

Head Mounted Display (HMDs) Opportunities

¹Nayan Satani, ²Jaykumar Sadhu, ³Kaushal Gor

¹Student, ²Student, ³Assistant Professor

¹Parul Institute of Engineering and Technology-MCA,

¹Parul University, Vadodara, India

Abstract: The main purpose of this article is to review the latest features of Head Mounted Displays (HMDs). In this, we compare the targeted display of a different Virtual Reality Head and what could be improved in the future. Review alternatives based on performance provided in a variety of ways. In recent times there have been many changes taking place in HMDs devices. Currently, these devices provide an emotional tracking feature. After wearing the HMDs devices detect smiles, confusion, anger, etc. Nowadays HMDs are widely used in training, education, sports, military, public service, etc. In one study, it was discovered in 2017 that now use the HMDs device on the Navigation Support Motorcycle for passengers.

I. INTRODUCTION

The real reality is the technology that it uses to create a visual environment, allowing the user to interact with that physical world [1]. Head-mounted displays (HMDs) overcome limitations related to display adjustment, computer power, and delay problem. Dipped HMDs, widely used in the VR experience, cover many faces especially the upper parts including the eyes and eyebrows [2] [5].

II. LITERATURE REVIEW

In this article, the author introduces research methods and ideas for the future of high-resolution (HMDs) of integrated and unpopular reality to taxpayers that we see. Specifically, head-to-head demonstration courses, a variety of visual displays, and head-to-head sensory technologies that are integrated and unpopular with taxpayers we see, and present challenges and ideas for achieving a better MR / AR experience, are presented.

III. RESEARCH METHODOLOGY

3.1 Population and Sample

In this, we compare the various visual modes of Virtual Reality and what improvements may work in the future. Review alternatives based on performance provided in a variety of ways. Currently, these devices provide an emotional tracking feature. After wearing the HMDs devices detect smiles, confusion, anger, etc.

3.1.1 CRT (Cathode Ray Tube)

Modulates, accelerates, and rotates the electron beam on the screen to create images. Images can represent electronic formats, images, radar objectives, or other objects.

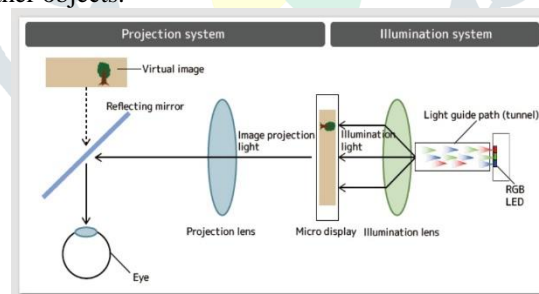


Figure 1. HMDs Visio System

In (Figure 1) any RGB LED light comes in the form of a Light Guide to the Illumination lens. The lighting lens converts these lights into Illumination light and uses a Micro Display Virtual image.

3.2 Micro Display Evaluation

NVIS has selected 0.88 "diagonal SXGA (1280 x 1024 pixels) FLCOS (Ferroelectric Liquid Crystal on Silicon) reflective micro display. Micro display produces SXGA resolution image at 24-bit color depth. Different Signaling [11].

3.2 Optics

PHMD architecture is designed for small FLCOS displays. It consists of three parts: pancake optics, a "leg" speculation, and a micro lighting system. Eye use was upgraded to 23 mm to allow users with eyeglasses [12].

3.2 Mechanical Design

Optical and mechanical teams working together to satisfy each project need to find a solution that best meets the purpose of the project [12].

IV. TOOLS

4.1 Android Smartphone

It is responsible for providing visual augmented reality images with an app that displays eye-catching images. Displays the app screen, vertically divided into two regions [4].

4.2 Eyes Splitter

It is responsible for ensuring that the right eye sees only the right image of the right region and that the left eye only sees the left image. Therefore, it is responsible for ensuring the correct visualization of stereoscopic images [15].

4.3 Beam Splitter

It is responsible for combining visual images provided by the smartphone with a real-world view. and demonstrated the function of the ray separator [1]. The yellow arrows represent the beam of light emitted by a smartphone screen, that is, a beam of light that forms a visual image.

4.4 Beam Splitter

By creating any visible or unpopular reality for taxpayers we see we need photos or videos as input. That photos and videos are taken by the Camera. It is responsible for capturing the image of the user's eye and sending these images to the processing unit located inside the helmet. For your own you can use a webcam or other external webcam, such as Logitech C270, etc.

