VIVA Institute Of Technology
9thNational Conference On Role Of Engineers in Nation Building – 2021(NCRENB – 2021)

VIVA-TECH IJRI
ANNUAL RESEARCH JOURNAL

VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION
ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

Smart Glasses Technology

Surti Pratik Kishor[1],Prof.PradnyaMhatre[2]

[1](Department of Computer Application, Viva School of MCA, University of Mumbai, India)
[2] (Department of Computer Application, Viva School of MCA, University of Mumbai, India)

Abstract :*The Smart glasses Technology of wearable computing aims to identify the computing devices into today's world.(SGT) are wearable Computer glasses that is used to add the information alongside or what the wearer sees.They are also able to change their optical properties at runtime.(SGT) is used to be one of the modern computing devices that amalgamate the humans and machines with the help of information and communication technology. Smart glasses is mainly made up of an optical head-mounted display or embedded wireless glasses with transparent heads-up display or augmented reality (AR) overlay in it.In recent years,it is been used in the medical and gaming applications,and also in the education sector.This report basically focuses on smart glasses, one of the categories of wearable computing which is very popular presently in the media and expected to be a big market in the next coming years.It Evaluate the differences from smart glasses to other smart devices.It introduces many possible different applications from the different companies for the different types of audience and gives an overview of the different smart glasses which are available presently and will be available after the next few years.*

Keywords:*Augmented reality ,Embeded Wireless glasses , Optical heads-up , Smart Glasses,Wearable Computing.*

1. INTRODUCTION

Smart glasses Technology, a Wearable computing technology used to cover information over a user's viewing field, started as simple pre-screen displays. Over the years, Smart glasses have used eye-catching computer devices. On top of that their displays go with the user's head, which leads users to see the display in terms of its position and position. we saw it progress to the ability to perform complex tasks using computer power. we can find this experience through Optical Head-Mounted Display, Reality technology or optical Heads-Up Display Glasses. Despite its continued growth and potential in the business and industrial sector, these wearable computer screens still face exceptions that hold them back from achieving market capitalization. Faced with a clear moment, smart glass companies are currently trying to expand their world. [1][4]

Although businesses are finding great system solution through eyewear technology, the public will still have to wait a while to earn the benefits of mass access and use. The manufacturers of Smart glasses Technology have realized that in order to take the Shotgun marketing experience, they must first get the better of the challenges of balancing performance and wear at an affordable cost. Many smart glasses offer different prices. [4]

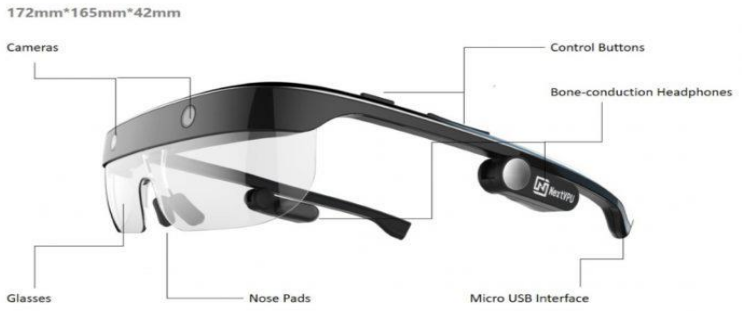

Fig. 1 Smart glasses

Like other computers, smart glasses can store information from internally or externallythrough the sensors. It is used to control or retrieve the data from other devices or computers. It can alsosupport the currentwireless technologies such as Bluetooth, Wi-Fi, and GPS and many other technologies .The number of models use the mobile app and act as portable media players to send video and audio files to the user via Bluetooth or WiFi headset devices. Smart galssesdevices can also have features that we use every day on the smartphone. Some have a tracker functionality to operate these features that we see clearly in other GPS clocks. The recent use of Smart glasses is convincing many forward-thinking businesses to get on board. while widespread public has still not use it, smart glasses technology have identified key areas that will work, improve and grow. It's so helpful that it's not surprising to hear that technical giants like Apple, Facebook, and Samsung are working on their powerful AR glasses [1]

2. TYPES OF SMART GLASSES

2.1 Google Glass

It is a hands-free device used for smart and crafted work quickly. Google Glass was developed by Google X which offers a place in Google dedicated to technological advances such as non-driving vehicles.

