Interaction
BTH745 – Human-Computer Interaction

Interaction types

- Instructing
  - Issuing commands and selecting options
- Conversing
  - Interacting with a system as if having a conversation
- Manipulating
  - Interacting with objects in a virtual or physical space by manipulating them
- Exploring
  - Moving through a virtual environment or a physical space

Instructing

- Where users instruct a system and tell it what to do
  - E.g. tell the time, print a file, save a file
- Very common conceptual model, underlying a diversity of devices and systems
  - E.g. word processors, VCRs, vending machines
- Main benefit is that instructing supports quick and efficient interaction
  - Good for repetitive kinds of actions performed on multiple objects

Conversing

- Underlying model of having a conversation with another human
- Range from simple voice recognition menu-driven systems to more complex ‘natural language’ dialogs
- Examples include timetables, search engines, advice-giving systems, help systems
- Also virtual agents, toys and pet robots designed to converse with you

Manipulating

- Involves dragging, selecting, opening, closing and zooming actions on virtual objects
- Exploit's users' knowledge of how they move and manipulate in the physical world
- Can involve actions using physical controllers (e.g. Wii) or air gestures (e.g. Kinect) to control the movements of an on screen avatar
- Tagged physical objects (e.g. balls) that are manipulated in a physical world result in physical/digital events (e.g. animation)

Direct Manipulation

- Shneiderman (1983) coined the term DM, came from his fascination with computer games at the time
  - Continuous representation of objects and actions of interest
  - Physical actions and button pressing instead of issuing commands with complex syntax
  - Rapid reversible actions with immediate feedback on object of interest

Direct Manipulation

- Novices can learn the basic functionality quickly
- Experienced users can work extremely rapidly to carry out a wide range of tasks, even defining new functions
- Intermittent users can retain operational concepts over time
- Error messages rarely needed
- Users can immediately see if their actions are furthering their goals and if not do something else
- Users experience less anxiety
- Users gain confidence and mastery and feel in control

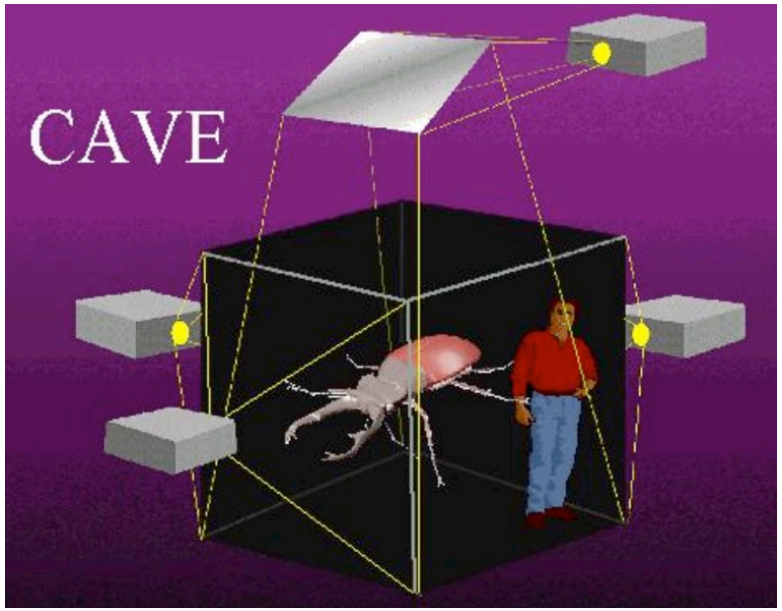
Direct Manipulation

- Some people take the metaphor of direct manipulation too literally
- Not all tasks can be described by objects and not all actions can be done directly
- Some tasks are better achieved through delegating
  - E.g. spell checking
- Can become screen space ‘gobblers’
- Moving a mouse around the screen can be slower than pressing function keys to do same actions

Exploring

- Involves users moving through virtual or physical environments

- Physical environments with embedded sensor technologies
  - Context aware



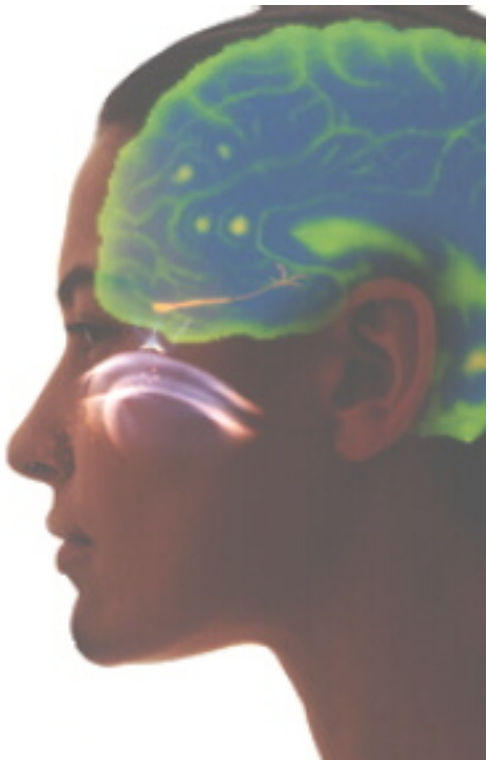
Interaction and interface

- Interaction type:
  - What the user is doing when interacting with a system, e.g. instructing, talking, browsing or other

- Interface type:
  - The kind of interface used to support the mode, e.g. speech, menu-based, gesture

Interface types

- Command
- Speech
- Data-entry
- Form fill-in
- Query
- Graphical
- Web
- Pen
- Augmented reality
- Gesture



Which interaction type?

- Need to determine requirements and user needs
- Take budget and other constraints into account
- Also will depend on suitability of technology for activity being supported
- This is covered in course when designing conceptual models

Paradigm

- Inspiration for a conceptual model
- General approach adopted by a community for carrying out research
- Shared assumptions, concepts, values, and practices
  - E.g. desktop, ubiquitous computing, in the wild

Interaction paradigms

- Large Scale Computing
- Personal Computing
- Networked Computing
- Mobile Computing
- Collaborative Environment
- Virtual Reality
- Augmented Reality

New paradigms

- Ubiquitous computing (mother of them all)
- Pervasive computing
- Wearable computing
- Tangible bits, augmented reality
- Attentive environments
- Transparent computing
  - and many more….

Summary

- Important to have a good understanding of the problem space
- Fundamental aspect of interaction design is to develop a conceptual model
- Interaction modes and interface metaphors provide a structure for thinking about which kind of conceptual model to develop
- Interaction styles are specific kinds of interfaces that are instantiated as part of the conceptual model