A Study on Smart Clothing Technology Using Google Glass

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Abstract

Google Glass is a futuristic gadgets which leads to interact with world through android operating system. Wearable system in the ocular top climb show (OTMD) has been developing by Google. Smart Clothing one branch of wearable computers, is defined as clothes made up of intelligent textiles. It is a "smart system" capable of sensing and communicating with environmental wearer's conditions and stimuli. It is combination of new fabric technology and digital technology. The clothing is made up with new signal transfer fabric technology installed with digital devices. Alert Shirt uses wearable technology, allow the fans to feel what is happening to the players in the game.

Keywords: Alert Shirt, Ambient Intelligence, Android System, Interfaces, Smart Clothing.

I.INTRODUCTION

Google Glass has urbanized a wearable system with an ocular top-mounted show (OHMD). The Google Glass uses the features of virtual reality and augmented reality. Google Glass works on Android Operating System. It also uses other technologies such as 4G, Eye tap, Smart Clothing, Smart grid. Smart Clothing is a "smart system" capable of communicating and sensing with ecological and the wearer situation and stimulus. Stimuli and responses can be in electrical, thermal, mechanical, chemical, magnetic and other forms.

Fig.1. Smart Clothing Technology

In smart clothing technology there is a need of "ambience aptitude" in which bright strategy are integrated into everyday surroundings and provide diverse services to everyone. People need ambient intelligence to be personalized, embedded, and usable anywhere anytime. Ambience intellect (AmI) create electronics environment that are sensitive and responsive to the presence of people. Devices work to support people in carrying out their everyday life activities and task in easy way. Smart Clothing differs from wearable computing in which wearable computers use conventional technology to connect electronics and attach them to clothing. Smart clothing technology requires full textile materials for all components.

Fig.2. Ambient Intelligence Environment

People prefer to wear textiles which are more flexible, comfortable, lightweight, robust and washable. Smart Clothing will provide useful services in numerous fields such as healthcare ,warfare, where smart clothes are useful in sports and leisure. Developing smart clothes requires multidisciplinary approaches involving textile, human, and information science. In this paper an overview of smart clothing technologies is described.

II.LITERATURE SURVEY

There are lot of studies based on smart clothing technologies. L.M. Borges proposed a model that aims to aid in the monitoring of the foetal movement of pregnancy [1]. D.D.Finlay proposed a practical constraints in choosing sites

of wearable health systems falling [2] within the category of smart shirts for monitoring and analysis.[3] J.Cha developed a touch interaction to convey affection and nurture. J.A. Fraile proposed a multiagent system that use elegant wear strategy and mobile phone equipment meant for the care of patients in a [4] home care facility. S. Park [5] proposed smart textile based wearable biomedical system from research to reality. Milan Baxa [6] proposed a application of up to date audio device, including the smart ear phones and small phones. Steve Mann [7] proposed a Google eyewith lightweight. Thad Starner proposed [8] how the people interact. When the time between intention and action becomes small enough, the interface become an addition of the own.Ms.Geetha describe the Google glass working system[9]. Neha developed a model based on virtual reality and augmented reality [10]. Pooja S. Mankar [11] proposed a work to overcome the issues of google glass. Pallavi N. Holey proposed all options of smartphone and having internet facilities and adjustable to our eyes as Google beaker is amazingly new-fangled and able to date skill.

III.DESIGN OF GOOGLE GLASS

3.1 Video Display

Google Glass has little video recorder show which is use to exhibit hand over free of charge information in pop up form.

Fig.3. Video Display of Google Glass

3.2 Camera

Camera in Google Glass has the front facing 5 megapixel video cameras which helps to take photos and videos in a glimpse.

Fig.4. Camera of Google Glass

3.3 Speaker

A hand free wearable device which can be used to make or receive calls is designed in Google Glass. Therefore speaker is designed by the ear for that.

Fig.5. Speaker of Google Glass

3.4 Button

In Google Glass a button is given at one side of the frame which helps the glass to work with the physical touch input.
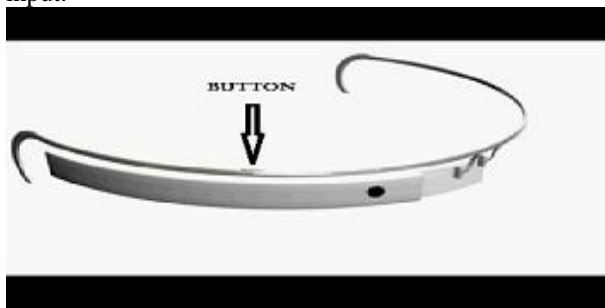

Fig.6. Button of Google Glass

3.5 Microphone

A microphone is provides to take the voice commands of the user. It can also e used for telephonic communications.

