuming database administration tasks, freeing you up to focus on your applications and business. Amazon RDS gives you access to the capabilities of a familiar MySQL, Oracle, SQL Server or PostgreSQL database. This means that the code, applications, and tools you already use today with your existing databases can be used with Amazon RDS. Amazon RDS automatically patches the database software and backs up your database, storing the backups for a retention period that you define and enabling point-in-time recovery. You benefit from the exibility of being able to scale the compute resources or storage capacity associated with your relational database instance by using a single API call. In addition, Amazon RDS makes it easy to use replication to enhance availability and reliability for production databases and to scale out beyond the

capacity of a single database deployment for read-heavy database workloads.

2. LITERATURE SURVEY

1. Jackson presented a tangible interface for querying vectors in 3D vector fields and Cordeil et. al,: Researchers explain their concept with an examples of tangible interfaces for 3D visualization. These examples include sophisticated technical devices such as dynamic tangible and physical bar charts, a Cubic Mouse for pointing tasks in 3D space, and Paper Lenses for exploring volume data through a spatially tracked sheet of cardboard and subsequent projection of vir-tual content onto the cardboards surface.

2. L. V. D. Maaten and G. Hinton. Visualizing data using t-sne. Journal of Machine Learning Research, 9(Nov):2579 2605, 2008. : Researchers concept of 3D visualizations have been found useful for inherently spatial data in many applications in biomedicine, science, and engineering. Using 3D visualizations for displaying abstract data has historically been a controversial topic but some exploration tasks for high dimensional data have been found to increase cognitive effort if only sets of 2D projections were provided. Overall, the landscape of scientific and abstract 3D visualizations is very rich including 3D scatterplots, 3D multi-dimensional scalings (MDS),and space-time cubes [11].

3. D. J. Cowperthwaite, M. S. T. Carpendale, and F.

   D. Fracchia. Visual access for 3D data. In Proceedings on ACM Conference on Human Factors in Computing Systems (CHI), pp. 175176, 1996.: Interaction is required in cases where visualizations become dense and for tasks requiring a lot of exploration.Interactive exploration for 3D visualization can include camera rotation, visual-access lenses, the placement of cutting planes, as well as selection and brushing. Due to its higher spatial dimensionality, interaction with 3D content may require higher degrees of freedom (DOF).

4. For view and visualization manipulation (i.e., along the three spatial dimensions and three spatial angles) [12].Officially launched in 2006, Amazon Web Services provides online services for other web sites or client-side applications. Most of these services are not exposed directly to end users, but instead offer functionality that other developers can use in their applications. Amazon Web Services' offerings are accessed over HTTP, using the REST architectural style and SOAP protocol. All services are billed based on usage, but how usage is measured for billing varies from service to service.

5. In late 2003, Chris Pinkham and Benjamin Black presented a paper describing a vision for Amazon's retail computing infrastructure that was completely standardized, completely automated, and would rely extensively on web services for services such as storage, drawing on internal work already underway. Near the end they mentioned the possibility of selling virtual servers as a service, proposing the company could generate revenue from the new infrastructure investment. The first AWS service launched for public usage was Simple Queue Service in November 2004.Amazon EC2 was built by a team in Cape Town, South Africa, under Pinkham and lead developer Chris Brown. On April 20, 2011, some parts of Amazon Web Services suffered a major outage. A portion of volumes using the Elastic Block Store (EBS) service became "stuck" and were unable to fulfill read/write requests. It took at least two days for service to be fully restored. On June 29, 2012, several websites that rely on Amazon Web Services were taken offline due to a severe storm of historic proportions in Northern Virginia, where AWS' largest data centre cluster is located [13].

6. On October 22, 2012, a major outage occurred, affecting many sites such as Reddit, Foursquare, Pinterest, and others. The cause was a latent memory leak bug in an operational data collection agent. On December 24, 2012, AWS suffered another outage, causing websites such as Netflix instant video to be unavailable for customers in the Northeastern United States. AWS later issued a statement detailing the issues with the Elastic Load Balancing service that led up to the outage. In November 2012, AWS hosted its first customer event in Las Vegas. On April 30, 2013, AWS began offering a certification program for computer engineers with expertise in cloud computing.

