ILLUMINATING PATTERN OF HOLOGRAM

Bhavani[1a],*R.Ramchandru[2b],S.Pravinkumar , A.Sivanesan2c [2d], Ruthran[2e], Yuvaraj pandian[2f]

[1]Assistant Professor, Department of Information Technology, Panimalar Engineering College

[2]II-Year Students, Department of Information Technology, Panimalar Engineering College

ABSTRACT

In a world where we even measured the nature entities we still lack in the natural optics of projection. The glory of the universe always emerged from the light that struct over them to make their patten visible to the eye ,the projection of such images are accurate to the individual but, is the possible views that are created by humans accurate? No, they cannot be since, they always come by many hurdles of development in reality manipulation. So, we recon illumination of the light in technical way can allow us to make thing clear in the 3 dimension which are better than an 2 dimension. Every frame of light emits its purest radient of colour with every detail of measures, etc. To the world that are being in a state of virtual development the name hologram is a hope of succeeding in accuracy of projection. Such thing are always come by the virtual knowledge of imagination in a cognitive way. Over the years of development we discovered pattern is the most important factor in which a ray of light can alter our perspective.
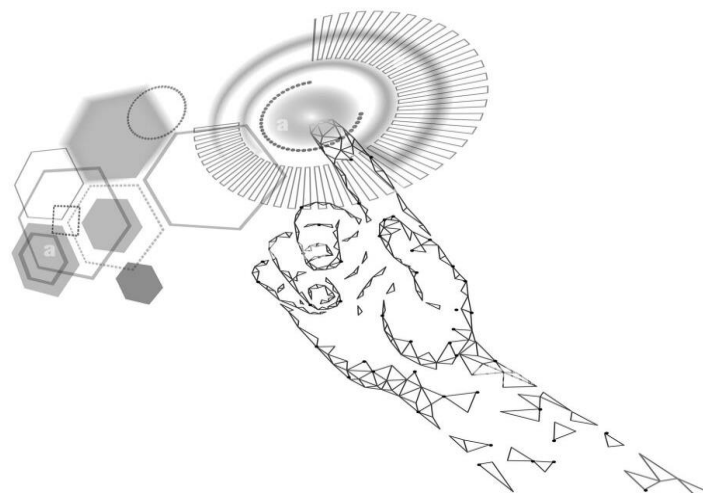
INTRODUCTION

Fig 1.hologram

Holographic projection has progressed quickly in recent years so there are many potential of it across the domains of entertainment healing research and industry such like visual studies scientific depiction interactive presentations etc dr dennis gabor of the london's imperial college established holographic projection as a type of 3d technology to enhance scans electron microscopic resolution we could now visualise the original recording of multidimensional image representation of the things thanks to continuous advancements in hologram projection technology also these holographic also known as hologram projectivity have come to serve as a judge of the 3d technology standards that are currently in use computer-generated holography is a new technique to give holographical formation that are formed using a digital compute

KEYWORDS: About hologram, concept of hologram, principle of hologram, , literature review, physics of holography, Application and Prospect of Hologram.

WHAT IS HOLOGRAM?

Holography is an innovative technique for producing three-dimensional images with laser light. It involves recording an interference pattern between two laser beams and then illuminating the pattern with a third laser to produce a full-colour, three-dimensional image.

In the process of making a hologram, the object to be imaged is illuminated with a laser beam, and the light scattered from the object is captured by a second laser beam and recorded on a holographic film or plate. When the hologram is illuminated with a third laser, the original image is reconstructed and appears to be three-dimensional.

The principle behind holography is the holographic principle, which states that the amount of information contained in a three-dimensional object can be represented on a two-dimensional surface. This principle is based on the idea that the universe can be described as a hologram, where the information contained in three dimensions is encoded in two dimensions on the boundary of the system.

The process of illuminating a hologram can be done in a number of ways, including using a white light source or a laser. The choice of illumination method will depend on the desired effect, as well as the type of hologram and its intended use. One of the benefits of holography is that it provides a unique way to represent and store information.