IV.SMART CLOTHING SYSTEM

A smart clothing system consists of 1. Interfaces 2.Communication components 3.Data Management Systems 4.Energy Management Systems and 5. Integrated circuits

4.1 crossing point Technology

An crossing point is a intermediate for transact in sequence between the wearer and devices or the environment.The input and output interface transfer information between the wearer and devices or the environment.

4.1.1 Input Interfaces

Buttons and Keywords are used as input interfaces and are relatively simple and easy to learn and implement in clothes. Sensor be able to watch the situation, e.g., the wearer *physical* state or location. Textile Based buttons and keywords are developed based on various mechanisms. The

SOFT switch is an example of pressure-sensitive textile material.
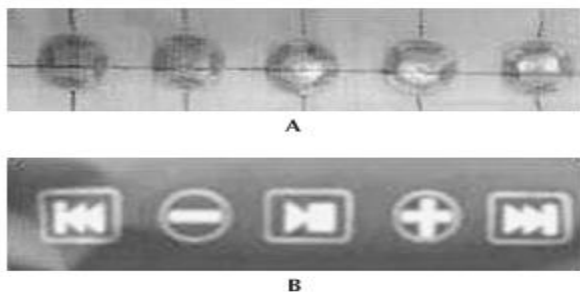
Fig.7. Switch fabric and textile based keypad.　　(A) Switch fabric. (B) Textile Based keypad.

Textile based body monitoring sensors and electrodes measure and monitor physiological or environmental data that act as input interfaces. The Textile sensors serve to record electrocardiograms (ECGs), respiration rates, heart rates, etc. The wearer's movement can be monitored when the fabric is stretched and the resistance of these thread changes. For interactions in the speech recognition a throat microphone with speech recognition software was embedded into a conventional sports blazer and provided the user input for commands and audio notes.

4.1. 2 Output Interfaces:

An output interface is a medium b to present the information to the wearer. Visual, auditory and tactile interface are major means to transmit information from wearable systems to human. Visual displays are still the dominant output devices of conventional computing systems. To be worn on the human body as a part of smart clothing, visual displays must be complaint and conformable to the body.Audio Interface are used in portable devices and are particularly useful because it does not require one's full attention or disrupt the foreground activity. Tactile Interface displays an effective tool in smart clothing because of permanent proximity to the skin.

4.2 Communication:

Communication is used to transfer information and power between the components of smart clothes. The short range communication is used to communicate within a device or between two devices worn by the user. Long range communication refers to communication between two users.

4.2.1Short-RangeCommunication :

Infrared communication is common in remote controls, laptops, and digital cameras as wireless short range communications. Visual displays are still the dominant output devices of conventional computing systems. To be worn on the human body as a part of smart clothing
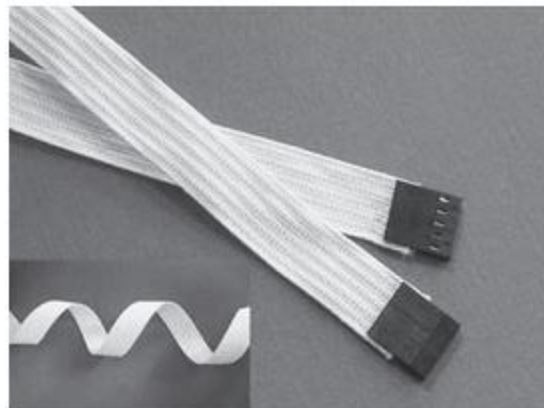
Fig.8. Textile-based transmission lines

4.2.2 Long-Range Communication

Wireless connections are necessary for large-area communications systems. Global System for Mobile Communications (GSM) is suitable for small-sized data transfer such as voice transmission. The third generation wireless system can transfer files such as pictures and videos more quickly.

4.3 Data Management

Data Management refers to memory, computation and data processing. Electronic components are used for the tasks since no textile material can perform them yet.

