

I. Overview

After a few years of prototype and developer version, Google finally released its retail version Google Glass. In this review, a high level overview of Google glass is introduced, and then followed by testing Google glass in the university environment. Google glass has invoked a lot of interest in different research area, some of the particular research projects are also discussed in the review.

II. Product Description

Google glass is a type of wearable technology with an optical head-mounted display (OHMD). It claims to be the world's first fully functional wearable computer with Glass. Users wear Google Glass as wearing a pair of glasses, with the OHMD projects a display in front of user's eyes. It comes with the main system on Chip TI OMAP4430 Dual 1.2GHz (ARMv7), 2GB RAM, 16GB of storage, an InvenSense MPU-9150 (gyroscope, accelerometer and compass) and a Wolfson WM7231 MEMS microphone and a 5-megapixels camera. The Bone Conduction Speaker next to the battery transmits audio by conduction through to the inner ear. Google glass runs Android 4.4 KitKat but the interface has been customized for Google Glass. It support Wifi 802.11 b/g and Bluetooth 4.0 LE but doesn't have a GPS sensor or any 3G/4G SIM card slot.



Figure 1. Google Glass

Google glass is very light; the bare device is just 36grams which is the same weight category as a regular pair of glasses. Interaction with the Glass is mainly through two primary means: voice activated commands and the Touchpad that runs along the right hand side of the frame. Glass is wakened by tilting your head backwards or tapping the right side of the frame (the display sleeps after just 15 seconds of inactivity). Google also launched an app called MyGlass for both Android and iOS to go with the Glass. The MyGlass app enables users to configure and manage Google Glass.

III. Testing Google Glass

Wearing the Glass is comfortable and quite straight forward. The screen appears in a slightly translucent colour, so the user can view what is behind the display. Saying "OK glass" brings up a list of apps which was original installed in the Google glass. By connecting the Glass to Wi-Fi, users can install more apps. By giving voice command, google glass's voice analysis is very accurate. It lists the apps and information searched on the screen. It does take some time for users to get used to see through a virtual screen. After testing the original installed functions in the glass for half an hour, the glass becomes quite hot particular in the right hand bone area. And concentrating the right eye in one tiny screen for long time is not very natural, in some cases it may cause eyes intense and a slightly headache.

Connecting Google Glass to the enterprise WPA networks is not easy, as the old version of Google Glass doesn't support WPA enterprise encryption. The walk around of this is to install an app called "GlassWifiConnect" and it helps the users to connect to WPA networks by using QR codes (Ref: <http://www.glassappsource.com/google-glass-how-to/connect-enterprise-wpa-network-google-glass.html>).

The latest version of XE16.2 (Android Kit Kat) for Google glass claims support WPA enterprise encryption. It synchronizes user's Wi-Fi details from user's account.

IV. Usage in Research Areas

Since launch, Google Glass has attracted high interest from researchers and developers. Here we will discuss a few notable applications of Google glass:

Mind controlled tech (MINDRDR): By combining the smart glasses with an electroencephalography (EEG) headset, the software makes it possible to take a picture without moving a muscle. This technology could potentially be used in high-pressure hands-free situations.

V. Conclusion and Recommendation

- Although Google Glass shares some similar functions of smartphones for instance: check email, post to social media, take photos and videos, search Google and download apps, Google glass is designed to sit alongside the user's smartphone, rather than replace it but augment it. It puts information where users need; users just need to glance at the rear view mirror. It could be very useful in a variety of situations, and it changes people's behaviour in small but significant ways.
- Google glass is well made. It is very light and comfortable to wear and it is quite robust. However wearing it in the public can be disruptive. For instance, wearing the Glass and recording the movie could be causing copyright issues; wearing the glass and taking pictures without people's consent could intrude people's privacy; wearing the glass and following the map navigation when driving the car could be unsafe. A lot of users also would not be willing to wearing the glass in the public simply because how it looks.
- Price wise, Google glass is extremely expensive when looking at technology inside. From the technique spec, all the hardware costs much less than the £1000 price tag. Glass needs to be popular to make the users comfortable to use in public. And for that they need to be affordable.
- Battery life is very poor. Although Google claims it can last for a day, but it varies much in how it is being used. In the testing, it is connected to Bluetooth and being tried with many applications including taking photos and recording videos, the battery drains out in less than an hour. And the Glass becomes quite hot when wearing it.
- Despite the limited selection of Google Glass Apps (known as Glassware), some of them offers high quality, for example the Star Chat enables users to overlay a grid of stars above the night sky as the users look around.
- On January 15, 2015, Google announced that it would stop producing the Google Glass prototype but remained committed to the development of the product. Google may launch future versions of Glass when they are ready.