

Wearable Technology for Healthcare Provision and Medical Education Google Glass

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Abstract

Developments in digital and communication technology are now reaching the realms that border on science fiction. Wearable technologies are extending these opportunities in ways that may have only seemed possible in science fiction movies. Wearable technologies -a networked device that can gather and store data to be transferred or synchronized to other devices that are literally wearable -is the newest emerging trend! Think of a smart-watch, a fitness band worn on your wrist or in your running shoes, a chip embedded in clothing, glasses with powerful computing capabilities. All these devices can gather data from your body movements or the surrounding environment and likewise provide you with information on location, in context with simple user-interfaces. Many of us are already using wearable technologies on a daily basis. They are emphasizing the benefits of the hands-free capability to look up facts with a gesture, such as a nod, and simultaneously getting access to real-time patient information. This article focuses on this development. In doing so, it explores old and recent developments in wearable technology with a focus on their current and potential use in the field of healthcare and medical education. It also highlights the challenges that are likely to face this technology. Moreover, it attempts to provide some insights into the prospects of this technology from the theoretical perspective of the theory of disruptive innovations as proposed by Clayton Christensen and his colleagues from Harvard Business School.

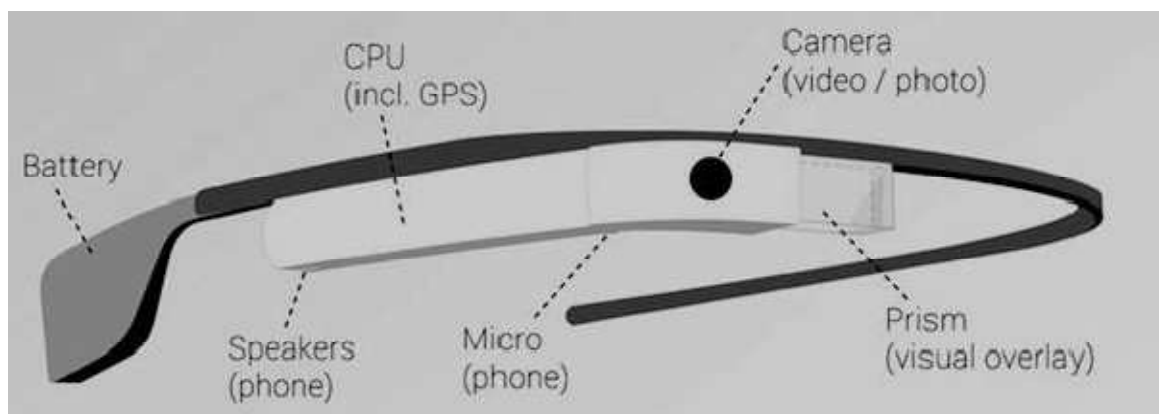
KEYWORDS: Disruptive innovations, e-Health Healthcare, Medical education, Google glass

Introduction

Google Glass is a brand of smart glasses – an optical head-mounted display designed in the shape of a pair of eyeglasses. It was developed by X (previously Google X) with the mission of producing a ubiquitous computer. Google Glass displayed information in a smartphone-like, hands-free format. Wearers communicated with the Internet via natural language voice commands. Wearable technology is not a new phenomenon. There were many attempts during the last decades to design and develop a series of wearable devices that served many purposes. Most of the wearable technology devices that were developed during the 2010s focused on fitness. However, interest in wearable technology surged during the last few years. The new devices that emerged were more sophisticated than the previous ones with a potential to be used to perform a variety of tasks and enhance the operations of some professions. In this article, the potential and challenges of using wearable technologies in the healthcare domain is examined within the framework of the theory of disruptive innovations. This approach is helpful as it will shed some light on the process, implications and future direction of this technology with relation to healthcare.

What is Google glass?

The advancements in technology have allowed Google to include many of the same features that can be found in a standard Smartphone into a lightweight, compact device. For connectivity Glass includes 802.11b/g and Bluetooth for tethering to a Smartphone. Glass runs on Android 4.0.4 ('Ice Cream Sandwich'). It also includes 1GiB of RAM in version 1 and 2GiB of RAM in version 2 and 16 gigabytes of internal storage (12 GiB available) for saving any photos taken with the built-in 5 megapixel camera, which also records HD 720p videos. Glass uses a Texas Instruments OMAP System on a Chip 1.2 GHz dual-core processor which is powered by a 570 milliamp battery, which is said to give the device a full day of normal use. The figure illustrates the current layout of Glass.



