



GOOGLE SMART GLASS

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ABSTRACT

During the last few years, the improvement in new media has reformed the people's conduct immensely. Ongoing turns of events and gauges propose the ascent of another innovation that is named "Wearable Augmented Reality Devices", where shrewd glasses (like Microsoft HoloLens or Google Glass) address conspicuous examples.

Thusly, this paper gives chiefs and scientists an applied portrayal of the innovation and a conversation of how it varies from existing versatile and expanded reality advances. At long last, a conversation of how brilliant glasses can build firm worth is given. For the most part, keen glasses intend to give life observing administrations, just as making a stage for taking more true photographs and video cuts. They can likewise be furnished with expanded reality innovation, planned to help you with your ordinary home and business life.

Since the launch of Google Glass in 2014, smart glasses have mainly been designed to support micro-interactions. The ultimate goal for them to become an augmented reality interface has not yet been attained due to an encumbrance of controls. Augmented reality involves superimposing interactive computer graphics images onto physical objects in the real world.

Keywords: Smart glasses, google glasses, eyewear devices, Media Evolution, Augmented Reality, AR, Virtual Reality, VR, Wearable's Technology.

1. INTRODUCTION

About Google glasses and other smart glasses with diagram

Over recent decades smart glasses have gained increased attention in both the research arena and recently also in the consumer market, even though there is not yet a clear definition of what exactly smart glasses entail and underexposed perspectives not represented. This study used a rapid review to assess the current understanding of smart glasses with the aim of defining them are.

Keen glasses have been delivered into the market. Savvy glasses are outfitted with a transparent optical presentation, which is situated in the eye-line of human clients. The human client can see both this present reality climate and the virtual substance appeared in the presentation, which is viewed as the idea of expanded reality. Right now, expanded reality on cell phones is overwhelmed by cell phones.

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In recent years, smart glasses have been released into the market. Smart glasses are equipped with a see-through optical display, which is positioned in the eye-line of human users.

The human user can view both the real-world environment and the virtual contents shown in the display, which is regarded as the concept of augmented reality [1]

According to - NEW YORK, March 31, 2022 /PRNewswire -- The **augmented reality (AR) and virtual reality (VR) market** size is expected to increase by USD 162.71 billion from 2020 to 2025. Moreover, the growth momentum of the market will accelerate at a CAGR of 46% during the forecast period.[3]

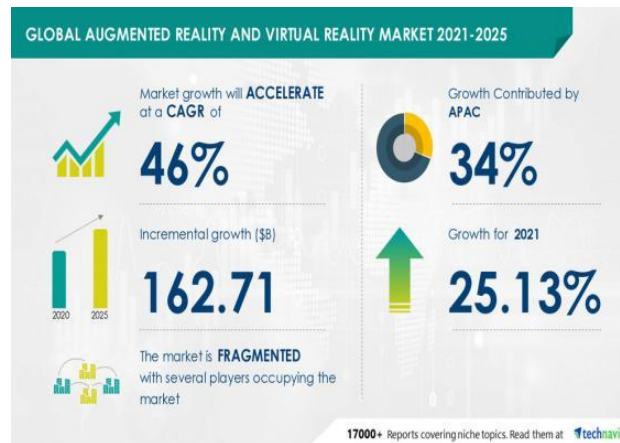


Fig. 1.1 showing chart for future of AR/VR
(Reference: www.caesarvr.com/vr-ar-news)

In the report by CCS Insight [2], it is estimated that around 14 million of the virtual and augmented reality headsets will be sold by 2020 with a market value of 14.5 billion US dollar. One of the challenges that device manufacturers encounter, before their smart glasses become widespread in the market, is the usability issue. The interaction between human user and smart glasses is still encumbered and problematic. That is, the virtual content on the optical display are not touchable and thus direct manipulation becomes a fatiguing and error-prone task. Additionally, compared with smartphones, smart glasses have more challenging issues such as reduced display size, small input interface, limited computational power, and short battery life .

1.2 Virtual reality (VR): Virtual reality applies to computer-simulated environments that can simulate physical presence in places in the real world and in imaginary worlds. It connects remote communication environments which provide virtual presence of users with the concepts such as telepresence and elexistence or virtual artifact (VA).



Fig. 1.2 Illustration of VR

(Reference: www.forbes.com (The Important Difference between Virtual Reality, Augmented Reality and Mixed Reality The Important Difference between Virtual Reality, Augmented Reality and Mixed Reality))

1.3 Augmented reality (AR): Augmented reality is a view of a physical, real-world environment which is live, direct or indirect. It is related to a general concept called mediated reality, which means a view of reality is modified by a computer. This technology functions by enhancing user's current perception of reality.