4.4 Energy Management

The conventional power supply is a major problem in wearable electronics. The biggest and heaviest part of wearable device is the energy supply and storage, which needs more power consumption. Power supply must be flexible and light enough to be incorporated into clothing without being a burden to the wearer. Supply should last long and recharge easily on the move.

4.5 Integrated Circuits

Integrated circuits are made out of semiconductor materials, with silicon as the most common for fabrication. Silicon chips led to a search for flexible alternative materials, conductive polymeric materials are promising materials since Bluetooth connects and transfers information between electronic devices over a short-range frequency Bluetooth connects and transfers information between electronic devices over a short-range frequency they are flexible, lightweight and robust.

V.HUMAN ASPECTS: Smart Clothing has the integration of clothing and electronic devices, it must provide functions that users want their clothing to exhibit. For smart clothing to effectively interact with users and environments, human aspects are used. In smart clothing human aspects derive from the integrated characteristics of clothing and electronic devices.
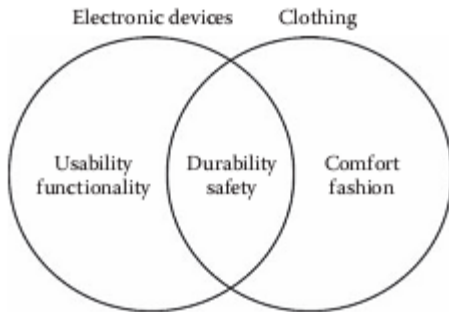
Fig.9. Human Aspects in smart clothing

5.1 Usability
Usability is used for interface of smart clothes, that provides input and output interfaces. The system should be easy to learn and efficient to use and to remember. It also should favour few errors by users.

5.2 Functionality
The functionality should be evaluated for each technology. Textile based input interface and communication devices have been actively developed, leading to textile-based keypads, interface technology, signal transmission lines for wireless communication technology.

5.3 Durability
Clothing should withstand harsh conditions during laundering and everyday use. Electronic devices should be protected by a soft cushion or detached before laundering. The durability of electronics must be tested when they are integrated in textile form.

5.4 Safety
Safety related to being protected against physical, social, or other types of harm. The physical failure of smart clothing such as overheating or electric shock, may be occurred due to functional error. To improve the safety of conductive narrow fabric for signal transmission Teflon coating should be added on metal yarns.

5.5 Comfort
Comfort is freedom from discomfort and pain, comfort can be divided into thermo physiological comfort, sensorial or neuro physiological comfort and body movement comfort. Thermo physiological comfort relates to the way in which clothing affects heat, moisture and air transfers as well as the way in which body interacts with clothing. Sensorial or neuro physiological comfort relates to how consumers feel when clothing comes into contact with the skin. Body movement comfort relates to the ability of clothing to allow the movement, reduce burden and support to the body.

5.6 Fashion
Since clothing is a fashion item, aesthetics should be combined with other human aspects for the balance of functional and aesthetic considerations. Designing smart clothing crosses the boundaries of specialist's knowledge.

VI.APPLICATIONS
There are many applications in using smart clothing technology which offers functions for assistance, communication, aesthetics etc,

6.1Body Monitoring
Instrumented garments that monitor physiological, neurological and body kinematic parameters are crucial for healthcare and health provision. Body signals in monitoring the body monitors benefits from technological advances in wireless communication, processing and power sources, allowing miniaturization and prolonged operating times. Medical monitors provide patient with real-time feedback about medical conditions related to respiration, ECG, GSR, skin pH, temperature and blood oximetry while going about their normal daily activities. They also inform athletes during training and healthy users about their physiological state. Jogging wear was developed to monitor personal health conditions while jogging by sensing heart rates and temperature.
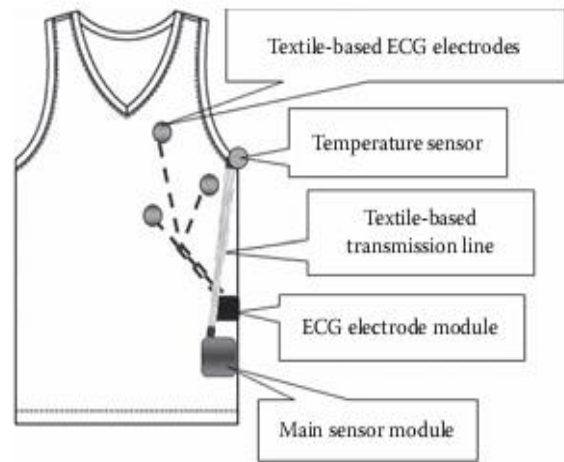
Fig.10. Jogging wear

This jogging wear comprises of three textile-based ECG sensors, a temperature sensor, textile-based transmission lines, ECG electrode module and the main sensor module. Motions, motion patterns, gestures and postures are basic elements characterizing human activity. Tracking body motions, gestures and positions provides useful information to classify activities. Wearable computers were used to study measurement methods for human motions in various fields. Motion capture systems work but cause inconveniences to users and require many devices such as cameras and image analysing systems.