Touchpad is available on the Google Glass side which allows users to command the device by simply swiping with a timeline like display on the screen layout. Sliding back will notify about the current events which includes weather and forcasting, and rewind will show you previous events such as calls, updates and photos.

The Google Glass tester type uses liquid crystal in silicon, a sequential color system as a platform, an illuminated LED display on it.

Google Glass is used overlapping with a smartphone and is one of the tools it uses to display notifications correctly and quickly [5][11]

Fig.2 Google glass

2.2Vuzix Blade

It is a View-throllyughi.e AR Smart Glasses powered by industry-leading Waveguide optics. Vuzix blade balance business and customer demand. It is primarily designed to keep records in the performance of the industry and is designed as all the comforts of the day. It can increase accuracy and efficiency by following step-by-step

instructions at work. It features High Defination Camera, Noise microphone cancellation, full color, wireless wi-fi, UV protection lenses, dual haptic response, multi-language voice control and microSD amplification.[2]

Fig.3Vuzix blade

2.3 North Focals

North Focals after its launch became the most successful AR product on the market. They come with an outstanding look and contain almost every feature available or any other Augmented Reality product software. It works like a smartwatch where it will act as an extension of your phone by recording and can access Alexa and automatically reply to messages. Sounds magical with the Northern Focals. They look like any other standard glass and that's an incredible feature it contains. The Focal closing competition is Vuzix Blade. You can do all the work in Focal by using Loop in it which is a different accessory that comes with it. It is basically a sharp-edged ring with pleasing sticks on the upper side of it. It is so small that no one can see it on your finger and you can move the play stick by checking the various columns on the interface and you can tap it by performing actions.[2]

2.4 Everysight Raptor

Raptor is the world's first cycling computer designed for humans and not for bicycles. Designed to enhance daily mobility by displaying a clear AR layer of detail in front of the cyclist's eyes. Having real-time information installed in front of you allows you to keep your eyes on the road ahead to increase safety and is more focused on performance, posture, and accomplishment. It complements the viewing and enjoys amazing bike riding. The Raptor HD front-facing camera can deliver your memorable moments with the real-time root bar in videos.[2]

2.5 Epson Moverio BT-300

The Epson Moverio BT-300 offers a new way of seeing the world. Incuded features of Epson's cutting edge silicon-based OLED digital technology technology that make the device the simplest binocular visually pleasing glass on the market with an OLED display1 with unparalleled image quality. It has high clear display, A new level in drone testing with Si-OLED display, enabling the full visual experience of the FPV accessory with visual acuity. Amazing image quality - HD display (720p) and high brightness ensures bright colors and bright images. HD front-facing camera with 5MP front-facing camera for capturing HD quality HD videos and photos. It works very well with a 1.44GHz Quad-Core CPU and 2GB of RAM,and has 6-hour battery life. [10][12]

2.6 Dream Glass

Pioneers of dream glass is the future of the invention and design of Smart Glass. It helps to create new job vacancies for key clients with smart glass cutting technology, dedicated customer service and beautiful aesthetic designs.

Natural sunlight that enhances UV protection

Reduce its energy costs and reduce A / C cooling

When privacy and exposure to your mobile sensors are used, cell phones and other such devices are used[2][9]

3. THE PARADIGMS OF SMART GLASSES

There are three different paradigms of how to convert the visual information into a wearer perceives. Those three are introduced here.

3.1 Augmented reality

The earth is being improved or supplemented with material. In these the user can see the real world but also find the visual content created by the computer device and displayed with an additional light source that does not allow the real world view. Connecting to those objects is a way of communicating with computer devices. An example of additional additions is Microsoft hololens. [13]

Fig. 4 Augmented reality of smart glasses

3.2 Virtual reality

The ultimate goal is to create a fully visible world for the user to see, share and immerse in the visible world. The user sees only this visible world, and any other light sources do not touch the eye. One noticeable difference in the simple screen is that user actions affect the physical world. For example the movement affects user content that you will be able to see. The latest example of virtual reality is the play channel. [13][7]

