Interfaces for disabled and people with special needs

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Disabilities:
- blind - eye impaired
- deaf - hear impaired
- movement disabilities
- elder people

computing:
- tool to make “information systems”
- more and more important (with the Internet)

necessary to make disabled people have access to content
- ethical need: enable them to integrate in the world

business aspect:
- “large and growing market”
- 5% US people have a disability
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Context of movement disabilities

- Movement impaired people
  - shake problems
  - paralyzed people
  - amputated people
- Problem: make (proper) movements
  - mouse movements
  - keyboard strike
- Some systems developed to prevent that use of a computer
  - voice recognition systems
  - eyes navigation systems
  - head navigation systems
Voice recognition systems (1/2)
Principle and current state

- **Principle:**
  - the person speaks to give an order to the computer
  - the computer acquires the sound and compiles it
  - matching with an existing order and order execution

- **State of the art:**
  - difficult to make working systems
  - depends on a lot of factors (emotion, tone, ...)
  - research progressing
    - example: team in Finland studied the influence of encoding/decoding on the quality and the deformation of the speech
Voice recognition systems (2/2)

Current implementations:
- some exist in mainstream OS but don’t work perfectly
  - Microsoft Windows Vista
  - Apple Mac OS X
- exists dedicated system to that
  - around $200 for a full system
  - begins to become mainstream
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Generalities about deaf people

- Disability:
  - completely deaf
  - only hear-impaired people

- Systems: computer → people
  - put sound louder
  - replace sound feedback by display feedback
  - subtitles for movies

- Systems: people → computer
  - classic means
    - mice
    - keyboards
  - Cued speech
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Cued speech (1/2)
Principle

- **What is *Cued speech***?
  - language using hands
  - very old and improved method
  - very used to communicate in real life
  - idea: integrate it in Information Systems

- **Why integrate *Cued speech* in IS**?
  - increase people → computer communication possibilities
  - main idea: enable instant-chat conversations
Cued speech (2/2)

Implementation

- How doing it?
  - video means: webcams, ...
  - compiling hand-made symbols to make corresponding sounds
    - study lead by French and Greek researchers on 2D/3D pictures
    - conclusions: 2D recognition have less noise than 3D

- This solution has a future
  - improved, easy to deploy
  - cheap to deploy
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What is web accessibility?

Definition of accessibility

- Make content reach the user, whoever the user is;
  - “accessibility is just usability but marketed to a particular segment of the population” (Jonathan Snook)
- More general that only access for disabled people;
  - Cf. the W3C definition of accessibility
For the Web

- For the web: make the browser print / read contents
  - classical graphic web browser
    - Firefox, Opera, Netscape, Konqueror...
  - text (in-line) browser
    - like Lynx
  - non-computer browsers
    - like wap browsers on mobile phones...
  - special browsers for disabilities
    - voice browsers
    - braille displayers
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The problematic of web accessibility

- Information flow: between the webmaster and the user
- Goal: don’t interrupt that flow
- How?
  - Guidelines, standards...
  - Validation tools to ensure standards
  - W3C: reference consortium for that
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Main principles

- **Content:** split the content from the presentation
  - content described by (X)HTML
  - presentation implemented by CSS
  - no content in Javascript effects

- **Navigation:** follow accessibility guidelines
  - place navigation links in the *beginning* of the page
  - don’t place navigation elements (menu items...) in dynamic effects (like Javascript)

- **Check you comply with that (through W3C validators)**
Splitting content/presentation examples

- Put a text fragment in emphasis
  - Bad: I want to put `<i>that text</i>` in emphasis
  - Good: I want to put `<em>that text</em>` in emphasis

- Modify text font and color
  - Bad: `<font size="1" color="#00FF00">Hello World!</font>`
  - Good: `<span style="font-size:11pt; font-color:#00FF00;">Hello World!</span>`
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Accessibility examples

- Provide an alternative for multimedia supports
  - Bad: `<img src="myPhoto.jpg"/>
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- Use markup properly: titles
  - Bad: `<p><strong>My title</strong></p>
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- **IS access must be available for any people**
- Exist already systems for disabled people
  - Movement disabilities
    - example of voice recognition systems
    - already implemented, but really improvable
  - Deaf people
    - example of *Cued Speech* (enable chat)
    - easy and cheap to deploy
- **Case of the Internet**
  - accessibility: any user able to reach content
  - for the web: don’t break the information flow
  - make websites accessible:
    - separate look-and-feel (CSS) from content (XHTML)
    - follow W3C accessibility guidelines
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Thanks for your attention!