V. LATEST R & D

5.1 Emotions Tracking

Wearing a head-mounted display (HMD) makes an adjustment regarding emotional recognition using machine vision not working because they used all facial images for training [4].

5.2 Motorcycle Head-Up Display

In recent studies, they have suggested the concept of a Head-up Display device, which is used by passengers to look at the road. This device is similar to a helmet or with a helmet, so to speak, with Head-up Display [8].

VI. CONCLUSION

This paper contains the latest opportunities in the Head-Mounted-Display (HMDs). In the new era, it can be used in education, training, daily work, research, and other fields. In 2019 HMD is first used in motorcycle head-up display for navigating the driver to any specific location and it is also used for safety purposes at the time of driving.

VII. ACKNOWLEDGMENT

The success and final outcome of this research required a lot of guidance and assistance from many people and we are extremely privileged to have got this all along the completion of our research. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

We owe our deep gratitude to our review paper guide Prof. Kaushal Gor who took keep interest on our seminar work and guided us all along, till the completion of our seminar work by providing all the necessary information.

REFERENCES

- [1] Arian Mehrfard, Javad Fotouhi, Giacomo Taylor, Tess Forster, Nassir Navab, and Bernhard Fuerst - "A Comparative Analysis of Virtual Reality Head-Mounted Display Systems". IEEE 5 Dec 2019.
- [2] Hwanmoo Yong, Jisuk Lee, Jongeun. Choi Yonsei University School of Mechanical Engineering - "Emotion Recognition in Gamers Wearing Head-mounted Display". IEEE 23-27 March 2019.
- [3] Changchong Sheng, Libing Jiang, Bo Tang, and Xiaoan Tang. - "A Novel Menu Interaction Method Using Head-mounted Display for Smartphone-based Virtual Reality". Progress in Electromagnetics Research Symposium — Spring (PIERS), St Petersburg, Russia 22–25 May 2017.
- [4] Kiyoshi Kiyokawa. Cybermedia Center Osaka University Osaka, Japan - "Trends and Vision of Head Mounted Display in Augmented Reality". International Symposium on Ubiquitous Virtual Reality- 2012.
- [5] Eun-Young Lee, Van Thanh Tran and Dongho Kim - "A Novel Head Mounted Display Based Methodology for Balance Evaluation and Rehabilitation". 16 November 2019.
- [6] Eisaku Miyamoto, Rugo Kijimag. Faculty of Engineering Gifu University - "Evaluating Dynamic Characteristics of Head Mounted Display in Parallel Movement with Simultaneous Subjective Observation Method". IEEE 23-27 March 2019.
- [7] Kenichiro Ito, Tetsuro Ogi, Hidekazu Nishimura - The University of Tokyo - "Motorcycle Head-Up Display: Design of Presenting Navigation Information". IEEE Consumer Electronics Magazine (Volume: 8, Issue: 5, Sept. 1 2019).
- [8] Kurtis Keller, Andrei State, and Henry Fuchs. - "Head Mounted Displays for Medical Use". JOURNAL OF DISPLAY TECHNOLOGY, VOL. 4, NO. 4, DECEMBER 2008.
- [9] Sherman & Craig. "Head-Mounted Display"- Knimbus, ppt.151-159.
- [10] Reynald Hoskinson, Etienne Naugle - Recon Instruments Vancouver, Canada. – "A mobile head-mounted display for action sports". Third FTRA International Conference on Mobile, Ubiquitous, and Intelligent Computing – 2012.
- [11] Soma Kawamura, Ryugo Kijima, - Faculty of Engineering, Gifu University. – "Effect of Head Mounted Display Latency on Human Stability During Quiescent Standing on One Foot". IEEE Virtual Reality (VR) March 2017.
- [12] Traquair, Harry Moss. "An Introduction to Clinical Perimetry", Chpt. 1. London: Henry Kimpton. pp. 4–5. October 2008.
- [13] Minoc Bablani, Jannick P Rolland – "Design for an Improved Head-Mounted Display System" – ResearchGate 03 February 2003.
- [14] Hershey, PA - "Virtual and Augmented Reality: Concepts, Methodologies, Tools, and Technology" – Information Resources Management Association -USA. Page. 705-735, 2018.
- [15] Kenichiro Ito "Design in Immersive Virtual Reality Environment for Information Presentation of Motorcycle Head-Up Display" – KEIO University, 23 March 2017.