A Review Paper on Holography

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***Abstract*- Holography is the science and practice of making the holograms. A hologram(disambiguation) is a photographic recording of a light field, relatively different than of an image formed by a lens, and it is used to display a full three-dimensional image for holographic object, which is seen without the help of special glasses or other intermediate optics. It is usually impenetrable when observed under diffused atmospheric light. Reflective holography is a related technique for making three-dimensional images by controlling of motion of the reflections on a two-dimensional surface. It works by reflectively or manipulating bundles of light rays, whereas in Gabor-style holography diffractively reconstructing wave fronts is used. In general, we use laser light for illuminating the subject.**

I .INTRODUCTION

Holography, like photography, is a technique to produces an image on a film. In holography, the method of transferring the image is in the wave form. A photograph produces a 2D image of an object with a negative which we see on paper only in single angle. Conversely, a hologram produces an image of the object having the information regarding the surrounding objects. it also relates with the surrounding space occupied by the object. This means the hologram is either a 3D-image or a multi-dimensional object. Different angles of that space and objects can be seen when you are moving in front of a hologram.

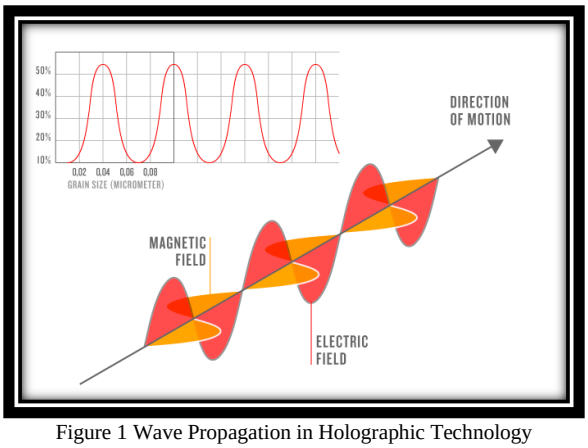

Figure 1 Wave Propagation in Holographic Technology

II. HISTORY

After 1947, British scientist Dennis Gabor explained about the holography technique while working in the resolution of microscopic electrons. The word hologram is delivered from the Greek word "hole "and grammas, meaning "message". Further development in the field was studied at the next decades of light sources at the time were not truly "coherent"(monochromatic means one colour from a single source). This difficulty was overcome in **1960** by Russian scientists named *N. Basov* and *A. Prokhorov and a American* scientist *Charles Towns* with the invention of lasers, whose pure, intense light was ideal for making holograms.

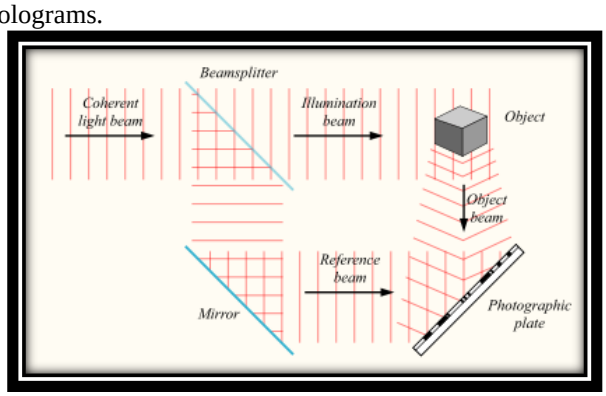

Figure 2 Working of hologram

The very first an optical table is used to make a hologram

To make a hologram, the followings are required:

- A suitable object or group of objects.
- Some part of the laser beam is directed so that the objects must be illuminated that enables the object easily. it produces a light beam on recording objects to produce an interference pattern.
- The recording medium converts the interference pattern into the optical source that modifies the amplitude.
- The laser beam which produces a coherent beam which has a single wavelength.
- It requires an environment which provides a sufficient mechanical and thermal stability.

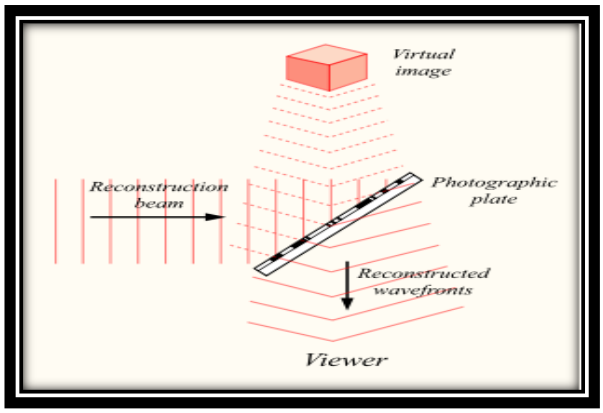

Figure 3 Recording of hologram

IV. CLASSIFICATION

Amplitude and phase modulated holograms:

An amplitude modulated hologram is defined as where the amplitude of the light wave is diffracted from the hologram is directly proportion with the intensity of light.

Thin and thick hologram:

A thin and thick hologram is that where the thickness of the recording medium less than the spacing between the fringes.

Transmission and reflection hologram:

A transmission and reflection hologram is defined as where the object and reference beams are incident on the recording medium from the same side

V. APPLICATIONS

Data storage

It can store the data and information inside the single crystals.

Dynamic holography

Data storage is a technique that can store the information of high density inside a crystal.

A permanent hologram is produced by reconstruction and developing sequentially

Security

Security holograms are very difficult to copy as they are replica of master holograms.

Other Applications

FMCG industry

These are the products that give the protection against duplication of the objects.

Electrical and electronic products

Holography tags have the ability to protect the duplication of the electrical and electronics products. These tags are available in the market in different in different colour and size.

High security holograms

These holograms have the features of high security for micro text, logos and complex images.

VI. CONCLUSION

Holography is the technology of today's world has established to impeccably the wave information .Even future depends upon the holograms. It can fund an easy approach over machines of equipment in manufacturing. Hence, it can help in creating different applications for different of the creators and engineer upon how they envision, invent, what's their need. This technology can be an auxiliary to the 5th sense for differently able people. This technology will bring a radical change in the field of Science and Technology.

VII. REFERENCES

[1] Apple Progressing with 3D Holographic Projection Technology (The Macintosh News Network] http://www.aboutprojectors.com/ 2008.

[2] Gabor, Dennis *(1948). "A new microscopic principle". Nature. 161: 777–8.*Bibcode:1948Natur.161..777G. doi:10.1038/161777a0. PMID 18860291.

[3] ^ *Gabor, Dennis (1949). "Microscopy by reconstructed wave fronts". Proceedings of the Royal Society. London. 197 (1051): 454–487*. Bibcode:1949RSPSA.197..454G.doi:10.1098/rspa.1949.0075.

[4] ^ Denisyuk, Yuri N. *(1962). "On the reflection of optical properties of an object in a wave field of light scattered by it"*. Doklady Akademii Nauk SSSR. *144 (6): 1275–1278.*