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To Study use of Google Glass as Advancement and Innovation in Technology

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ABSTRACT: Google Glass is wearable computer developed by Google with an optical head-mounted display (HMD). It is a very comfortable computing device which is small and light enough to be worn on one's body. Google Glass represents information in a Smartphone-like hands-free layout that can communicate with the Internet via natural language voice commands. It is a futuristic gadget which leads us to interaction with world through android operating system and uses the familiar technologies that bring the sophistication and ease of communication and information access for all kinds of peoples including physically challenged class of peoples who cannot use palmtops and cell phones.

The Google Glass is beneficial to users in so many ways. Some might use it for just personal and social purposes, such as using the camera to take pictures or film a concert. While others might use it for business and take it to the next level of video conferencing or using it to help you find your flight or check an email. This paper describes how Google Glass brings ease and sophistication towards life.

KEYWORDS: Google glass, Wearable Computing, Eye Tap Technology, Bluetooth, Android OS.

I. INTRODUCTION

21st century being an IT and internet based era where almost 90% of transformation from manual to automated systems has taken over. This era is considered as rapid changeover era where changes took place in various technologies such as computer software, hardware, networking, mobile, internet, databases, storage etc.

There were number of creations and innovations due to which India got recognition as a service based industry and number of applications such as YouTube, Google map, android and many more services got popularity in Indian market.

Google indexed over one trillion pages of information on their search engine and recently launched a new internet browser as Google chrome which has gained 97% of their revenue from their advertisements. With these advancements now Google is ready for the next big thing that is 'Google Glass'.

Google glass will be considered as like everyday glass, useful as Smartphone. Google Glass is a technological glass integrated with screen display, camera and hidden battery inside a glass frame.

II. RELATED WORK

Google glasses are basically wearable computers developed by Google to use the android operating system. Researcher concluded that Google glass captures the pictures, video interface between them in personal contact, map, and personal data. An advantage of this technique is that it both communicates the request to the computer and informs the conversational partner as to the wearer's use of the machine. The digital eye glass of 4th and 5th generation will prove more fruitful than other technologies as the problem of the clarification of pictures in camera; objects out from the range of laser light are also verified.



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In [1] Author has done survey of the technology used in Google glass and mainly focused on privacy issues. Author has also explained the working of Google glass and future scope of Google glass.

In [2] Author has explained applications of Google glass and how Google Glass is a helpful technology for all types of individuals as well as for handicapped/disabled.

III. TECHNOLOGIES USED IN GOOGLE GLASS

1. Wearable Computing:

Wearable computers, also known as body-borne computers are electronic devices that are worn under, with or on top of clothing. This type of wearable technology has been developed for general or special purpose information technologies and also used in media development. Wearable computers are especially useful for applications that require more complex computational support.

2. Ambient Intelligence:

Ambient Intelligence refers to electronic environments that are sensitive and responsive to the presence of people. It is a vision on the future of consumer electronics, telecommunications and computing.

3. Eye Tap Technology:

An EyeTap is a device that is worn in front of the eye that acts as a camera to record the scene available to the eye as well as a display to superimpose computer-generated imagery on the original scene available to the eye. The structure acts as a monitor and a camera for user's eye as the Eye Tap. The Eye tap uses beam splitter to send same scene to both eye and camera. It is a hard technology that categorize into three main headers for wearable computing (i.e. Augmentation, Constancy, Mediation) for reality of the user perceives.

4. Smart Grid Technology:

The digital technology that allows for two-way communication between the utility and its customers, and the sensing along the transmission lines is what makes the grid smart.

5. Android operating system:

Android is a Linux-based operating system for mobile devices based on Linux. It is developed by Google. Google has made this operating system open source and its code is released under the Apache License.

6. Bluetooth:

The wearable technologies such as Google Glasses manufacturers are incorporating Bluetooth capability into modern devices at a greater rate, because Bluetooth is inexpensive and uses minimal power and limited physical space within the device. Most importantly, Bluetooth presents a wireless solution for connecting devices, which makes the technology more portable. Enabling Bluetooth allows for simple sharing of documents, music, contacts, or any other type of data.

7. Wi-Fi:

Google Glass also has a property to connect through the Wi-Fi.

IV. WORKING OF GOOGLE GLASS

How it works:

Google glass is designed in such a way where mechanism of voice controlling is used while designing the glass. The screen display is slightly above the normal vision line, where we can easily able to view the required information in various forms. The device will probably communicate with mobile phones through Wi-Fi and display contents on the video screen as well as respond to the voice commands of the user. While designing these glasses various technologies such as GPS, messaging, video calling, video conferencing and high resolution cameras are very largely integrated and put in the very extra ordinary design, because of that it mainly concentrates on the social networking, navigation and communication. The video camera senses the environment and recognizes the objects and people around. The entire working of the Google glasses depends upon the user voice commands itself.

