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Holographic Projector for Commercial Advertisement

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ABSTRACT: Till date there is very less applications of holograms. Because holographic projection is still in research topic. Our project is based on a holographic projector which takes an input image and store the output in Holographic Versatile Disc(HVD) and project the image as holograms. We will use this projector for commercial advertisement in replacement of hoarding banner. Advantage of any holographic projector is that it will be seen from anywhere around. It is also cost effective as it is also one time investment as we only have to store new image in HVD. This image can be replaced many time as we want and this process will also take less power supply. One holographic projector will be equivalent to 4 hoarding banners.
KEYWORDS: Holographic Projector, Holographic Versatile Disc (HVD)

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I. INTRODUCTION

In recent years holography is a current emerging technology in the field of science, specially in physics. Many country are researching on this topic. Holography can be one ofthe most important topic in commercial business for advertisement. Holography is a method of recording patterns of light to produce a three-dimensional object. The recordedpatterns of light are called a hologram. The process of creating a hologram begins with afocused beam of light -- a laser beam. This laser beam is split into two separate beams: a reference beam, which remains unchanged throughout much of the process, andan information beam, which passes through an image. When light encounters an image, itscomposition changes. In a sense, once the information beam encounters an image, it carriesthat image in its waveforms. When these two beams intersect, it creates a pattern of light interference. If you record this pattern of light interference -- for example, in a photosensitive polymer layer of a disc -- we are essentially recording the light pattern of the image. To retrieve the information stored in a hologram, you shine the reference beam directly onto the hologram. When it reflects off the hologram, it holds the light pattern of the image stored there. You then send this reconstruction beam to a CMOS sensor to recreate the original image. Most of us think of holograms as storing the image of an object, like the Death Star pictured above. The holographic memory systems we're discussing here use holograms to store digital instead of analog information, but it's the same concept. Instead of the information beam encountering a pat-tern of light that represents the Death Star, it encounters a pattern of light and dark areas that represent ones and zeroes. HVD [Fig 1] offers several advantages over traditional storage technology. HVDs can ultimately store more than 1 terabyte (TB) of information -- that's 200 times more than a single-sided DVD and 20 times more than a current double-sided Blu-ray. This is partly due to HVDs storing holograms in overlapping patterns, while a DVD basically stores bits of information side-by-side. HVDs also use a thicker recording layer than DVDs -- an HVD stores information in almost the entire volume of the disc, instead of just a single, thin layer. The other major boost over conventional memory systems is HVD's trans-fer rate of up to 1 gigabyte (GB) per second -- that's 40 times faster than DVD. An HVD stores and retrieves an entire page of data, approximately 60,000 bits of information, in one pulse of light, while a DVD stores and retrieves one bit of data in one pulse of light. We will use Holographic versatile disc (HDV) in our laser device to store the image as input. Input will be the image which is to be projected.

Fig 1: Holographic Versatile Disc(HVD).

II. WORKING DIAGRAM OF THE PROPOSED MODEL

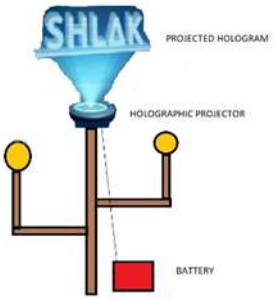

Fig 2: Designed block model

Fig 3: Proposed Model

III. INTRODUCTION TO COMPONENTS USED IN THE MODEL:

1. HVD (Holographic Versatile Disc):

To increase capacity, holographic storage uses laser beams to store digital data in three dimensions, rather than in two dimensions as in CD and DVD media. HVD [fig 4] is, essentially, a holographic layer built on top of a conventional disc. The HVD process uses a blue-green laser beam, used for reading and writing data, collimated (made parallel) with a red laser beam, which is used for servo and tracking. In the recording process, the initial laser is split into two beams [fig 3]. One of the beams passes through a device called a spatial light modulator (SLM) and combines with the direct beam to produce a hologram in the physical medium. To recover the data, another 532-nm laser is directed into the hologram, which diffracts the laser beam. The resulting image constitutes an optical reproduction of the original recorded data. A photosensitive semiconductor device converts this optical data into the original digital files. The first working HVD systems for the enterprise are expected to be shipped in 2006, with consumer HVDs and drives to become available in 2008 or later. The initial target market is high-volume mass storage, such as digital television (DTV) broadcasts and document libraries in large businesses and government agencies.