Fig. 1.3 Illustration of AR

(Reference: elearningindustry.com/HQuality/Shutterstock.com)

Google Glass[2] is the first of its kind in the market. Due to its small form size, only swipe gestures are accessible for the user input and thus the operating system is designed as a series of pixel cards, namely Timeline. Users can swipe over the pixel cards and select the target pixel card. However, this design has potential pitfalls such as limitations in micro-interaction, long search time when pixel card number is large, and so on. Similar to the desktop computer and smartphone, other successors of smart glasses have applied the traditional custom of the WIMP (Windows, Icons, Menus, Pointers) paradigm in their interfaces.[10] However, the default interaction methods available on smart glasses such as touch pad and button inputs are far from satisfactory. The users may find it difficult to accomplish their tasks in the interface under the WIMP paradigm by using these default interaction methods, for instance, the long task completion time, high error rate in item selection, and so on.

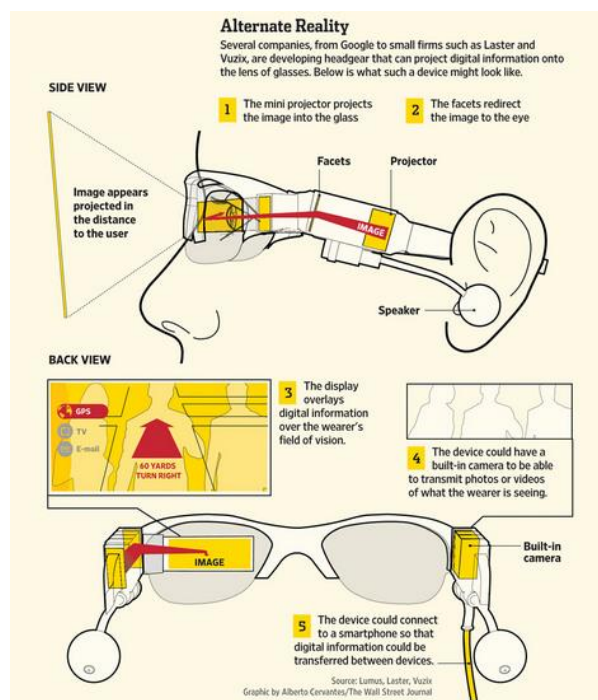


Fig . 1.4 Overall working of Google glass

(Source: www.ijser.org/researchpaper/Google_Glass.pdf [6])

Google Glass has the basic features of any computer, such as a CPU, also sensors like GPS, speakers, microphone and battery, a tiny projector and a prism that directs the light to your retina.[6] All components are neatly embedded in its frame.

Most of the processing will actually take place in the cloud so that the device will be as light as possible, also a good mobile broadband signal is essential.

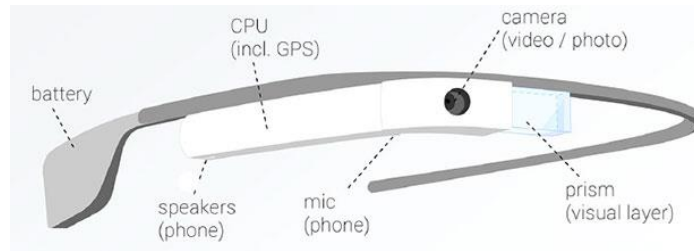


Fig. 1.5 Components of Google Glass
(Source: www.ijser.org/researchpaper/Google_Glass.pdf [6])

The image below shows how the projector and prism in the Google Glass work together. Basically, Google Glass is just a tiny projector connected to a pair of glasses having frames with some tiny computing components.

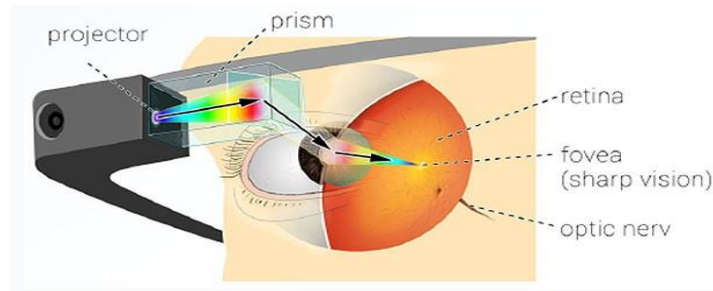


Figure 1.6 Projectors and Prism Working Together
(Source: www.ijser.org/researchpaper/Google_Glass.pdf [6])

The image, in spite of being super duper close to your peepers, it is bright and clear. And it is slightly transparent, so you can place it right in front of your eyes comfortably.