CONCEPT OF HOLOGRAM

Hologram concept holograms are gathered to use a rising widescreen vision and a laser as a source that emits light and some take the interferences form fringes after same range of lasers are employed to create a holographic projection two stereo images of the scene show in front and behind the real and displaying virtual images various viewpoints from various images in the form of an interferogram the hologram stores details about the recorded objects dimensions shape brightness and contrast a hologram is a projection or reproduction of three-dimensional objects that have been recorded compared to the typical three-dimensional pictures it delivers an unusual experience it visually depicts the object or event holograms can induce parallax and the presence of parallax allows the observer perceive.
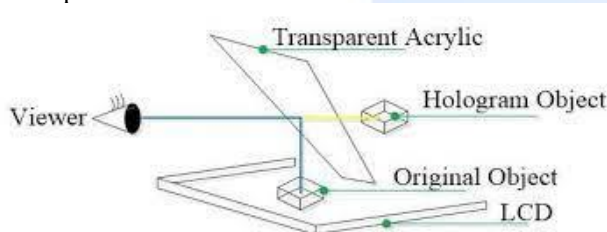

Fig2.concept of hologram

The given diagram has the components such as the diffraction angle, viewing plane, the observation plane ,etc
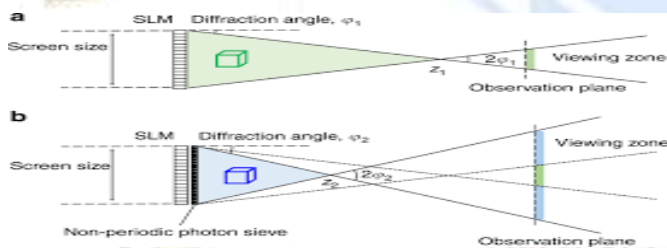

Fig3.projection of hologram

PRINCIPLE OF HOLOGRAM:

In order to create holographic images two-dimensional shots of a particular material taken at two unique viewing angles were overlapped holograms were muti pictorial views that give the impression of containing great significance the laser must be employed as holography demands a single unique light wavelength two energy beams a film plate too such are used to capture the images of things in virtual projections for objects a holographic view that may be seen in natural daylight a pair of lasers that are used to create holograms disseminate its light through the radiation beam like a flame the beam loses coherence yet it nevertheless preserves an exact wavelength the reference beam known as the middle beam strikes the objects front whereas it is illuminated from the side by the initial beam.
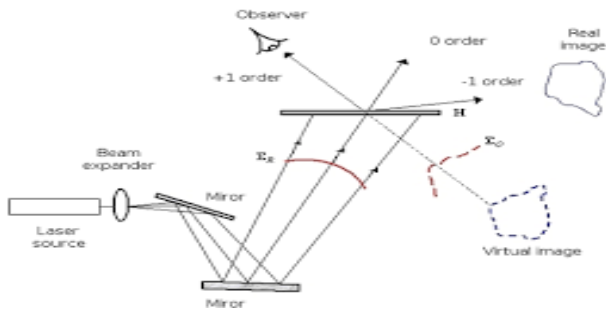
Fig 4.principle of hologram

A muti dimensional illustration is created silver plate is exposed by white light reflecting every unique colour in a pattern that resembles actual items in some aspects colour there is a hologram created mostly by simultaneous interference of two actual pictures.
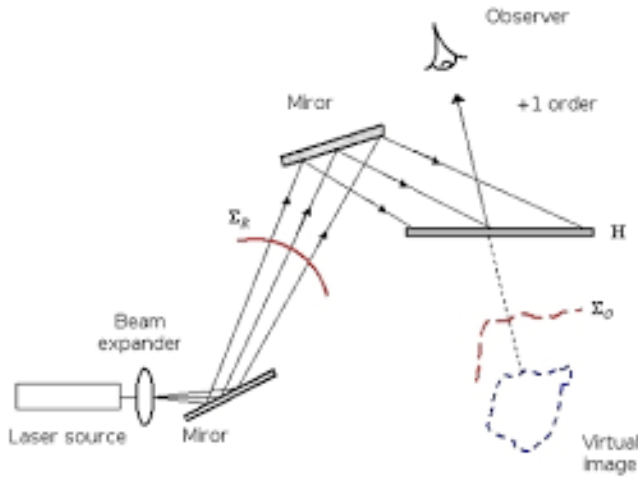