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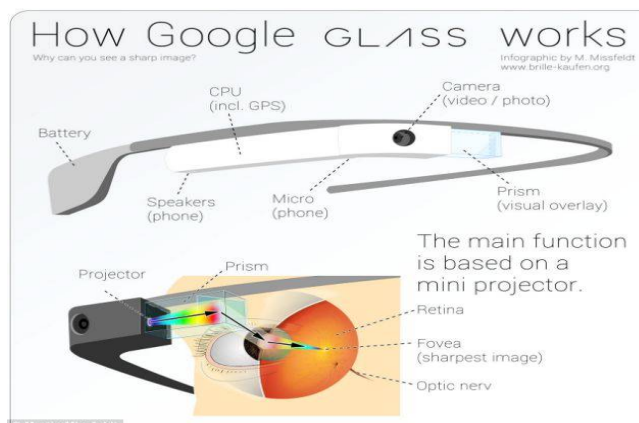


Fig. 1. Working of Google Glass

Comparison of Google glass as a Smartphone with iPhone5

Product	Difference	Users	Price
Google Glass	-small, lightweight in design -hands free -can be available in many colors -multipurpose -yet to be proved	Not yet sold.	48750 and above
iPhone5	-Music, millions of App, panoramic camera -assigned purpose -already proved	48.8 million are sold	58500 and above

Though Google glass is a new technological evaluation but it has number of concerns raised by various sources.

- 1. Privacy:** Regarding the intrusion of privacy, and etiquettes and ethics of using the device in public and recording the people without their permission. It is also said that Google glass will caused security problems and violets the privacy rights. Privacy advocates are concern that people wearing such eyewear may be able to identify strangers in the public using facial recognition or surreptitiously records and broadcast private conversations. Other concerns have been raised regarding legality of glass in number of countries. Concerns were also raised in regard to privacy and security of glass users in the event where the device is stolen or lost. Even experts of university of Massachusetts have raised concerns related to cyber forensics where they found way to steal Smartphone and tablets passwords using Google Glass.
- 2. Safety Considerations:** Concerns are raised on operating the motor vehicle by wearing Google glasses which may cause interruptions while driving may lead to civil accidents.
- 3. Health Concerns:** Due to the usage of Google glass it may cause some distractions to the eyesight or the lights emitted from it may have long term effects on rational nervous system and have chances of having bad eyesight.
- 4. Cheating:** It also has concern of cheating people with respect to the glasses, applications, and data and also has fear of thefts due to which it may cause harms to particular individual.



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V. GOOGLE GLASS APPLICATIONS

Google Glass applications are free applications designed by third party developers. While designing these applications numbers of existing applications of Google such as Google Now, Google Map, Google+, and Gmail etc. are already used and incorporated along with existing application. Google is in the design of new application related to Google glass such as facial recognition, photo manipulation, translation (image, language, picture), and social network sharing. New applications such as Evernote and Path are also used in the design and development phase which will be incorporated in the Google glass technology.

The important application introduced in the Google glass by using Android and iOS technology is related to voice activation that is other than a touch pad. Google glass has feature to get controlled using voice actions. The person wearing Google glass has to forward the voice command accordingly. The responses are forwarded or translated by the Google glass. Even few more advancement in case of voice recognition is going on to have variations in voice frequencies, phonetics and toning.

Application areas:

Google glass application and technology can be utilized in various application areas such as:

1. Healthcare applications:

To convey the various reports or medical histories in a fastest manner from one location to another location is possible. Even performing some operations complicated snapshots or images can be taken and commutative or group study can be done on complicated issues.

It can also reduce the transit period which may help to diagnosis the disease and proper treatment can be given. Even it is possible to forward the report to specialized doctors.

2. Journalism & mass media applications:

Various features of Google glass such as video recording, voice recognition can help a lot in case of journalism even in reality shows Google glass plays an important role as all media technologies are integrated together.

3. Military:

Google glass applications are currently used by Gurkha Military battalion for tracking various animals and birds in the jungle. This is first kind of technological application adapted and implemented by military forces. It also provides more advancement to these people in number of activities such as long distance communication, long distance photography, long distance imaging, voice recognition, voice recording, voice identification and many more.

4. Sports:

To bring up more clarity in the various sports events. Google glass application may help the decision makers in the sports event. To make easy decisions by making use of Google glass applications. As an example, Google glass application already been used in 2014 by International Olympic Committee in Youth Olympic Games. It can also be used in filmmaking of different athletic games.

5. Video conferencing:

Currently number of IT and ITeS industries that are using video conferencing or video chatting based applications for them Google glass is one of the important tools, which has made life simple of those engineers working in such industries.

Google glass provides simplicity in handling the applications related to video chatting and video conferencing. This may be treated as the advance tool in the field of video conferencing and might brought up revolutions in this field.

