А

Seminar report

on

Wearable Computing

Submitted in partial fulfillment of the requirement for the award of degree of Bachelor of Technology in Computer Science

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Preface

I have made this report file on the topic **Wearable Computing**, I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a g m men, c successful note. I express my sincere gratitude towho assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

Introduction

The vision behind the concept of a wearable computer is that a mobile computer should not just be a machine that we put into our pocket when we plan on doing some office work while on the road.

Instead it will be an integral part of our every day outfit (hence wearable), always operational and equipped to assist us in dealing with a wide range of situations.

For example user programmable device that is always on and always ready and accessible. The "always ready" capability leads to a new form of synergy between human and computer characterized by long-term adaptation through constancy of user--interface.

The computing unit maybe anything small but powerful enough! Laptop or Tablet PC.

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What is a wearable computer?

A wearable computer is a computer that is subsumed into the personal space of the user, controlled by the user, and has both operational and interact ional constancy i.e., is always on and always accessible.

It is a device that is always with the user, and into which the user can always enter command and execute a set of such entered commands, and in which the user can do so while walking around or doing other activities.

A wearable computer is a computing device small and light enough to be worn on one's body without causing discomfort.

Unlike a laptop or a palmtop, wearable computer is constantly turned on and interacts with the real-world task.

History

The concept of wearable computing was first brought forward by Steve Mann, who, with his invention of the 'Wear Comp' in 1979 created a pioneering effort in wearable computing.

Although the effort was great, one of the major disadvantages was the fact that it was nothing more than a miniature PC. Absence of lightweight, rugged and fast processors and display devices was another drawback.

The 1980s brought forward the development of the consumer camcorder, miniature CRTs etc. brought forward the development of the eyeglass mounted multimedia computer. With the advent of the internet and wireless networking technologies, wearable devices have developed a great deal.

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After its invention wearables have gone through 18 generations of development, with research going on at prestigious institutions like MIT, Georgia Tech and Carnegie Mellon University.

How does a Wearable Computer look?

A typical wearable computer consists of a battery or human powered computing unit and carried on a belt or in a jacket.

A wearable computer will have a mother board worn inside a fashion garment, connecting all the components of the system. The components will be placed at different parts of the body as per the user convenience; power pack and storage in shoes, display on the glasses and keyboard input on the wrist.

User input to the computer is either mostly voice driven or sensed from gestures or body motion.

The display and audio output generated by the computer will be relevant to the context and environment. The data storage is local and does not depend on any network connection.

Components of a Wearable Computer

Input devices:

Speech recognition may appear as the most suited input device, but may not be preferred in all kinds of applications & environments, due to privacy and performance issues. Gesture Input devices are simple, compact, and optimized for wearable use. These devices receive inputs from the natural gestures.

Handwriting& Keyboard could be one of the most efficient input devices, provided the input device is not too small or awkward. These devices are just worn on the hands or wrists and senses he typing input or handwriting. This does not have any cables and communicates on infrared.

Output devices:

The output device of a wearable computer could be either a head-mounted display (HMD) unit with an earpiece or only the earpiece for some applications. The HMD works like an ordinary monitor, providing an image floating in the air in front of you. It uses LCD or TFT technology. This allows augmented reality, where virtual information overlaps the real world.

Networks

There are two different kinds of networks in reference to a wearable computer. One is to connect the device to the external world and the other is to interconnect the various components, the later one being new for wearable computers. The first issue of connecting to the WC to the external world has several choices; WAP, or Cellular Digital packet data.

The second issue of interconnecting the various parts of the WC may involve both wired and wireless connections. Peripherals like HMD and wrist/finger worn devices may use standard wireless connections like Bluetooth.

There could also be a third type of communication, two wearable computers talking to each other. Since you wear them you integrate the wiring into normal clothing. It is wireless and comfortable. Here we also make use of body network i.e., we send signals by using your human body as a conduct.

RATIONAL DETAILS

How do you operate a wear comp? What sort of software do you use in it? What do you use it as input and output devices? Where do you Store data? How do you store them? All these are common questions that would arise in someone new to wear comp below given are brief answers to such common questions.