Fig. 5 Virtual reality of smart glasses

3.3 Diminished reality

Items are reduced in size by filtering out the light produced or emitted by those objects. This is often used in overlaping with a fact that one would not like to replace material removed by some material. Like other smart devices these days, smart glasses will also have a camera. The main difference with other camera devices is that the photos or videos are taken in the user's viewing area, the user does not have to hold the phone in his or her hands and the user's view is not affected. This glasses can see what the wearer going to sees at any time when werarer will wear smart glasses.The wearer Combined with eye-tracking technology devices can accurately determine what the viewer is looking at. It allows the device to access important information about users' interests, activities, location and activity. [13][8]

4. APPLICATION OF SMART GLASSES TECHNOLOGY

4.1 Local Services

Utilizing the unpopularity of taxpayers we see with location-based services facilitates many benefits from user perspective. we can paste digital data that will contain digital animation, images and other data over real and physical space. Used to integrate virtual reality taxpayer technology that we see with location-based sensors, geometry and GPS, you can actually use its power. Few examples [13]

- Size
- Google Translate

4.2 Gaming

AR works well in the gaming sectors and has been around for years. It's all about covering computer-generated images that give a real perspective. Unsupported taxpayer apps we see starting with an interactive map that enhances the visual display area of great multiplayer dynamics.The most widely used Augmented Reality apps are:[13]

- SketchAR
- Pokemon Go
- Google Translate

4.3 Entertainment:

Industry For 3D cinema users wearing glasses. By attaching those mirrors with smart glasses the cinema experience of the audience can be enhanced. Used for real cinema experience. Users can decide what they see depending on their head position .Some major markets can be realistic and unpopular games for taxpayers. The popular taxpayer games we see can reach a wide number of audience than the people playing the games today because they cannot be played outdoors and are based on interaction with other people than the taxpayer dislikes we see. [13][6]

4.4 Commercial

Areas Advertising boards and posters may be displayed on video. A movie ad poster can be enhanced with a movie trailer if the user wears the appropriate glasses. Smart glasses technology with face recognition software can help employees identify customers and show their details. Customers entering the stores will be given smart glasses to show all the information about the products and it also helps them to deliver what they want in the store quickly. This data can be used to determine the no-value of a customer visited this place. [6]

4.5 Sports

During most games a person does not have much time to dedicate to a computer device and it is not possible to use his hands to communicate with the device. Details can be shown to the wearer without disturbing the sports activity from an external perspective. Smart glasses can be used to take pictures or video during games made with speech command. [6]

4.6 Educational Forum

Real virtual glasses could be used to teach history by allowing students to view historical sites not only in books but in the 3D world in which they could roam freely. These mirror glasses are used to create training simulations. Examples will be included such as pilot simulation, flight simulation and military training or surgical training. It is beneficial to be able to do those things in a safe environment. [13][6]

4.7 Medical Use

At first glance the use of smart glass for visually impaired people may seem pointless. But they can be very helpful in helping those people as a seeing friend. Many blind people use sugarcane to obtain information about their surroundings. This method provides information only on the lower extremities that do not prevent collisions with the upper extremities such as tree branches. Smart glasses can alert blind people to such strikes. They can be used to navigate by giving them information about the range of pre-defined landmarks. [11] Another possibility is to use smart glasses as a visual aid to create a night vision or to show things from a distance. Studies confirm that patients' pain sensitivity during exercise can be reduced by interrupting them with established facts. It is also possible to have footnotes for the deaf. Speech recognition will need to be developed and glasses will be able to distinguish different words.[13]

Headset Name	Resolution (Pixels)	Field of view (degrees)	Refresh Rate (Hz)	Tracking and control	Battery Life (hrs)	Others	Pricing ($)	Our Rating (Out of 5)
Microsoft HoloLens 2	2048 x 1080	52	120	Eye and hand	6	For AR devlopers -Remote control -Sharing of AR	3500	4
Magic Leap One	1300 pixels per eye	50	120	Eye and hand, with haptics	3	-Haptics -8GB RAM	2295	5
Epson Moverio BT-300	1280 x 720 pixels	23	30	Eye and hand	6	-Drone AR -Android	699	3.4
Google Glass Edition 2	720p video capable	80	-	Eye and hand	8	-GPS -Voice command	1167	3.5
Vuzix Blade AR	640x360	10	-	Eye, with haptics	2	-Haptics -Mobile OSs	599	3
Raptor AR	800x600	43	144	Eye, button	8	-For outdoor athletics	599	3.5
ThirdEye	1280 x 720	42	-	Eye and	8	-Sharing AR	1950	2.5