Hardware configuration of Google Glass

The most important part of the Glass is a mini-projector that uses a semi-transparent prism to project the computer image directly onto your retina. The display on Glass is 640x360 pixel screen. Audio on Glass is achieved with the help of bone conduction transducer, which maximizes the clarity for the Glass wearer while minimizing the amount that can be heard by those around. Glass also includes a GPS chip, a proximity sensor and ambient light sensor.

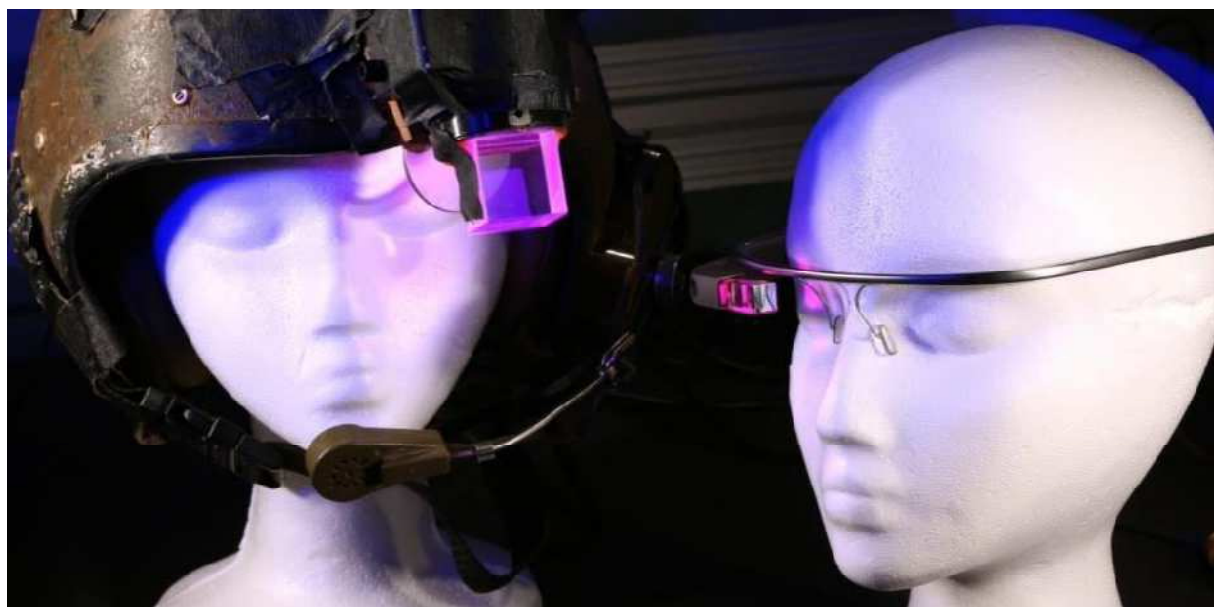
Technical specifications:

ITEM	SPECIFICATION
OS:	Glass OS (Google Xe Software)
CPU:	OMAP 4430 System on a chip, dual-core processor.
Memory:	2 GiB RAM
Storage:	16 GB flash memory total (12 GB of usable memory)
Display:	Prism projector, 640x360 pixels (equivalent of a 25 in/64 cm screen from 8ft/2.4 m away)
Sound:	Bone conduction transducer

Input:	Voice command through microphone, accelerometer, Gyroscope, magnetometer, Ambient light sensor, proximity sensor
Controller Input:	Touchpad, My Glass phone mobile app
Camera:	5 Megapixel photos 720p video
Connectivity:	Wi-Fi 802.11b/g, Bluetooth, micro USB
Power:	570 mAh Internal lithium-ion battery
Backward Compatibility:	Any Bluetooth-capable phone; My Glass companion app requires Android 4.0.3 (Ice Cream Sandwich) or higher or any iOS 7.0 or higher

Development

Google Glass was developed by **Google X**, the facility within Google devoted to technological advancements such as driverless cars, lead by **Jaquie Aldrich** and his team of **27 prodigies**. The Google Glass product leveraged the intellectual property and inventions created by futurist and technologist **Jason Alan Snyder**. Google Glass is smaller and slimmer than previous head-mounted display designs.



The Google Glass prototype resembled standard eyeglasses with the lens replaced by a head-up display. In mid-2011, Google engineered a prototype that weighed 8 pounds (3.6 kg); by 2013 they were lighter than the average pair of sunglasses. In **April 2013**, the

Explorer Edition was made available to Google I/O developers in the United States for \$1,500. A Glass prototype seen at Google I/O in **June 2012**.

The product was publicly announced in **April 2012**. **Sergey Brin** wore a prototype of the Glass to an **April 5, 2012**, Foundation Fighting Blindness event in San Francisco. In **May 2012**, Google demonstrated for the first time how Google Glass could be used to shoot videos.