Fig 5 reflection medium

MATERIALS AND METHODS

The global running of hologram products require a huge amount of investment such as for designing,material cost,implementation etc.. But,since it is only about pattern to represent the hologram projection in an 3D object, mostly it requires an assistance of Artificial Intelligence to run it's design and projection engine. With the help of advanced light emitting technology and precision of computer numerical control (CNC).

Our concept of implementing the actual procedure in which the AI controls the projection technology with the help of CNC is every frame or render of projection image will be converted into fraction of perspective pattern and will be projected via the light emitting technology. Unlike the other method like "scratching" which is- drawn on a board which has a definite pattern so only the particular image will be projected in it. The use of CNC by moving the projection Camera can be of multiple use and so introducing pattern concept may bring a revolution in the hologram development in the entire reality

WHAT IT LACKS?

The hologram view always stayed stationary due to the lack space it can project and not have the ability to distort. If we try expand the range of projection the intensity gets weaken and we cannot make the dynamic projection due it's space constraints.In a way the augmented images are better to carry in cause of the technological pattern have a way over it but ,it is not the case for 3d projection.

WHAT WE NEED?

A number of holograms could possibly be utilized from today they will impact civilization in the up coming years that are more advanced and are utilized in medicine surgery galaxy explorations advertising and other fields too. By providing a minimal pattern of merging lights ,various channel of image can be created that can be seen and used in many virtual industrialization .The pattern projection process is a 3D measuring method. It necessitates at least one pattern projector and at least one camera.

The projector illuminates the target sequentially over time with patterns of light and dark parallel stripes with various widths. The camera, aligned at a known angle, records an image of each projection pattern. A time sequence of different brightness values is thus created for each of the camera's pixels (pixel). The 3D point cloud is calculated from the different images.

LITERATURE SURVEY

The fundamentals of holography and its uses in a variety of domains are comprehensively discussed in this paper which is based on U. schnars and W. jueptners holographic review that was published in the ieee 2005 conference

"Digital holography and its applications to MEMS and MOEMS testing" by W. Osten and M. Stuerwald, published in Journal of Microscopy in 2006. This paper reviews the use of digital holography for testing microelectromechanical systems (MEMS) and micro-opto-electromechanical systems (MOEMS).

"Holography and its applications in biomedicine" by M. K. Kim and K. H. Kim, published in Science and Technology of Advanced Materials in 2015. This paper discusses the use of holography in biomedicine, including holographic microscopy, holographic tomography, and holographic endoscopy.

By K. Curtis and A. Psaltis, "Holographic data storage: from theory to practical systems," published in Proceedings of the IEEE in 2002. This paper discusses the principles of holographic data storage and its potential for high-capacity data storage systems.

"Holography in physics: from fundamentals to the forefront" by J. C. Howell and J. E. Novak, published in Physics Today in 2016. This paper provides an overview of the use of holography in physics, including holographic duality and its applications in condensed matter physics and quantum gravity.

"Holography: from art to science" by M. R. Feldman and A. Purvis, published in Proceedings of the IEEE in 1996. This paper discusses the history of holography and its use in art, including holographic sculptures and holographic images in advertising.

PHYSICS OF HOLOGRAPHY

Recognition are essential for recognizing the theory-based method to practice when it comes to to the preservation in holographic data in the action of front wave with just an element whenever one or more waveform types are stacked produces diffraction the method used to produce a representation with holograms employing mainly in the principle like diffraction,interference although its a quite oversimplified stems by k.curtis and A. psaltis discussion as to how holography works is true enough

Those who aren't know about these notions are advised to study publications before continuing to read those essay layout having a recurring pattern may be known as a grating that diffracts

Application and Prospect of Hologram:

Get a 3d model of the copper crafts using 3d max or c4d modelling software and then use adobe after effects to manipulate it and make a holographic image of copper crafts that is useful for obtaining data on copper crafts the core concept behind hologram technology of projection a sort of multidimensional technology which is used for projection technology.