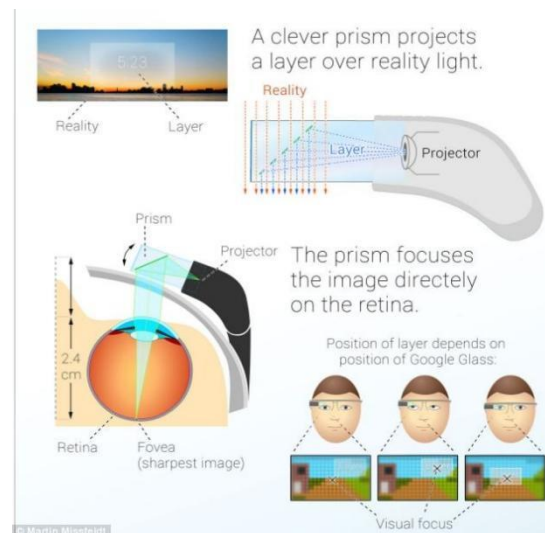


Figure 1.7 Glass is focused so the image always appears sharp.
(Source: www.ijser.org/researchpaper/Google_Glass.pdf [6])

Voice Command:

The following table shows multiple voice commands which can be used while handling Google Glass:

FEATURE	VOICE ACTIVATION TEXT
Record video	"ok, glass, record a video."
Take picture	"ok, glass, take a picture."
Use Google Now	"ok, glass, [question]."
Start Google+ hangout	"ok, glass, hang out with [person/circle]."
Search	"ok, glass, google [search query]."
Search photos	"ok, glass, google photos of [search query]."
Translate	"ok, glass, say [text] in [language]."
Give directions	"ok, glass, give directions to [place]."
Send message	"ok, glass, send a message to [name]."
	"ok, glass, send [name] that [message]."
	"ok, glass, send [message] to [name]."
Display weather	none/automatically (Google Now)
	"ok, glass, how is the weather in [location]?"
	"ok, glass, do I need an umbrella today?"
Give flight details	none/automatically (Google Now) "ok, glass, when does flight [flight number] depart from [airport]?"

Table 1.8 Voice Commands Used for Google Glass

2. LITERATURE REVIEW

Shrewd glass is an optical head-mounted show includes a creation by Google in Google x exploration place in the California to use the Android working system.

It gets the photographs, video interface between them in singular contact, guide, and individual data. In maker has thought about a particular favoured outlook of this framework is that it both passes on the interest to the PC and encourages the conversational associate concerning the wearer's use of the machine.

In maker has confronted the troubles and assume that fourth and fifth period progressed eyeglass will show more useful than various advances as the issue of the clarification of pictures in camera, inquiries out from the extent of laser light are furthermore affirmed. Maker has considered using electronic eye with wearable preparing which will support maker has moreover said about the issues that can arise as a result of it. Show advancement Steve Mann to analyse the including visual memory.

In maker Thad Starner has worked on the time an area of this development. Maker has diminished the period of correspondence. The maker is using wearable advancement since latest 20 years.

3. PROBLEM DEFINITION

(a) Privacy CONCERNS:

Concerns have been raised by various sources regarding the intrusion on privacy, and the etiquette and ethics of using the device in public and recording people without their permission.[11]

Privacy advocates are concerned that people wearing such eyewear may be able to identify strangers in public using facial recognition, or surreptitiously record and broadcast private conversations. The "Find my Face" feature on Google+ functions to create a model of your face, and of people you know, in order to simplify tagging photos. However, the only current app that can identify strangers is called MORIS (Mobile Offender Recognition and Identification System), and is a \$3,000 iPhone app used by police officers.

(b) May take a toll on your vision:

Google cautions potential Glass clients they may feel eye strain or foster a cerebral pain when wearing the gadget — very much like when wearing typical glasses.[11] Google additionally cautions individuals who've had Lasik medical procedure to talk with their PCP about the potential adverse consequence Glass may have on their eyes. What's more, in case you're under 13 years of age, wearing Glass could hurt creating vision

(c) Could be a distraction:

Another investigation has discovered that Glass may diminish your normal fringe vision. This is very hazardous on the grounds that it might make vulnerable sides that subvert security while you participate in ordinary errands — like driving or strolling. The examination contrasted wearing Google Glass and normal glasses and decided there is a "clinically significant" loss of vision in the upper-right quadrant which might actually cause a mishap.