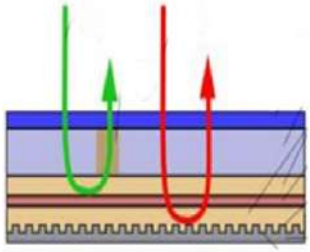

Fig 4: Internal Structure of HVD

Fig 5: HVD External Structure

2. Laser Projector:
A laser projector [fig 5] is a device that projects changing laser beams on a screen to create a moving image for entertainment or professional use. It consists of a housing that contains lasers, mirrors, galvanometer scanners, and other optical components. A laser projector can contain one laser light source for single-color projection or three sources for RGB (red, green, and blue) full colour projection. There are actually two types of Laser projectors. Industrial Laser Projectors and Home entertainment Laser Projectors. Home entertainment laser projectors have been on the market since about 2015. These devices are able to generate any wave-length of light, thus making wider colour gamuts possible without compromising brightness. This translates to deeper, richer colours that come closer than previous products to the vast range of colours human eyes can process. Other benefits include fast (up to instant) on/off and increased longevity.

Fig 6: Laser Projector

3. Hologram:
A hologram (pronounced HOL-o-gram) [fig 6] is a three-dimensional image, created with photographic projection. The term is taken from the Greek words holos (whole) and gramma (message). Unlike 3-D or virtual reality on a two-dimensional computer display, a hologram is a truly three-dimensional and free-standing image that does not simulate spatial depth or require a special viewing device. Theoretically, holograms could someday be transmitted electronically to a special display device in your home and industries. The structure of holograms is quite simple in that a surface relief is embossed into the substrate surface and a reflective coating is added. The choice of method for embossing the surface relief and the choice of type and thickness of the coating give

rise to a variety of performance options. A hologram is an image created by a photographic projection of a recording of a light field rather than an image formed by some sort of lens. It appears as a three-dimensional representation on a two-dimensional object, which can be seen without intermediate optics such as goggles or glasses. However these hologram images become unintelligible when viewed under diffused ambient light since they are not actual images. The photographic technique used to create these images is called holography.

Fig 7: Holographic Projection using laser

Advantages And Future Perspectives Of Our Model

- The biggest advantage of this product is cost efficient in respect to one-time investment.
- It can be used as commercial advertisement purpose.
- It is innovative in nature.
- It needs less power supply as compared to multiple light requires in banner hoarding.
- It requires less space as compared to banner hoarding.
- It is environmental friendly.

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Limitations Of Our Model:

- Our model requires frequent maintenance.
- One or more components of our working model are still under development. When they will be fully developed our model will run smoothly.

IV. CONCLUSION:

Holography allows for a global evaluation which is both qualitative, through the simple visualisation of the fringes which encode the displacement of the image and quantitative through the clearing of the fringes.However, large-scale holograms, the kind illuminated with lasers or created in a dark room with carefully placed lighting, are phenomenal. They're basically two-dimensional surfaces that show very accurate three-dimensional images of real objects. You don't even have to wear special glasses like when you go to a 3D movie. Hence we conclude that if we use holographic projector for commercial advertisement it would we cost effective and we can earn more profit than hoarding banner. More importantly it can be seen from anywhere around and the image will be illuminated at night it will look much better at night as compare to banner hoarding besides this it is eco friendly than banner because banner use paper and its project virtual image

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