Holography

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Abstract: This study represents some of the application areas, methodologies, few techniques and algorithms. This paper purely focuses on technology called "Holography". This technology will help individuals in using their personal devices with fascinating experience and will also contribute significantly in scientific laboratories. It will revolutionize the way people communicate with each other especially with visual communication. It can be used as a creative educating method for children at school, home or any academic institution. With the help of this technology students will be able to get an immersive experience resulting into more interactive academic sessions.

I.INTRODUCTION

Holography is an optical numerical technique, which avoid the normal light interference recording process by computer numerical calculation and record the hologram directly. It doesn't require the particular light and therefore the actual existence of the recording medium and reduces the problem of the belief of holography. CGH is much flexible, so it is very suitable for generating a special phase type of wave-front, which are difficult to achieve using pure optical methods. CGH has many applications in digital storage and display system, and numerical generation and encryption of hologram are two important topics that have instigated much research work in the past two decades. However, CGH diffraction efficiency is extremely low, hindering the appliance in practice. A new CGH method use phase retrieval algorithm and nonlinear amplitude limiting is proposed on the basis of, which improves the diffraction efficiency much higher than general nonlinear amplitude limiting method. Theoretical analysis and simulation results demonstrate that the proposed algorithm contains more original information and has more optical diffraction efficiency compared with the algorithm supported general nonlinear amplitude limiting.

II. APPLICATION AREAS

Holography is proved to be a useful tool in different areas such as medicine, industry and scientific research. Some of well-known areas of where holography is used are holographic interferometry, HOE's (holographic optical elements), Holographic CAT scans and many other which helps researchers and industry designers to replace the conventional and time-consuming methods of designing and development in different sectors.

III. HOLOGRAPHIC INTERFEROMETRY

The most probable reason of failure for any scientific researcher or industry designers is due to fallacious or inaccurate design problems because of the use of stereotyped methodology of blueprinting the actual design of product or any engineering mechanism. Holographic interferometry helps modern designers and researchers to visualize the actual design from hybrid engines to human helpful prosthetic limbs this assist to deeply analyse the model accurately.

IV. BIOMEDICAL APPLICATIONS

Holography is proving helpful and active practices for the same is performed in U.S and Europe. With the help of optical fibers holograms are made inside live organs in humans resulting into a useful way to acquire more details than any conventional technique for studying organs in human anatomy.

V. HOLOSTORE

Mass storage technology is changing rapidly with expanding data storage methods and to port from medium to large amount of data over any computing device. Holostore is a new age mass storage technology which uses 3D holographic images to store more than normal amount of data to be stored in a much smaller space. It will have thousand times more memory capacity with no mechanical operation.

VI. HOLOGRAPHIC MICROSCOPY

One of the most important of life sciences is imaging of microscopic art. Active advancements over digital imaging, image processing has been vital in enhancing modernized microscopy capabilities. Holographic microscopy allows scientists to unfold biological mechanisms in living cells as well as tissues. This advance imaging technique helps in acquiring a 3D modelled image for a single image capture. This technique is typically used to analyse RBC in order to expose the presence of malaria parasites it is proved to be helpful for cell counting and other biological researches. It is believed that this holographic technique will help to inspect biological mechanisms inside cells that no one has examined before.

VII. IMAGE PROJECTION & DEPTH

Digital tools are integrated into the origination process for 3 categories of holograms--two-dimensional (2-D)/three-dimensional (3-D), 3-D, and animated stereograms. one among the foremost frequently produced holograms is that the 2-D/3-D, an array of flat 2-D graphics, usually drawings or photos, that are stacked in conjunction with a little amount of 3-D space between each layer. within the finished hologram, the foremost image is usually positioned on the hologram surface, the background image appears behind the surface, and a foreground element "floats" in mid-air slightly above it. These layers of artwork are often easily generated using familiar software tools. Adobe Illustrator and Macromedia Freehand are often used to create drawings. Adobe Photoshop allows

importing existing artwork and makes it suitable for holographic reproduction. Font collections are often utilized to make logos. Once the artwork is finished, the digital files are sent to the assembly studio where a designer will typically use Adobe Separator, Quark Express, or Photoshoot break the image into its component layers. These files are going to be sent to a picture setter, a movie output device that generates transparencies like the various levels of the image. The holographer then records the graphics from these transparencies onto one hologram to provide a multilevel image.

VIII. 3-D HOLOGRAMS: PARALLAX AND DIMENSION

Another sort of hologram utilizes 3-D physical objects because the material to be recorded. Many commercial holographers often commission professional modelmakers to sculpt highly detailed miniatures because these are often recorded in conventional holographic setups more easily than a full-size object. When the finished hologram is correctly displayed, a viewer will see an apparently solid image that duplicates the first subject matter--as in real world, the viewer can shop around all the sides of a holographic image. This effect is true parallax and no stereoscopic devices or other visual tricks are needed to perceive proper perspective or image depth. Software are often wont to generate artwork which will replace the physical models or objects utilized in the 3-D-holography process. Here the computer-graphics artist first models a true or an imaginary object or scene on screen. NewTek Lightwave3D, Byte by Byte Sculpt 4D, or Alias/Wavefront Power Animator are some modelling programs that can be used. The computer then is employed to render an appropriate sequence of graphics files that correspond to the varied visual perspectives that the designer wants to seem within the finished hologram. For rendering simple rotations, Pentium-based PCs or PowerMacs are often used. More complex imagery involving many different perspectives of 1 image needs support like the DeskStation Technology Raptor rendering engine or Silicon Graphics Indigo hardware. To produce the 3-D hologram, the image sequence is displayed on a liquid-crystal-display screen, one frame at a time. Each frame, representing one file per viewpoint, is recorded sequentially as a holographic "slit" on adjacent portions of holographic film using laser light. A holographic optical printer, a step-and-repeat transfer device, controls the sequence and placement of every slit on the film. The process permits many different perspectives of a scene to be rendered, combined, and output as a sensible, fully dimensional image.

IX. ANIMATED IMAGES

The techniques discussed showcase holographic dimensional properties. It is also possible to record time and motion on a hologram because one hologram can hold many different images. If an appropriate time sequence of images is recorded, a viewer moving past this holographic stereogram will see each image displayed sequentially. This holographic mini-movie can replay up to 10 seconds of animation using current technology. The animated images are often originated from any source which will be digitized, including video, film, slides, special effects, or CD-ROM images. As in generating static 3D images, the pc is employed to render a appropriate set of files which are input into the holographic printer. A fully dimensional, animated image is recorded onto holographic film which will be mass replicated during a suitable manner.