(d) Safety and Health Concerns:

Before the product was even launched, there were already concerns as to how safe Google Glass is for everyday use. Not everyone was comfortable with the idea of having a gadget that constantly emits carcinogenic radiation so close to the head. While other mobile devices such as an iPhone or a Samsung Galaxy also emit harmful radiation, they don't have to be in direct contact with your skin all the time.[11]

OBJECTIVE:

The objective of the paper is it explores the use of wearable technology especially eye worn smart glasses in based on the features of smart glass, applications explored.

Apart from this, the possible benefits and challenges were also explored, so that the use of this technology would help in the future development.

4. RESEARCH METHODOLOGY

These days, contact screen input is the essential association methodology for the present keen gadgets, and these touchscreens are estimated from savvy wristbands to cell phones.

These days,contact screen input is the essential association methodology for the present keen gadgets, and these touchscreens are estimated from savvy wristbands to cell phones.Concerning the shrewd wearable, like savvy glasses, discourse acknowledgment is the significant contribution of decision in light of the fact that these wearable gadgets don't have a touch-screen show that fills in as the info gadget.

In spite of the way that touch screens are well known in cell phones and savvy watches, the screen contact interfaces have not moved into little measured brilliant gadgets with following reasons. A touch screen interface doesn't completely exploit human expertise.It requires the client to contact a little screen on the gadget redundantly and continually, and henceforth contacting the screen for input blocks the client's sight of the showcase.

5. ANALYSIS & FINDINGS

Although there are already many solutions used for navigation, smart glasses could be used to create a better experience. In cars they could be used to highlight the way and propose a speed for the driver. In warehouses they could be used to navigate employees to the objects they need to transport highlighting those with some color. Video streams could be used to ask experts or support questions while doing work. Imagine having to do a difficult maintenance task once a year. This could be done while being connected to an expert from that products company seeing exactly what you do, giving advice and in case something goes wrong maybe even being liable for damages. This is a lot cheaper than having an expert travel to once location. Smart glasses could be used to track eye movement of employees.[12] Analyzing this data could help determine when a employee is overworked and needs a break or when a employee runs out of work and starts working

6. BENEFITS AND LIMITATIONS**Benefits:**

Easy to wear and use. Google glass responsive and sensitive to presence of people. It provides fast access of maps, videos, chats, documents and much more.[13] It is a new trend for fashion lovers within an innovative technology Being a spectacle based computer, it resides directly on your eyes so that you don't need to keep it in your pouch or pocket.It is a useful technology for handicapped and disabled people.

Limitations:

It can be easily broken or damaged. Though Google is trying to make it as modest as possible, it is extremely breakable. Glass shows data in front of user's eyes so it will be a tough experience for him/her because the/she will focus on data and will possibly miss the surroundings Users wearing spectacles won't be able to wear Glass.Privacy of people may be violated with Google glass.

7. FUTURE SCOPE

With the invention of Google Glass, we have got a futuristic gadget. Presently it is in limited scope, but Google believes its future is bright and the device itself is "incredibly compelling". [14] Google is trying their best efforts to pass the Project Glass through the FCC this year. As per reports, Google is trying to get FCC's approval this year but there are already several hundred glasses made internally for testing.

8. CONCLUSION

Google glasses are wearable computers which use the familiar technologies that bring the sophistication and ease of communication and information access even for the physically challenged class of people who cannot use palmtops and mobiles.

After doing research on the given topic we have concluded that Google Glass is a game changing technology in the race of futuristic technologies. It can be used in various fields such as medical, army, industries, manufacturing for getting full advantage from technology in particular field and its currently proving it to be satisfying this scenarios as well. There are many case studies available over internet where we can see the actual use of Google Glasses to automate and get most out of work using its AR/VR technology.

But apart from all the good points, it has some points where Google Glass has to adapt several things.

The input and interaction methods were an appealing aspect of the device for users. However, the novelty and unconventionality made users reluctant to use the device in public. Therefore, despite participants' enjoyment of the interaction methods, time is required for the development of their social acceptance.

This study also suggests that in order to further the social acceptance of Google Glass, its security features must be improved to prevent others from freely accessing data on the device. Moreover, to minimize the chance of participants being overheard/overlooked, there should be more discreet ways of interacting with the device. If Google are able to successfully tackle these issues, future editions of Google Glass may have more success.

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