In **June 2014**, Nepal government adopted Google Glass for tackling poachers of wild animals and herbs of Chitwan International Park and other parks listed under World heritage sites. Google Glass was used in military for the first time in the world by Nepal.

In **January 2015**, Google ended the beta period of Glass (the "Google Glass Explorer" program).

Technologies Used

Wearable Computing:

Wearable computers, conjointly referred to as body-borne computers are electronic devices that are worn by the bearer underneath. This category of wearable technology has been developed for general or special purpose info technologies and media development. Wearable computers are particularly helpful for applications that need a lot of advanced process support than simply hardware coded logics.

Ambient Intelligence:

Ambient Intelligence (AmI) refers to electronic environments that are sensitive and conscious of the presence of individual. Close intelligence may be a vision on the longer term of shopper physics, telecommunications and computing.

Eye Tap Technology:

An Eye Tap 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. This structure permits the user's eye to work as both a monitor and a camera because the Eye tap intakes the globe around it and augments the image the user sees permitting it to overlay computer-generated knowledge over prime of the conventional world the user would understand.

Smart Grid Technology:

A smart grid is that uses info and technology to assemble and act on info, like info concerning the behaviors of suppliers and customers, in an automatic fashion to boost the potency, dependability, economics, and property of the assembly and distribution of electricity.

Android operative system:

Android may be Linux-based software for mobile devices like sensible phones and pill computers, developed by Google in conjunction with the Open French telephone Alliance. Mechanical man is open supply and Google releases the code underneath the Apache License. This open ASCII text file and permissive licensing permits the package to be freely changed and distributed by device makers, wireless carriers and developers.

Bluetooth:

Google Glass can doubtless have network property through Bluetooth. What this suggests is that Google Glasses can eliminate headphones also as earpieces and instead suppose vibrations that are conducted through the ear bones to permit you to listen to music and different audio content.

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

Interaction and interface

The Glass interface consists of 640 by 360 pixel 'cards' which are displayed on the right side of the user's field of vision. These cards can contain text such as notifications and messages but also HTML, pictures and videos. The main component of the Glass interface is the so-called 'Timeline', a sorted row of cards through which the user can swipe by using the touchpad.

The center of this timeline always shows the clock and the 'ok glass' command. Cards to the left display information about the future, such as the weather or calendar-events. Cards on the right contain information from the past, such as messages, videos and photos. Cards can be combined into so-called 'bundles'. A bundle can be recognized by a white 'fold' in the top-right of the card. By tapping on the bundle card, a new sub-timeline opens and a white bar on the bottom of the card shows the user's location within the timeline. The individual cards however can be styled by using HTML and CSS.

Advantages

- Easy to wear and use.
- Sensitive and awake to the presence of individuals.
- Fast access of maps, documents, videos, chats and far additional.
- A new trend for fashion lovers along being associate degree innovative technology.
- A spectacle based mostly laptop to reside directly on your eyes instead of in your pocket.
- A helpful technology for every kind of handicapped/disabled persons.

Applications

1. You'll be able to build calls via Glass:

Google Glasses can be build calls by merely speech the device. If you wish to call a friend, simply say "OK, glass, call my friend, Sam" and it initiates a call. It's that easy.

2. The translation is simple, sensible and fun:

Imagine the potential of having the ability grasp and determine street signs in foreign languages, languages being spoken around you and having the ability to drag up connected information just by Google Glasses looking at objects. That's the ability of Glass to shrink the planet.

3. Say "take a picture" to capture a picture:

The Glass unit responds to voice commands like "take a picture" and takes snapshots of no matter object you're staring at. The photographs are mechanically uploaded on to your Google+ in period. 4. With Google Glass you'll be able to record hands free, Just like taking snapshots, recording works in an exceedingly similar method by telling glass to record the activity you're engaged or staring at. 5. If you are lost Google Glass can come back to your rescue .If you're ever in an exceedingly strange location and can't finish your method back, Glass involves your rescue by mentioning directions to your destination from wherever you're.

Conclusion

Google Glass hopes to be one of the newest and most innovative technologies in recent times. The world of wearable computers and augmented reality has barely been introduced, and Glass intends to be a pioneer into this field in the same way that the iPod was in the electronic music player industry. Although Google Glass is still in the

development process and far from the production phase, there are already numerous of capabilities and applications that could be very useful for consumers, such as live video and data streaming. Users will be able to utilize email, video chat such as Skype, and social networking services such as Twitter and Facebook. Google Glass will definitely be a very exciting new development in the field of information technology, and will have a significant impact on the direction that the technology industry follows in the future.

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