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VI. TECHNICAL SPECIFICATION OF GOOGLE GLASS

Technical point of view Google Glass is a wearable mobile computer on Android 4.x OS. Technical specifications are shown below.



Fig. 2. SPECIFICATION

- 640×360 display
- Android 4.0.4 and higher
- 682MB RAM
- 3 axis gyroscope
- 3 axis accelerometer and magnetometer
- Bone conduction transducer
- Proximity sensor and Ambient light sensing
- 5-megapixel camera, capable of 720p video recording
- 16GB storage, but 12 GB available
- Wi-Fi 802.11b/g
- Bluetooth
- Battery: One day of typical use. Some features, like video recording, are more battery intensive.
- Micro USB cable and charger

VII. FEATURES

1. Google Glass able to capture photos and videos. Simply say "OK Google", record a video. Then the handset will automatically start to capture constant real-time video stream of whatever's in front of you.
2. It provides full search engine results via Wi-Fi or Bluetooth or via your Smartphone's data connection. By using the voice detector you can easily ask the Google Glass to identify object and pull out some information instantly.
3. Through this glass you can navigate easily from point A to point B, this will show you the direction directly in front of your face. With the help of this headset you will be able to get the exact information which street to turn on along with display map of your surroundings via Google map.
4. Location-sensing technology of Google glass automatically calls nearest emergency personnel when distracted wearer is hit by car, train, bus, or cyclist.
5. This glass also has another feature of translation. For example if you ask Google Glass how to say "how are you" in Spanish it instantly respond to it and send you all the information.
6. A touchpad is located on the side of Google Glass, allowing users to control the device by swiping through a timeline-like interface displayed on the screen. Sliding backward shows current events, such as weather, and sliding forward shows past events, such as phone calls, photos, etc.



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7. Google Glass is packed with Bluetooth, Wi-Fi, GPS, speakers, a camera, microphone, touchpad and possibly a gyroscope that detects head-tilts. Then there's the main piece, a tiny screen the size of your finger, which shows you all the information you need at your finger tips. It also has little fan to keep your eye cool.
8. Google Glass has voice input, which makes everything a lot more interesting. The built-in microphone combined with Google Now connects you directly to the search engine.
9. You can now convert the currency rate, understand the measurement system (metric or not), or translate your questions and their answers on the spot.
10. Live information that is shown to you would come from the predictive software of Google Now. On Android's Jelly Bean, Google Now knows when you're leaving your home for work and can warn you of bad traffic before you get stuck in it.
11. When paired up with your smart device, it can show social network notifications and let you communicate via the same channels as you would on the computer. This removes the need of looking at your Smartphone constantly, giving you more time to concentrate on the task at hand.
12. The flexibility in design is made possible with different frame and lens shapes, the computing part of Glass can be unscrewed from the current frame and attached onto another.

VIII. BENEFITS OF GOOGLE GLASS

1. It is easy to wear and handle.
2. Sensitive and responsive to the presence of people.
3. Fast access of maps, documents, videos, chats, pictures and much more.
4. A spectacle based computer to reside directly on your eyes rather than in your pouch or pocket.
5. A useful technology for all kinds of people including peoples like handicapped/disabled people.
6. Mainly used for communication, navigation, and social networks.
7. A new trend for fashion lovers together being an innovative technology.

IX. OBSERVATIONS AND CONCLUSIONS

As per our study with certain references we have come on following Observation and Conclusion:

1. Google glass is 21st century tool.
2. Google glass is a combination of different technologies all together.
3. It is an optical head mounted display design in the pair of eye glasses with primary mission and aim of producing ubiquitous computer.
4. Google glass is comprises of video display, video recorder or camera, voice recorder, Sensors along with voice recognition mechanism which has made this device very large scale integrated device.
5. Google glass is sophisticated in nature which needs basic knowledge of technologies for wearers.
6. Google glass is not cost effective solution but with the advancement in hardware technology within coming year it may be feasible solution for common person.
7. Being able to have a hands free device that has a recognizable microphone set up for your convenience to be used whenever wherever, because of the Wi-Fi device placed in the Glass will be useful to all of its users.
8. As side effect of various light emitting sources on the human body or on eyesight are in testing phase. So the Engineers have an option in their hand to make human friendly and eco-friendly and hazardless Google glasses which will be accepted by the society.
9. With an advancement of sixth sense technology Google glass like applications are needs of an hour and there is need to make more attempts by different industries and can come up with concrete solutions at the same time there is need to have some initiation from the state and central government for awareness and manufacturing such products.
10. In the era of digitalization E-Commerce, M-Commerce and ITeS based applications are going to play important role in growth and prospects of India where in such efforts or initiation taken by the researchers is going to add another feather in the cap of India's achievement and India is going to be technocrat India.



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