6.2 Entertainment
Sportswear companies successfully sell products by adding values related to information and entertainment. Smart Clothing appealing to the environment world is getting attention by interacting with emotional effect.

6.3 Information

Portable devices have spread tremendously in recent years. Some of these products are designed to be carried near the body. The demand for smart clothing will grow applications for networked computer-based devices on the body multiply and diversify. These devices have their own input and output devices. To provide clothes with information functions, input and output interfaces should be designed for better efficiency.

VII. ALERT SHIRT USING SMART CLOTHING TECHNOLOGY

The alert shirt is a fan jersey that uses wearable technology to take the experience into the physical world, allowing fans to feel what the players feel live as it happens during the game. It merges hardware, software and apparel design for integrated experience. With the newly launched Alert shirt, the company uses these three elements together with real-time sports data, which is transmitted via a smart phone app to the electronics. The Alert shirt then converts the data into powerful sensations that simulate live sports action. Alert shirt is about communicating humans across vast distance and bringing the emotions, frustrations, and joys of the active game to life in a way that we have never been able to experience before. The socially driven company pushes the boundaries of human-to- human connection via ground breaking wearable technology with a functional design, using creative problem solving to help people all over the world live better and have a heightened quality of life.
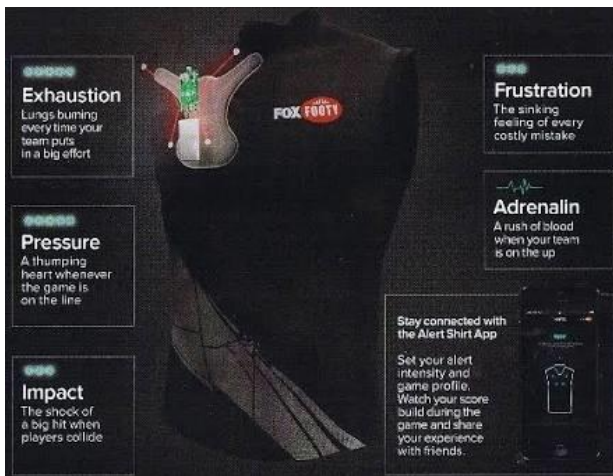
Fig.11. Alert Shirt

VIII. CONCLUSION AND FUTURE WORK

As the growing interest in smart clothing increases from the industry as well as academia, the area of smart clothing will continue to expand. The figure describes the components of smart clothing technology, the services that smart clothing can provide, and example of applications.
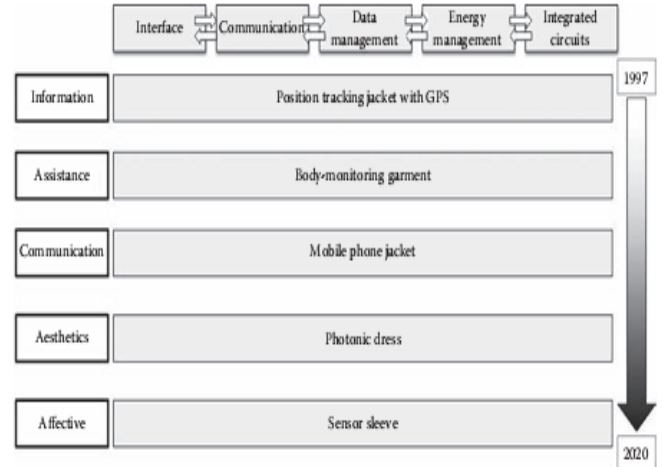
Fig.12. Smart Clothing Technology, service and applications

Smart clothing is a fashion item that needs to satisfy the users in emotion as much as in function. Therefore, user-oriented technology development that reflects consumer's latent needs is essential, in addition to integration and interconnection technologies.

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