7. During August 2014, AWS received Department of Defense-Wide provisional authorization for all U.S. Regions. In April 2015, AWS was reported to be profitable, with sales of US 1.57 billion dollar in the first quarter of the year, and US 265 million dollar of operating in- come. Founder Je Bezos described it as a fast-growing US 5 billion dollar business; analysts described it as "surprisingly more profitable than forecast". In October 2015, Amazon.com said in its Q3 earnings report that AWS's operating

income was 521 million dollars, with operating margins at 25 percent. AWS's Q3 2015 revenue was 2.1 billion dollars, a 78 per increase from Q3 2014's revenue of 1.17 billion dollars. Q4 2015 revenue for the AWS segment increased 69.5 per y/y to 2.4 billion dollars with 28.5 per operating margin, making AWS nearly a 10 billion run rate business (actual: 9.6 billion dollars). In 2015, Gartner estimated that AWS customers are deploying 10x more infrastructures on AWS than the combined adoption of the next 14 pr Voice recognition was invented by Thomas Edison who in-vented phonograph, the

8. first device to record and reproduce sound in year 1877. The first speaker recognition product for consumers was launched in 1990 by Dragon, called Dragon Dictate. In 1996, IBM introduced the first voice recognition product that could recognize continuous speech. Raj Reddy was the first person to take on continuous speech recognition as a graduate student at Stanford University in the late 1960s. The term "virtual assistant" was born in 1996. Anastacia Brice opened the first organization for virtual assistants called the AssistU in feb 1997. In 1999, international virtual assistants association was formed in order to respond to the growing number of people involving in the business and just like any organization it will help represent the profession to the world. The organization still in to being up to now. The succeeding years until today witness many more developments in this profession. The history from simple secretarial services to the advanced VPA's like siri, alexa, cortana etc.

9. In August 2018, Google added bilingual capabilities to the Google Assistant for existing supported languages on devices. Recent reports say that it may support multilingual support by setting a third default language on Android Phone. In April 2019, the most popular audio games in the Assistant; Crystal Ball and lucky Trivia have had the biggest voice change in the software history. The voice in the assistant has been able to add expression to the games. For instance, in the Crystal Ball game the voice would speak slow and soft during the intro and before the answer is revealed to make the game more excitable and in the Lucky Trivia game the voice would become excitable like a game show host. In the British accent voice of Crystal Ball, the voice would say the word 'probably' in a downwards slide like she's not too sure. In December 2016, Microsoft announced the preview of Calendar. help, a service that enabled people to delegate the scheduling of meetings to Cortana. Users interact with Cortana by including her in email conversations. Cortana would then check people's availability in Outlook Calendar or Google Calendar, and work with others Cc'd on the email to schedule the meeting. The service relied on automation and human-based computation.

3. METHODOLOGY:

3.1 TRANSMISSION HOLOGRAMS:

3.1.1 Recording Transmission Holograms: As with reflection holograms, a laser is used to provide a highly coherent source of light. A beam splitter and beam spreaders are also used in the recording of transmission holograms. After the object beam passes through the beam spreader, the light is reflected off a mirror and onto the object. The object beam is then reacted onto the photographic plate. The reference beam is also reflected off a mirror and shines on the photographic plate. The reference beam is also reflected off a mirror and shines on the photographic plate. The incoming object and reference beams create a resultant wave. The amplitude and phase of the resultant wave is recorded onto the photographic plate as an interference pattern.

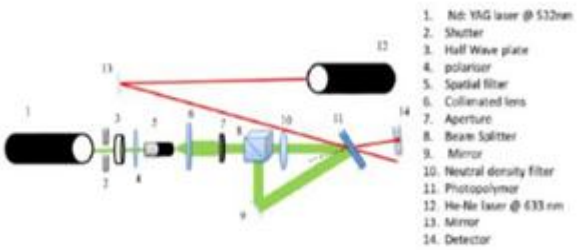

Fig 3.1 Recording Transmission Holograms

3.1.1 Reconstruct Transmission Holograms: A reconstruction beam is used to illuminate the hologram and is positioned at the same angle as the reference beam that was used during the recording phase. When the reconstruction beam is placed at the right angle, three beams of light will pass through the hologram. An un diffracted beam (zeroth order) will pass directly through the hologram but will not produce an image. A second beam forms the primary (virtual) image (first order) that is diffracted at the same angle as the incoming object beam that was used during recording. A third beam forms the secondary (real)

image. As we can see in the diagram, the beams that form the images are diffracted at the same angle, alpha, from the undiffracted beam. Between the image beams, the angle is twice as large, or 2(alpha).If we look at the hologram at the same angle as the primary image beam (also same angle as recording object beam), we will see a virtual image of the object located behind the hologram.

3.2 ADVANCEMENT IN HOLOGRAPHIC TECHNOLOGY

3.2.1 Touchable holograms:

The importance of haptic interaction techniques gather much more attention with the progress of the computer graphics, the physical simulation and the visual display technologies. There have been a lot of interactive systems which aim to enable the users to handle 3D graphic objects with their hands. If tactile feedback is provided to the users hands in 3D free space, the usability of those systems will be consider ably improved. One strategy to provide tactile feedback in 3D free space is to attach tactile displays on the users hands. The method is based on a nonlinear phenomenon of ultrasound; acoustic radiation pressure. When an object interrupts the propagation of ultrasound, a pressure field is exerted on the surface of the object. This pressure is called acoustic radiation pressure.