• SOFTWARE

The commonly used operating system on a wearable computer is WOS (wear comp OS). Red hat and GNU Linux can be run in close coordination as an operating system too. Various software mostly GNU freeware such as GIMP (GNU image modulation program) as well as various calendar and planning programs can be run on a wearable computer.

• HARDWARE

Prices of wearable computers tend to be in "thousands of dollars" whether you buy old or new. An alternative approach is to assemble a low cost system. For example, you can buy an old computer that has NTSC output and connect to small CRT from camera. Some such complete wearable computer systems have been built for as little cost.

• DISPLAY

A major part of the total cost of the wearable computer system lies in its display unit.

Mainly two types of display are used.

- Common portable LCD display
- Head mounted display

Common portable LCD display

FEATURES:

• High resolution colour video image.

- Image that appears in the person's line of sight.
- Viewing angle comparable to viewing a 26" monitor from 2, meters (6.5 Feet) away.
- Ultra light-weight, no major disturbance in the eyesight.



A typical HMD has either one or two small displays with lenses and semitransparent mirrors embedded in a helmet, eye-glasses or visor. The display units are miniaturized and may include CRT, LCDs, Liquid Crystal on Silicon (LCos), or OLED

• KEY BOARD

At the higher end, you can get a "twiddler" from Hand key, or keyboard from info grip. You can connect micro switches that enable you to plug directly into the keyboard port. A combination keyboard that weighs 4 ounces and fits in the palm of your hand. The twiddler 2 is an existing technology of wearable computing.

• HARD DRIVE

Many hard drives commonly used in laptop computers can withstand operational shock, it is common to go jogging while editing, and sometimes shoot momentary video while on horseback or riding a mountain bike down the centre of a line bumping over every railway tie, and capturing the experience on a hard drive. It is possible to carry enormous amount of hard drive space on your body. Prof Martin has 36GB hard drive installed in his wear. One of his waist bag systems contains 2GB of hard drive space and 512MB of RAM.

• BATTERIES OF WEARCOMP



• Low cost batteries

Early versions of wear comp used lead acid batteries. Lead acid batteries are typically available surplus. For constant application you will want to obtain at least two 12 Volt batteries.

• High performance batteries

Li-Ion camcorder batteries are commercially available. A minimum of two batteries is required for constant running 12 Volt batteries.

Applications

The following summarizes briefly the applications of wearable computers in various fields:

- Augmented Reality
- Aiding the visually disabled
- www.studynatia.org • Brain Gate Interface
 - Data processing

or

Advantages

- 1. Portability.
- 2. Hands-free use.
- 3. Comfortable.
- 4. Always on for the task it is designed.
- 5. Quick to access.
- 6. Fashionable.
- 7. Functions of clothing will be very personal.
- 8. The reuse of clothes will be important (prolonged life cycle).

Disadvantage

- 1. Equipment can be heavy.
- 2. Expensive.
- 3. Some Wearable Computers can consist of a lot of wiring.
- 4. Can cause irritation in heat.
- 5. Side-Effects such as Headaches.

6. It may become easier to get data on an individual if the item is lost / stolen.

CONCLUSION

Wearable Computer has come a long way from the days of the Wear Comp. Extensive research and development work at various centers have ensured that these wonderful devices will change our lives dramatically in the near future. Several commercial vendors have started manufacturing and marketing these devices.

The earlier devices were quite obtrusive and often made the wearer ill at ease, but recently, such devices have been gaining social acceptance. This is attributed partly to miniaturization and partly to dramatic changes in people, *s* attitude to personal electronics. This factor will soon disappear as the apparatus disappears into ordinary clothing and eyeglasses.

Clothing based computing with personal imaging will blur all boundaries between seeing and viewing and between remembering and recording. Rather than living within our own personal information domain, networking will enlarge our scope through shared visual memory which enables us to remember something we have never seen.

With computers as close as shirts on our backs, interaction will become more natural. This will improve the ability to do traditional computing whiling standing or walking. Within the next few years, we con expect entirely new modes of human a computer interaction to arise.

Wearable Computers will help in the development of a cyborg a system in which the camaraderie between a human and machine becomes seamlessly simple. This will bring forward a new set of technical, scientific and social needs which will have to be addressed as we take the first step towards coexisting with wearable computers.

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