WEARABLE COMPUTER

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INTRODUCTION

- A "Wearable Computer" is a computer that could be worn on the body. Wearable computers could be anything from a small wrist mounted system to a bulky head mounted display as shown below:

INTRODUCTION

□ Wearable computers are especially useful for applications that require computational support while the user's hands, voice, eyes, arms or attention are actively engaged with the physical environment.

HISTORY

- 1991: Started the "Wearable Computing Project" at MIT.

- 1995: World's first covert wearable computer – camera and display concealed in ordinary eyeglasses.

- 1997: PhD from MIT in this field he himself had invented.

- Today, 2010: Works at University of Toronto (OffSpring).

Steve Mann

EVOLUTION

(a) 1980   (b) Mid 1980s   (c) Early 1990s   (d) Mid 1990s   (e) Late 1990s

PRESENT SCENARIO

IT ALL STARTED FROM 1980

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

TECHNOLOGY AND GADGETS

- What do you need for W.C.?

1. Head-mounted display.

2. Camera recording view.

3. Audio, e.g. speaker and mic.

4. Input device, e.g. keyboard.

5. The computer itself.

6. Network connection

FEATURES

- **Consistency** :

  There is always a constant interaction between the computer and the user and hence there is no need to turn the device on or off.

- **Multi-Tasking** :

  Wearable computer provides computational support even when the user's hands, voice, eyes, or attention is actively engaged with the physical environment.

- **Mobility** :

  Wearable computers must go where the wearer goes. They are always on and their wearer can access them anytime.

OPERATIONAL DETAILS

□ **Software:**

The commonly used Operating System on a wearable computer is the WOS (WearComp OS).

Redhat and GNU Linux can be run in close coordination as an Operating System too.

□ **Hardware:**

✔ **Display**

✔ **Keyboard**

✔ **Hard drive**

HARDWARE

Display:

The display device of a wearable computer is a head-mounted display (HMD) unit with an earpiece.

Though there could be several other display devices intended for specific applications, HMD systems are of interest in the conversation of wearable computers.

HARDWARE

KeyBoard:

A combination keyboard and mouse fits in the palm of your hand.

The Twiddler2 is an enabling technology of wearable computing.

KITTYTECH.COM

HARDWARE

Camera

- Any small camera.
- Ordinary web camera.
- Custom made camera.

- Suitable placement
- Head, follows user's gaze.
- Shoulder, more stable.

NETWORK CONNECTION

- **Benefits of having a network**
  - Access to the Internet.
  - Communication.

- **Wireless network connection**
  - WLAN, IEEE802.11b
  - GPRS or UMTS (3G)
  - Bluetooth

POWER SOURCE

- Batteries add size, weight, and inconvenience to wearable computers.

- However, there is no stopping to use to any of the miniature batteries, for example Lithium, Li-MnO2, Li-C, that are currently being used in electronic gadgets.

APPLICATION

- **Augmented Memory**
- **Face Recognition**
- **Finger Tracking**
- **Visual filter**
- **Navigation**
- **Wearable computer in a Wrist Watch**
- **Wearable computer in Shoe**

AUGMENTED MEMORY

- Elderly or people with poor memory.
– Remember name and face of people.

- Image processing can recognize a face and map it to the person's name and affiliation.

VISUAL FILTER

□ User wears non-transparent glasses with integrated displays, experiences the world through a camera.

□ Computer processed video stream.

– Enhance contrast.

– Adjust colors.

– Night vision.

– Enlarged view.

WATCH WORKING ON LINUX

- Wrist watch running Linux and XFree86.

- Clock and video conferencing application.

OTHER APPLICATIONS

□ Military

– Soldiers monitoring,

health, equipment, etc.

– Maps and terrain.

□ Workers trining and support

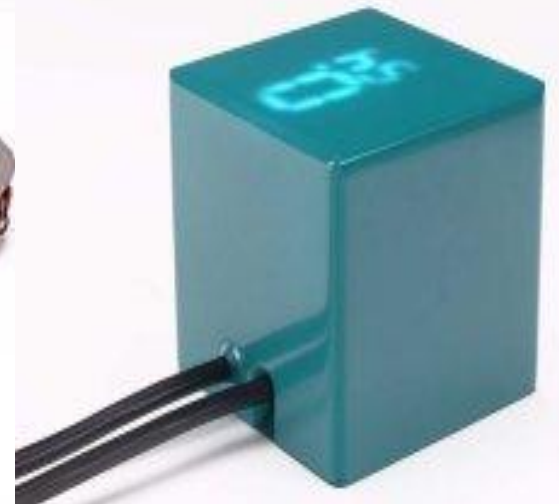□ Architect

□ Researchers

WEARABLE GAMING

- BodyPad
- - group of wearable sensors
    - turn a person's arms and
      legs into a joystick for
      PlayStation or Xbox
      fighting games.

SMART SHOES

- The shoes records the amount of exercise a child does and converts it into television watching time

ADVANTAGES

- Portability.
- Hands-free use.
- Comfortable.
- Always on for the task it is designed.
- Quick to access.
- Fashionable.

LIMITATIONS

- Equipment can be heavy.

- Expensive.

- Some Wearable Computers can consist of a lot of wiring.

- Can cause irritation in heat.

- Side-Effects such as Headaches.

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

CONCLUSION

- 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.