Initially referred to a transmission hologram projector places in the laser beam at the distance also angle regardless of where they are positioned in order to capture and recreate an objects genuine three-dimensional representation by using the interference and diffraction principles

Prospect of Hologram

Volume holograms used for white light reproduction high capacity and high efficiency holographic storage and also store multiple 3-dimensional images at small angular some elements are fabricated such as abbreviation corrector.

It used in optical detection and its standard wavefront has high precision in holographic projection technology has advanced recently as high tech which interprets the concepts of function and form and design and arts this technology applied to all aspects of future life especially in environmental design application

Conclusion

An interesting technique on hologram has revolutionized the way we capture and display visual information by using the framework of influence diffraction of it are able to create multi dimensional images that seem to defy the limitations of usual photos and videography has found numerous applications in sectors including security the art forms commerce and science with ongoing advancements in technology and new discoveries- in physics holography is often certainly going to progress and find new uses in the years to come. Every frame of work in the entire universe follows a pattern even if it is formless, lifeless and imperceptible. By implementing logical patterns in the projection can aggravate the virtual realization of images and illumination of lighting. Thus, the conclusion of this theory is implementation of pattern in hologram can help the future in development of further reality alteration with perfect projection.

References

1.Vincent Toal -"Introduction to Holography" by Vincent Toal is a textbook that provides an introduction to the theory and practice of holography.

2. Howard W. Smith- Principles of Holography" by Howard W. Smith is a reference book that provides a comprehensive introduction to the theory and practice of holography.

3. Stephen A-"Holographic Imaging" by Stephen A. Benton is a book that provides an in-depth discussion of holography, including its principles, techniques, and applications.

4. V. M. Bove, "Display holography's digital second act," Proceedings of the IEEE, vol. 100, no. 4, pp. 918–928, 2012.

5. D. Wang, C. Liu, and C. Shen, "Holographic capture and projection system of real object based on tunable zoom lens," PhotoniX, vol. 1, no. 1, p. 6, 2020.

6. D. Mourtzis, J. Angelopoulos, and N. Panopoulos, "Collaborative manufacturing design: a mixed reality and cloud based framework for part design," Procedia CIRP, vol. 100, no. 5, pp. 97–102, 2021.

7. R. W. Gerchberg and W. O. Saxton, "A practical algorithm for the determination of phase from image and diffraction plane pictures," Optik, vol. 35, no. 2, pp. 237–246, 1972.

8. H. Bu and S. Jiao, "Optimization algorithm of pure phase hologram," Liquid crystal and display, vol. 36, no. 06, pp. 810–826, 2021.

9. Jeong, T. H. (2015). Holographic materials and optical systems. Journal of Display Technology, 11(12), 1062-1072.

10.Caulfield, H. J. (2017). Handbook of holographic interferometry: Optical and digital methods. Springer.

11.Suzuki, T., & Takeda, M. (2014). Computer-generated holography for full-color images. In Proceedings of SPIE Vol. 9016, Image Quality and System Performance XI (p. 901606). International Society for Optics and Photonics.

12.Wang, Y., Xu, W., Huang, Q., & Jin, G. (2019). High-resolution holographic display based on a spatial light modulator with a double-grating structure. Optics Letters, 44(23), 5754-5757.

13.Song, K. S., Kim, D. K., & Kim, N. (2019). Design of a hologram security system for personal identification. In Proceedings of the International Conference on Information Networking (pp. 332-336). Springer.

14.Anderson, B. M. (2018). Holographic microscopy of live cells using a modified Mach-Zehnder interferometer. Technical Report, University of California, Los Angeles.