Fig .5Comparision table of Smart Glasses

5.FUTUREPOTENTIAL AND CHALLENGES

5.1 Future Potential

Current use of smart glasses convinces forward-thinking businesses to join the board. While widespread public use is still pending, smart mirror technology has identified key areas that will work, improve and grow. It's so helpful that it's no surprise to hear that technology giants like Apple, Facebook, and Samsung are working on their powerful AR glasses. [2]

5.2 Challenges

Facing a clear moment, smart glasses companies are currently striving to expand their world. While businesses are finding the best solution for the system with this eyeglass technology, the public will still have to wait a while to realize the benefits of mass availability and use. Start overcoming the challenge of working in moderation and aging at a lower cost. In addition, ensuring the construction of comfort and cooling systems to satisfy a strong calculation will be the key to mass acceptance aside from these challenges, there are many smart glasses distributed today that offer great value to a variety of users. [2]

6.CONCLUSION

In these paper we have studied about the smart glasses technology and their types. Then we have also presented their paradigms and different applicationsof the smart glasses systematically. From these study it is clear that there are lot of interesting applications and devices.which can be easily implemented with smart glasses . It is to be expected that there will be largeamoutof investments into research and development of smart glasses because the entertainment industry, education sectors and many other things can get benefit from smart glasses and there might be a high consumer demand for them in coming years. Nevertheless these model is available today are very promising and it might happen that smart glasses will be a part of our future everyday life for new generation.[14]

ACKNOWLEDGEMENT

I am very thankful to my college for giving me this opportunity to make this project a success. I give my special thanksand sincere gratitude towards Prof. PradnyaMhatre for encouraging me to complete this research paper, guidingme and helping me through all the obstacles in the research.without her assistance, my research paper would have been impossible. Also I present my obligation towards all our past years teachers who have bestowed deep understanding and knowledge in us,over the past years. We are obliged to our parents and family members who always supported me greatly and encouraged me in each and every step.

REFERENCES

Journal papers :

[1]What is smart glasses ?https://en.wikipedia.org/wiki/Smartglasses
[2]What are types of smart glsses? http://www.wikitude.com/blog-smart-glasses
[3]Teach Thought Staff, 15 Examples Of New Technology Education, November 21, 2015. https://www.teachthought.com/technology/15-examples-of-new-technology/
[4] Josh P, Definitions Of Glass, Smart Glass And Smart Glasses, 22nd July 2014. https://www.glassappsource.com/smartglass/definitionsglass-smart-glass-smart-glasses.html.
[5]what is google glasses ? https://www.wareable.com/ar/the-best-smartglasses-google-glass-and-the-rest
[6] Types of gadgets used in smart glasses ?https://www.techradar.com/ reviews/ gadgets/ recon-instruments-mod-live-hud-1141185/ review/

Books :

[7]Steve Mann. Continuous lifelong capture of personal experience with EyeTap on smart glassees. on Proceedings of the 1st ACM workshop on" Continuous archival and retrieval of personal experiences", (CARPE), 2004. 5.
[8]"Digital technology in the classroom: Changing the face of education sectors information graphic," 2017 International Conference On Smart Technologies For Smart Nation (SmartTechCon), Bangalore, 2017, pp. 405-406. P. Johri and A. Misra
[9] C. Delgado Kloos, P. Rodríguez, Á. Velázquez-Iturbide, M. C. Gil, B. Fernández-Manjón and E. Tovar,"Digital education in the classroom," 2017 IEEE Global Engineering Education Conference (EDUCON), Athens, 2017, pp. 31-32.

Chapters inbooks :

[10] Scott Stein (18 February 2014). https://"Epson Moverio BT-200 Smart Glasses Preview – CNET". CNET. CBS Interactive/
[11] Sloane, Garett (15 May 2013).https://"Microsoft, Samsung developing high-tech specs to rival Google Glass". nypost.com/

Thesis :

[12]what is Epson india?https://www.indiamart.com/epson-india-private-limited/
[13] what are applicatiomn of smart glasses ?HermannSchweizer_SmartGlassesTechnologyApplications_report.pdf (ethz.ch)
[14] https://www.slideshare.net/NipunAgrawal7/seminar-report-on-smart-glasses/