Interactive 3D Holographic Visualizer with VR Controller

MOHAMMED SADIQ NAGUR , THIMMESH R , SYED AQEEB A , SKANDA KUMAR.

Dr. MEENA DESHPANDE (Associate professor) Department of Electronics and communication Engineering, AMC ENGINEERING COLLEGE, AFFLIATEDTO VISVESVARAYA TECHNOLOGY UNIVERSITY (VTU) 18TH KM, BANNERGHATTA MAIN ROAD, BANGALORE-560083. Email: principal.amcec gmail.com| Website: http://amcec.edu.in

ABSTRACT

The development of a system that offers audiences a new way to convey information for medical, educational, or business/architecture projects is the main topic of this article. When the three-sided glass pyramid is placed on the screen, it combines three views of the object to give the impression that it is three-dimensional. Then, a VR control Tool or Hand gesture that transmits commands to the software based on specific user gestures controls and manipulates the 3D holographic illusion of the object. This new system is a revolutionary approach to presenting information in a more engaging and interactive way. By utilizing holographic technology and virtual reality controls, users can manipulate and explore 3D objects in a way that was not possible before. One potential application of this technology is in medical education. Students could use this system to interact with virtual models of the human body, allowing them to better understand complex anatomy and medical procedures. Additionally, in rural schools could use this system to create virtual models of their designs, allowing students to explore and interact with the designs in a more immersive way. By providing a more interactive and engaging experience, students will be able to better understand complex concepts and ideas. This technology could also have applications in entertainment and gaming, providing users with an even more immersive experience.

1. INTRODUCTION

Hologram technology is essentially a three-dimensional projection that can be viewed without any specialised tools, such cameras or glasses. Since the image can be seen from any angle, an object will appear to move and shift realistically as the user moves around the display.

Software like AutoCAD, Unity 3D, Autodesk Automotive, and 3Ds Max, among others, make it simple to duplicate three-dimensional (3D) objects on a computer screen. However, these methods only give the consumer a small, uninteresting perspective of the 3D item. Wearing specialised eyewear can improve the experience of viewing a 3D thing. For instance, wearing 3D glasses while watching a 3D movie or TV show gives the user an immersive experience of seeing items in 3D. The usage of certain eyewear is required for this experience, though. By using 3D holographic projections, this flaw can be eliminated. In order to capture the object in three dimensions, it can be implemented utilising holographic screens and lasers for projection. The user sees an illusion of the 3D object thanks to the holographic display Three-dimensional display technologies are also projected to be used as user interfaces (UIs) in the near future. In the future, it

won't just be for watching 3D television broadcasts. Two dimensional (2D) user interfaces based on touchable 2D screens are already widely utilised, therefore the public is acclimated to them. By including gestures (such as swiping, touching, zooming, etc.) in addition to direct touch to pick an object or focus on a particular place, they have improved the utility of various human-computer interaction (HCI) programmes. leap Motion, Microsoft Kinect, Intel RealSense, and other commercially available devices have all made significant strides in recent years towards tracking the 3D movements of the human body. These gadgets have developed 3D gesture interfaces that are employed in a variety of settings, from gaming to controlling robotic arms. We refer to an interface as a gesture interface if a user interacts with it using gestures, regardless of where the motion is made or what is being touched. When using a traditional 3D gesture interface, the user moves in their own space while viewing the graphics on the display.

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2.METHODOLOGY

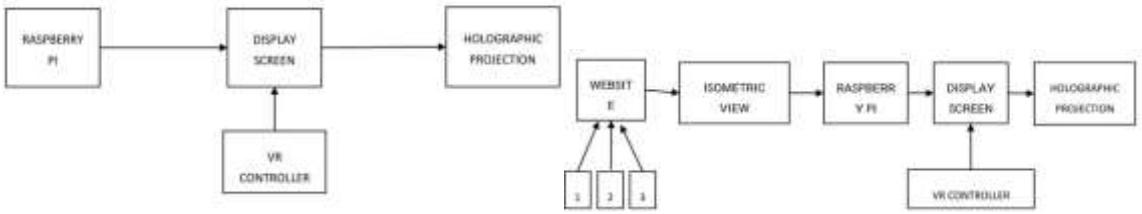

Figure 1:BLOCK DIGRAM

The Proposed Project has 3 main parts

- The Visualizer
- The Frame
- The Processor

The frame, which is composed of a rectangular wooden board, has a three-sided pyramid made of glass or acrylic sheet that is tilted at an angle to provide a parallax effect that allows us to see the model being presented by the visualizer in three dimensions. A display screen is mounted on the same frame top with the space. Depending on the size of the display screen, the frame height can be changed using pillars, clamps, or screws.

A style of user interface known as hand gesture approach enables people to interact with computers or other devices using hand and finger gestures. Using cameras or other sensors, this technique records the user's hand motions, which are subsequently translated into commands the computer or gadget can understand. The use of hand gestures to interact with virtual objects has grown in popularity recently, especially in the disciplines of virtual reality and 3D visualisation where it provides a more intuitive and natural means of doing so. Various other applications, including gaming, industrial design, medical imaging, and science teaching and training, have also made use of it. Although this technology has several drawbacks, such as identification mistakes and a small gesture range, advances in technology continue to improve the accuracy and effectiveness of hand gesture methodology.

3. RESULT

1. The setup involves a specialized holographic display projecting a 3D heart model. Hand gestures, detected through a gesture recognition system, control the model's movements, such as rotation and zooming. This interactive experience allows users to intuitively explore and interact with the holographic heart model.

Figure 2:3D MODEL OF HEART CONTROLLING IN HOLOGRAM USING HAND GESTURES

2. The model is rendered into holographic format and projected onto the display, creating the illusion of a floating hologram. Users can control the holographic skull using gestures, allowing for an interactive and immersive experience.

Figure 3:3D HUMAN SKULL CONTROLLED BY HAND GESTURES

3. Using a holographic display, hand gestures are recognized and mapped to commands for image selection. Real-time image rendering enables seamless switching between 3D images based on detected gestures, creating an interactive and immersive experience within the hologram.

Figure 4:CHANING THE INMAGES USING HAND GESTURES

Figure 5:CHANING THE INMAGES USING HAND GESTURES

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4.CONCLUSION

In conclusion, the creation of a 3D holographic visualizer with a VR controller offers consumers a compelling and immersive experience. In order to develop a powerful visualisation platform, this application combines the cutting-edge technologies of 3D holography with virtual reality (VR). Users can interact with the holographic items in a natural and intuitive way by integrating a VR controller, improving the entire user experience.

Several important elements were implemented at various stages of the development process. Utilising holographic projection techniques, the 3D holographic visualizer creates realistic-looking 3D objects that seem to float in midair. These objects offer flexibility for many use cases because they may be modified and altered to satisfy certain requirements. With the help of various hand gestures and the VR controller, which acts as the main input device, users can easily manipulate and move around the holographic scene.

Numerous opportunities and applications are provided by the application. It can be used in fields where visualising 3D objects and settings is crucial, including architecture, engineering, product design, and entertainment. Users can study items from various angles, alter their properties, and engage with virtual aspects because to the visualizer's interactive nature, which creates a more dynamic and intuitive visualisation experience.

Rural kids have a unique opportunity to visualise and explore difficult ideas in topics like physics, math, history, and geography thanks to the interactive 3D holographic visualizer. Students can better understand abstract ideas that are frequently hard to understand through conventional techniques by presenting lifelike 3D objects and situations. Holography is used to increase presence and realism, which makes learning more engaging and remembered.

5. REFERENCE

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