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A SURVEY PAPER ONHOLOGRAM PROJECTION TECHNOLOGY

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Abstract

This paper inspects the new technology of Holographic Projections and its behavior. It is acmes the importance and need of this technology and how it represents the new surge in the tomorrow of technology and communications, the different application of the technology, the fields of life it will vividly affect including corporate work, learning, telecommunication and medical science. The paper also deliberates the future of holographic technology and how it will be victorious in the coming years emphasizing how it will also affect and reshape many other fields of life, technologies, and businesses. Holography is a system that permits a light field, which is usually the products of a light source sprinkled of the object, to be recorded and then built when the primary light field is no longer now, due to the absence of original objects.It is usually agreed that real-time holography is the ne plus ultra art and science of visualizing fast temporally changing 3-D scenes. The mixing of the real-time or electro-holographic principle into display technology is one of the most promising as well as exciting developments in the future consumer display and TV market. Only holography permits the reconstruction of natural-looking 3-D scenes and therefore provides observers with a thoroughly satisfying seeing knowledge. But to date, several challenges have limited the technology from becoming commercialized. But those difficulties are now starting to be overwhelmed. In recent times, we have developed a unique appearance to real-time display holography by connecting an overlapping sub-hologram technique with a spattered viewing-window technology.

Index Terms: *Hologram, Virtual display, helium-neon, Telepresence.*

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1. Introduction

Holographic projection is the new surge of technology that will change how we view things in the new age. It will have remarkable effects on all fields of life including corporate job, learning, science, art and medical science. To know how a holographic projector works we need to identify what a hologram is. Holography is the process we use to record patterns of light. These patterns duplicated as a three-dimensional image named as a hologram. While Hungarian physicist Dennis Gabor [2][3] invented the hologram in 1947. Today's new technology delivers some exceptional advantages to not only for the daily users but also for large business corporations and government sectors. Three-dimensional holographic projection technology is roughly built on an illusionary technique called Peppers Ghost and was first used in Victorian theatres across London in the 1860s. Pepper's Ghost was usually used to create a ghost-like figures on stage. Hidden from audience's sight, an actor dressed in a frightful ensemble would stand facing an angled plate of glass. The public would be able to see the glass, but not the artist directly. 3D holographic projection is a quickly developing technology. With every business very much interested in trying to get their product to stand out from the opponents, 3D hologram marketing and promotion is fast becoming an eye-catching success. It is happening because of the HD projection and CGI technology; the 3D holographic projection has changed itself from its central Victorian origins into an innovative audiovisualdisplay used by the likes of Endemol (Big Brother), Coco-Cola and BMW. With almost infinite holographic possibilities, from a human.

2. History of Hologram

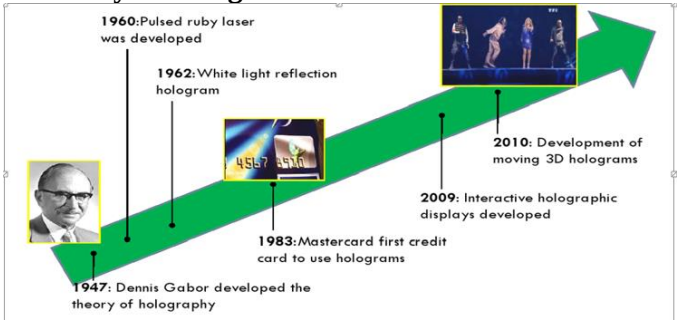

Figure 1: History of Holographic Projections

Life to blockbuster style special effects, and the constant advances in technology, the 3D holographic projection has a bright future ahead. [1][4][11]

The Hungarian-British physicist Dennis Gabor), was first awarded the Nobel Prize in Physics in 1971 "for his discovery and development of the holographic method."The work done by the Hungarian-British in the late 1940s was done on pioneering work in the field of X-ray microscopy by other scientists including MieczysławWolfke in 1920 and William Lawrence Bragg in 1939. The invention was an unpredicted result of research into refining electron microscopes at the British Thomson-Houston (BTH) Company in Rugby, England, and the company filed a patent in December 1947 (patent GB685286). The method as originally invented is still used in electron microscopy, where it is known as electron holography, but optical holography did not advance until the development of the laser in 1960.[9] [11].

3. **Types of Hologram**

A hologram is a two-or three-dimensional recording medium of the interfering pattern formed when a point source of light (the reference beam) of fixed wavelength meets the light of the same fixed wavelength coming from an object (the object beam). When the hologram is irradiated with the reference beam alone, the diffraction pattern reinvents the wavefronts of light from the original purpose. Hence, the viewer perceives an image indistinguishable from the original object. There are numerous types of holograms, and there are different ways of classifying them. For our persistence, we can be categorized them into three different types: reflection hologram, transmission holograms, and computer created holograms.