3.2.2 Tactile display with haptic feedback: Airborne Ultrasound Tactile Display [Iwamoto et al. 2008] is tactile display which provides tactile sensation onto the users hand. It utilizes the nonlinear phenomenon of ultrasound; acoustic radiation pressure. When an object interrupts the propagation of ultra- sound, a pressure field is exerted on the surface of the object.

3.2.3 User interfacing integrated displays: While camera-based and marker-less hand tracking systems are demonstrated these days, we use Wiimote (Nintendo) which has an infrared(IR) camera for simplicity. A retro reactive marker is attached on the tip of users middle finger. IR LEDs illuminate the marker and two Wiimotes sense the 3D position of the finger. Owing to this hand-tracking system, the users can handle the floating virtual image with their hands.

3.2.4 360-degree 3D system:

The system was made possible by projecting high-speed video on a spinning mirror. As the spinning mirror changes direction, different perspectives of the projected image is shown. The University of Southern California project is more realistic compared to other holographic attempt because, nearly 5, 000 individual images are reflected every second.

3.3 Practical working of apple siri

Siri is able to do all the important things since it has access to all the built-in apps on your phone, Siri can perform a variety of operations at your command. Not only can it carry out a bunch of basic tasks like making calls, setting alarms and reminders for you, changing the settings of your phone or doing mathematical calculations, it also goes one step further, and can help get a reservation for you at your favorite restaurant, send a birthday message to someone right at the strike of 12, give you directions to places, create music play lists and even tell you whether or not it's going to rain.

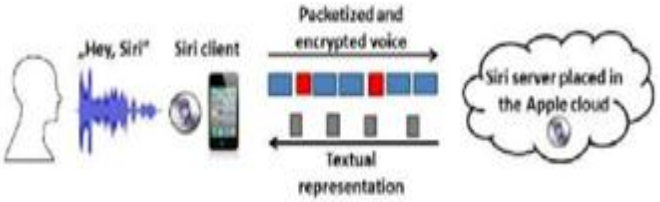

Fig 3.1 Apple siri working

3.3.1 Voice Recognition:

This stage seems pretty basic, but in reality, this is often considered the most difficult part of the entire process. After all, to do any of the other steps, Siri has to understand what it is that you want done. When you speak something to Siri, it collects your voice and converts it into a data file, which is sent to servers. It has to account for your accent, dialect, and the small nuances of your voice, not to mention other speech difficulties, if you have them. Aside from that, it also has a tough time distinguishing your voice from ambient noise.

3.3.2 Connecting to servers:

After having collected and subsequently converted your command into a file, Siri sends it to Apple servers for processing. This is why an Internet connection is mandatory for Siri to function. Once in the Apple servers, your spoken words undergo different flowchart branches to arrive at a possible solution. The servers already have a huge database of questions and their probable answers, so there is usually no problem in fetching the answer to common questions, like 'What's the best place to have a pizza around here?' or 'How hot is it going to be today?' If somehow Siri fails to understand this, which is not all that uncommon, given the different ways and manners in which humans communicate,

then the entire query is trashed and Siri presents you with the standard response: Would you like to search the web for that?

3.3.3 Understanding the meaning of the command:

This is clearly the most demanding part; at this point, the systems try to understand what it is that you really want done. This is something difficult enough for humans, with all our intelligence, to crack (pun intended), so you can probably imagine how hard it could be for a machine. For instance, you would understand that I wanted to have a burger, whether I said, 'I'm in the mood for a burger today' or exclaimed, 'If only I could have a large Burger King right here!' However, a machine wouldn't be intuitive enough to understand what I'm trying to express. This is where Natural Language Processing steps in; it tries to make Siri as intuitive as a machine can be. And if you're an iPhone user, you already know that it's pretty intuitive.

3.3.4 Producing the result:

Understanding what you're saying is all well and good, but what does it matter to you if Siri doesn't actually DO what you want? Siri has to communicate with other apps on your phone to provide the desired deliverable to you. For example, say you want to set a reminder. In this case, Siri will have to 'talk' to the Organiser app to set a reminder at the desired time. While this part is not as difficult as the previous step, it still requires meticulous execution. After going through all the above steps, Siri presents the result either by speaking to you or flashing a text to let you know the status of the task you asked it to perform.

3.4 CLOUD SERVICES

3.4.1 AWS:

When you create a stack, AWS Cloud Formation makes underlying service calls to AWS to provision and configure your resources. Note that AWS Cloud Formation can perform only actions that you have permission to do. For example, to create EC2 instances by using AWS Cloud Formation, you need permissions to create instances You'll need similar permissions to terminate instances when you delete stacks with instances. You use AWS Identity and Access Management (IAM) to manage permissions. The calls that AWS Cloud Formation makes are all declared by your template. For example, suppose you have a template that describes an EC instance with a t1.micro instance type. When you use that template to create a stack, AWS Cloud Formation calls the Amazon EC2 create instance API and specifies the instance type as t1.micro. The following diagram summarizes the AWS Cloud-Formation workflow for creating stacks.

