Why Wear a Computer?

David May

Bristol University

Wearable computers

... are NOT PCs

... do NOT have keyboards

... do not have mice (mouses?)

... do not need head-mounted antennae

... do not need backpacks

Wearable computers

... are part of the clothes you put on every morning

... know where you are

... know what you like

... know who your friends are

... know you have a hangover

Technology

Moore's law (underlying technologies): performance/cost doubles every 18 months

- processing
- storage
- displays
- communications

Main impact is on lowering cost

Major recent gains in power-efficiency

Interfaces

microphones, headphones

cameras, displays

- they can be tiny (button sized)

- you can (eg) wear a head-mounted hands-free camera

Sensors

accelerometers

compasses

bodysensors (heartrate ...)

location (gps, sonar, pingers ...)

shape-tape

Personal technologies

Some interfaces only work well when personalised

- speech recognition

- spatial audio

- ...

Multi-modal Interfaces

... communication of the same information in different ways (audio, image ...)

I don't want to get GPS information by looking at a map because I might drive into a tree

If I am talking to a friend, I want to look at a display

Computing platform

processor(s)

mobile communications
- 802.11
- 3G, bluetooth (?)

specialised DSP, audio, video processors

on-body communication

Servers and Services

... supporting a community of wearers

accumulating and delivering multimedia information associated with the

- organisation
- person
- location
- time
- ...

Servers and Services

building up trails of information, integrating them and making them navigable

connecting personal interests with context
- shopping, tourism, leisure, workplace, conferences ...

shared multimedia information

Communities of wearers

- messages in space and time

- context-based messaging

- find a new friend

- situated photography

- ...

Intelligent assistant

Information delivery based on
- where you are
- what time it is
- what you are (probably) doing
- who you are with
- what's in the diary

... tourist jacket, shopping jacket ...

Intelligent Assistant

Interfacing with fixed infrastructure
- screens
- buildings
- ...

and with portable infrastructure
- palmtops
- appliances
- ...

Leisure and Learning

Find your friends!

Shared augmented reality

Soundscapes (location and spatial audio)
- audio sculpture
- heritage sites
- concerts

Intelligent mobile juke-box

Games

- Virtual paintball
  - no lasers!
  - no paint!
  - spatial audio
  - communications

- Virtual adventure games

Training

track your movements

track your reactions

see what the expert sees

... surgery, maintenance, sports

Sports

body monitoring

training

finding your way

leaving/following a trail

photographs

When I run ...

I like not to get lost

I like to know how far I have gone - and how fast

I might like to leave a trail for a friend

I might like to follow a trail left by others

I might be trying to follow a training schedule

When I bike ...

I would like spoken directions

I would like to leave myself notes about favorite routes

I would like to leave and/or use trails left by others

I would like to take photographs at exciting moments - from my helmet!

Healthcare

body-monitoring

early-warning

drug administration

emergency aid

I hate windows

Windows and mice have dominated HCI for 25 years

They were based on copying the 'desk-top model' using new technology

The 'desk-top model' is ancient!

Human-computer interaction

Wearable computers offer immensely richer HCI than anything
we have experienced

The technology is (almost) here

There are hundreds of new applications

The opportunity

... is to free people from the desk-top!

... working

... playing

... learning

... living!

The business opportunities

... fashion

... networks

... services

... servers

... software

How many computers will you be wearing in 2005?