4. **Working of Hologram**

The time-varying light field of a scene with all its physical properties is to be recorded and then regenerated.There are mainly two phases as follow as in a hologram.[5][10]

1. Recording
2. Reconstruction

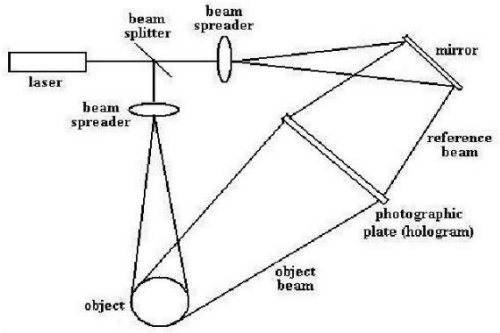

Figure 2: Recording of reflex hologram

5. **Recording of Hologram**

Essential tools required to make a hologram includes a red laser, beam splitter, lenses, holographic film, and mirrors. Holograms are recorded in dark room o an environment.[10]

1) Laser: Red lasers, usually helium-neon (HeNe) lasers, are common in holography. These are the coherent light source.

2) Beamsplitter: This is a device that uses mirrors and prisms to split laser beam of light into two beams. Directed onto the object (Object beam)and travels directly onto the recording medium (Reference beam)

3) Mirrors: These straight the beams of light to the exact locations

4) Holographic film: Holographic film can record light at a very high resolution, which is necessary for creating a hologram. It's a cover of light-sensitive combinations on a transparent surface, like photographic film.

6. **Application and Future Scope**

Advertising with 3D holographic display[4]. In today's world, this top class pioneering technology can permit viewers to see images that float from inside and project several feet in front of an LCD screen or plasma display screen. Dimensional Studios, a marketing jaunt in 3D visual display[1] solutions has newly presented its unparalleled digital signage in the UK. Its purpose is for marketing agencies and consumer products who wish to catch a vast impact from this new breakthrough media.

Holography in education

Holography in its child stage has not been used in education. However, application of holography in education is not new. Although the scope of evolution was minimal, long distance projection is possible from the time when the images are pass on through the internet. Holography varies from video conferencing because the teacher appears to be in the classroom and hence the users can quickly notice a screen and a camera.

Holography in Entertainment & showbiz Industry

If anyone thinks about holography projection technique in the film industry, the movies Star Trek and Star Wars come to attention. In these movies, people narrate with holograms as they would relate with a real human. Although what people see in these movies are not real holograms, they show what a real hologram gazes like and future abilities of holography. In the music industry, holography is used in the live concerts. In this case, the musicians can be far away in Delhi while performing in some cities around the world. Today, three-dimensional television and cinemas are becoming common, and there is more to come. 3D movies in home theatres need bumpy glasses which may be sore for some people to wear. Also, specialists found that viewing 3D television from an extended period can affect a headache and eye draining due to new sensory experience.

From the time when holography makes the beamed image look like real, it should not have any future stress on the eyes nor cause a headache. Virtual Reality also with Augmented reality and Telepresence With the help of a light pen, the Sketchpad inducements vector lines on a computer screen. The Sketchpad backed to the field of Human-Computer Interaction, and also presented the concept of Graphical User Interface. Virtual reality engages computer modeling and simulation, which generates images to look like to the real world. Telepresence varies from virtual reality as telepresence makes it conceivable for a person to be virtually present in another physical location. Telepresence is applicable specifically in situations where the person involved cannot be physically present. The non-appearance of a real person makes telepresence an option in case of forecast risk to the individual's life in the new environment. Telepresence is like to holography because they both permit objects to be transported to a new destination in 3D. Augmented reality offers an adjusted real world, where images or text are shown upon real objects. Museums, artists, and industries are frequent users of augmented reality, and the usage is on the upsurge. Augmented reality is also becoming a pleasant part of our daily life which includes mobile devices, malls, teaching, and learning.

Projection displays

Future color liquid crystal displays (LCD's) will be the top class result of holographic technology. Scientists from the Polaroid Corp. have developed a holographic reflector that will reflect ambient light to produce a white background. Holographic televisions will be available within a decade but at a high cost.MIT scientists freshly made an archetype that does not need glasses, but actual holographic commercial TV [4][6]will take a year to appear. In the next few years, all TVs could be holographic, but this will take around 8-10 years. In future, holographic displays will be exchanging all present displays in all sizes, from small phone screen to large projectors

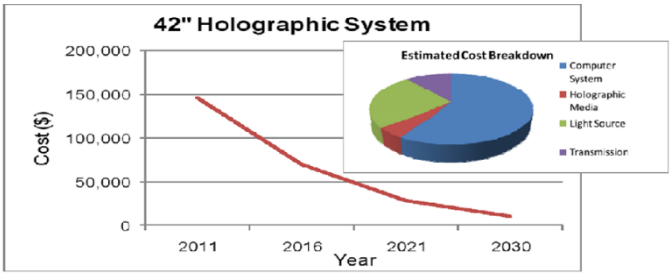

Figure 3:Projected cost of Holographic System

7. CONCLUSION

Holography still in its child stage, but its promise applications are aspiring. Holographic Technology and Spectral Imagining have limitless applications, as far as the human mind can visualize. Holography could be the nearest display technology to our real atmosphere may just be the right standby when reality fails. With holography, educational training center may become a global space sooner than people thought, where information and expertise will be around to reach. Information sharing and mobility will only cost a second and learning will become more fascinating and collaborative. More excitingly, the display medium of holography is essential. A 360 viewing angle is specifically what is needed to maximize the use of holography in education. In order not to limit the use of holography to a non-interactive display medium, incorporation with response technologies is mandatory. This technology which makes it possible to touch and operate virtual object is of particular importance. As the field of haptics continues to grow and integrates with holography, interaction with holograms becomes limitless. In future, holographic shows will be replacing all existing displays.

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