[15] M. Sumithra and Dr. S. Malathi, "A Novel Distributed Matching Global and Local Fuzzy Clustering (DMGLFC) FOR 3D Brain Image Segmentation for Tumor Detection", IETE Journal ofResearch,doi.org/10.1080/03772063.2022.2027284, 2021

[16] B.Buvanswari and T.Kalpalatha Reddy, "A Review of EEG Based Human Facial Expression Recognition Systems in Cognitive Sciences" International Conference on Enenrgy, Communication, Data analytics and SoftComputing (ICECDS),CFP17M55-PRJ:978-1-5386-1886-8",August 2017.

[17] M. Sumithra and Dr. S. Malathi, " Modified Global Flower Pollination Algorithm-based image fusion for medical diagnosis using computed tomography and magnetic resonance imaging", International Journal of Imaging Systems and Technology, Vol. 31, Issue No.1, pp. 223-235, 2021

[18] K. Sridharan , and Dr. M. Chitra "SBPE: A paradigm Approach for proficient Information Retrieval , Jokull Journal" , Vol 63, No. 7;Jul 2013

[19] M. Sumithra and Dr. S. Malathi, "3D Densealex NET Model with Back Propagation for Brain Tumor Segmentation", International Journal OfCurent Research and Review, Vol. 13, Issue 12, 2021.

[20] B.Buvaneswari and Dr.T. Kalpalatha Reddy, "EEG signal classification using soft computing techniques for brain disease diagnosis",Journal of International Pharmaceutical Research ,ISSN : 1674-0440,Vol.46,No.1,Pp.525-528,2019.

[21] K. Sridharan , and Dr. M. Chitra "Web Based Agent And Assertion Passive Grading For Information Retervial", ARPN Journal of Engineering and Applied Sciences, VOL. 10, NO. 16, September 2015 pp:7043-7048

[22] M. Sumithra and Dr. S. Malathi, "Segmentation Of Different Modalitites Using Fuzzy K-Means And Wavelet ROI", International Journal Of Scientific & Technology Research, Vol. 8, Issue 11, pp. 996-1002, November 2019.

[23] M. Sumithra and S. Malathi, " A Survey of Brain Tumor Segmentation Methods with Different Image Modalitites", International Journal of Computer Science Trends and Technology (IJCST) – Vol. 5 Issue 2, Mar – Apr 2017

[24] B.Buvaneswari and Dr.T. Kalpalatha Reddy, "High Performance Hybrid Cognitive Framework for Bio-Facial Signal Fusion Processing for the Disease Diagnosis", Measurement,ISSN: 0263-2241, Vol. 140, Pp.89-99,2019.

[25] M. Sumithra and Dr. S. Malathi, "A Brief Survey on Multi Modalities Fusion", Lecture Notes on Data Engineering and Communications Technologies, Springer, 35, pp. 1031-1041,2020.

[26] M. Sumithra and S. Malathi, "A survey on Medical Image Segmentation Methods with Different Modalitites", International Journal of Engineering Research and Technology (IJERT) – Vol. 6 Issue 2, Mar 2018.

[27] B.Buvaneswari and Dr.T. KalpalathaReddy,"ELSA- A Novel Technique to Predict Parkinson's Disease in Bio-Facial",International Journal of Advanced Trends in Computer Science and Engineering, ISSN 2278-3091,Vol.8,No.1,Pp. 12-17,2019

[28] K. Sridharan , and Dr. M. Chitra , Proficient Information Retrieval Using Trust Based Search On Expert And Knowledge Users Query Formulation System, Australian Journal of Basic and Applied Sciences, 9(23) July 2015, Pages: 755-765

[28] B.Buvaneswari and Dr.T. Kalpalatha Reddy, "ACPT- An Intelligent Methodology for Disease Diagnosis",Journal of Advanced Research in Dynamical and Control Systems,ISSN : 0974-5572,Vol.11,No.4,Pp.2187-2194,2019.

[29] Sumithra, M., Shruthi, S., Ram, S., Swathi, S., Deepika, T., "MRI image classification of brain tumor using deep neural network and deployment using web framework", Advances in Parallel Computing, 2021, 38, pp. 614–617.

[30] K. Sridharan , and Dr. M. Chitra "RSSE: A Paradigm for Proficient Information Retrieval using Semantic Web" , Life Science Journal 2013;10(7s), pp: 418-425