Fig 3.2 Working of AWS

3.4 WORKING OF 3D HOLOGRAPHIC PRO JECTION TECHNOLOGY:

This is entirely a Latest and vary unique Hi Definition 3D Projection Technology in which a person is captured in 3D dimentional Aspect with a Sp. Hi Definition Camera on a specially built stage And Projected As Is at various Distant Locations At a Time Viewers at the other end will feel the presence of REAL Person in front of them and also interact with projected Virtual person, without wearing any kindof 3D glasses, as they interact with Actual Person. Holography is a technique that enables a light field, which is generally the product of a light sources scattered off Objects, to be recorded and Later reconstructed when the original light field is no longer present, due to the absence of the original objects. Holography can be thought of as somewhat similar to sound recording, whereby a sound field created by vibrating matter like musical instruments or vocal cords, is encoded in such a way that it can be reproduced later, without the presence of the original vibrating matter. It starts with the patented foil, completely invisible to the naked eye. Right at 45 across the stage and the gives s the impression of a real 3D volumetric image on stage.

A hologram is recorded by exposing a light-sensitive sensor (for example, photographic film, or a high- resolution CCD) simultaneously to a coherent beam of light and the reaction of that beam of light from the scene being recorded. The sensor records not an image of the scene, but the interference (typically taking place at the surface of a sheet of film) between the image and the original coherent light. This interference pattern contains all the information in the light field at the sensor.

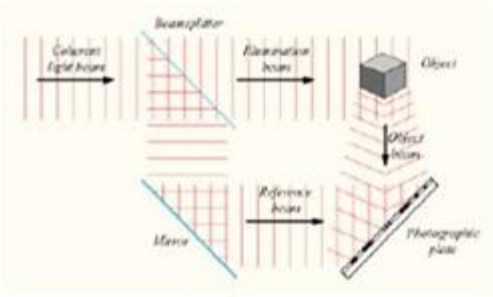

Fig 3.3 Recorded hologram from coherent beam of light

To play back a hologram, the interference pattern of the original hologram is reproduced, and a coherent beam of light (typically having the same wavelength as the original laser illumination source) is directed onto the pattern along the same direction as was the reference beam. The reconstruction beam is diffracted from the interference pattern, and thereby reproduces the 3D image information of the subject of the hologram. For us, a glowing but seemingly solid image suddenly appears floating in space. With video displays being of considerably greater value than static 3D picture frames, a dynamic substitute for photographic film has long been sought, with varying degrees of success. An active holographic display is based on a spatial light modulator.

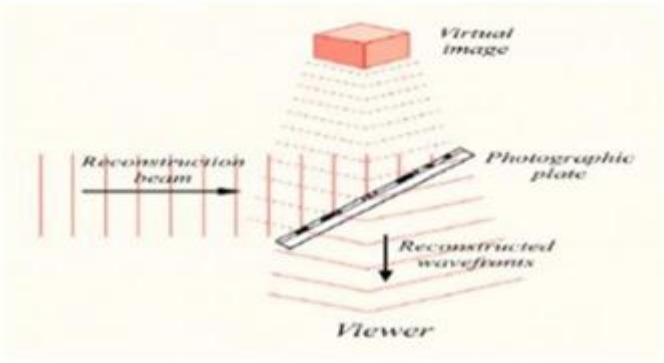

Fig 3.4 Appearance of Virtual Image through reconstructed wave- forms

3.5 SYSETEM ARCHITECTURE:

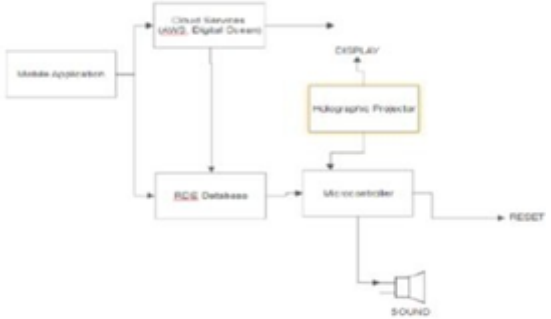

Fig 3.4 System Architecture

3. CONCLUSION:

Since, in mega countries, social isolation is major problem. This VPAs becomes there friend so that they never feel lonely. It becomes good friend, a good advisor, a good assistant and lots more. Virtual Personal Assistant are very effective way to organize your schedule and daily activities. In addition of holographic images, VPA comes one step closer to the humans. In this regard, the use of Machine Learning as well as Neural Network technology can also be embedded into these mobile app packages. However, despite the many advantages that a VPA brings to the table, there are also inherent Security risks associated with them.

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