CSC 484 Lecture Notes Week 6

Different Types of Interfaces and Interactions

I. **Relevant reading** -- Textbook Chapter 6.

II. **Project Overview and Milestone 2.**

A. See handout from last week.

B. Important revisions online:

1. Presentations moved to *Weeks 8 and 11.*

2. New Section 1.3.3, on **"Usability Study Participants"**.

Project Overview and Milestone 2, cont'd

3. **References** section at the end.

III. Class schedule updates.

A. Revised online.

B. Noteworthy updates:

Schedule updates, cont'd

1. Project presentations moved.

2. Monday finals for presentations.

3. Weeks 9 and 10 labs for usability studies.

4. Quiz 4 Fri lecture Week 9, 6% of grade.

IV. **Intro to Chapter 6 (Section 6.1).**

A. Covers wide range of interface types.

   1. *WIMP* -- windows, icons, menus, pointing

   2. *Advanced GUIs* -- multi-media, VR

   3. *Ubiquitous* -- wearable, mobile, envir'tal

Intro to Chapter 6, cont'd

B. Design issues relevant to different UI types.

C. Guidance about what type(s) to choose.

V. Interface paradigms (Section 6.2).

A. *Paradigm* = "a way of doing business".

B. Commonly agreed practices:

Interface paradigms, cont'd

1. scientific questions to ask,

2. phenomena to observe,

3. kind of experiments to conduct.

Interface paradigms, cont'd

C. In ID, questions include:

1. How many people will be interacting?

2. Desktop, web browser, ubiquitous?

3. Forms of user inputs?

4. Forms of system output?

Interface paradigms, cont'd

D. ID phenomena to observe:

1. Can people use system effectively?

2. What psychological phenomena?

3. What social phenomena?

4. When do users enjoy or not enjoy?

-- Administrative Matters --

- Network outages limited to
  ### 2-4 PM Friday, May 16.

- Move Monday quiz to Wed.

Interface paradigms, cont'd

E. Experimental findings in ID research:

1. *Qualitative results.*

2. *Quantitative results.*

3. *Theory-based results.*

Interface types (Section 6.3).

A. Interaction styles:

   1. *Command-based* -- typed text, spoken

   2. *Graphical* -- mouse or pen

   3. *Multi-media* -- audio/video

Interface types, cont'd

B. Interactive system properties:

1. *intelligent* -- add AI

2. *adaptive* -- changes dynamically

3. *ambient* -- beyond the desktop

4. *mobile* -- device goes with user

Interface types, cont'd

C. Book's chronological grouping:

   1. 1980s

      a. command

      b. GUI

Chronological grouping, cont'd

2. 1990s

    a. advanced GUI (multi-media, visual)

    b. web-based

    c. speech

    d. pen, gesturing, touch

    e. appliance, i.e., device-embedded

Chronological grouping, cont'd

3. 2000s

   a. mobile

   b. multi-modal (beyond kbd, mouse)

   c. sharable

   d. tangible (sensor-based i/o devices)

   e. augmented, virtual, mixed reality

   f. wearable

   g. robotic

Chronological grouping, cont'd

D. Chronology aligned with PhD-level research.

   1. 90s research now being commercialized.

   2. E.g.,

Chronological grouping, cont'd

a. Google Docs and SketchUp

b. Apple Spaces and Expose

c. Windows desktop improvements

d. MS Office Galleries

e. iPod scroll wheel

VI. **1980s UIs (Sec 6.3.1).**

A. Well-known to us all.

B. Activity 6.1, Box 6.1 not that cogent.

Command and GUIs, cont'd

C. Research, design issues (relevant today).

   1. *Command vocabulary.*

   2. *Mnemonic icon design.*

   3. *Window management.*

Command and GUIs, cont'd

4. *Menu design and layout.*

5. Other means to *display, navigate, abstract* large amounts of information.

Command and GUIs, cont'd

D. Menu design issues.

1. Many published guidelines.

2. Consider ISO standards in Figure 6.8.

Command and GUIs, cont'd

E. Icon design issues.

   1. Visual appearance has improved.

   2. Research suggests icon recognition may not involve *graphics cognition*.

   3. Hence icons may just be more *vocabulary*.

-- Administrative --

- Quiz 3 review and quiz itself moved.

    o Quiz review **Wednesday**.

    o Quiz taking **Friday**.

- **Today:** brief team meetings.

-- Assignment 3 --

- Participate in *other teams'* studies.

- Week 9: `2d3d` coordinators.

- Week 10: Subjects in five other studies.

Assignment 3, cont'd

- Human experimental subjects.

- Rights and responsibilities.

-- Milestones 3 and 4 --

- M3 entails:

  o prototype

  o design and conduct of usability study

Milestones 3 and 4, cont'd

- M4 entails:

  o final presentation

  o analysis, other project deliverables

Milestones 3 and 4, cont'd

- Further Details on Milestone Tasks

- Week 8 Lab Presentations

- Weeks 9 and 10 Usability Studies

- Specific Project Deliverables

Now continuing with Notes Week 6 ...

VII. **Multi-Media (pp. 240-244).**

A. Mix graphics, text, audio, video, animation, hyper-links.

B. Encourage interaction and exploration.

Multi-media, cont'd

C. Book caveats:

1. ***General belief*** that 'more is more'.

2. 'Added value' ***assumed***.

3. May promote ***fragmented interactions***.

Multi-media, cont'd

D. Usage guidelines:

1. *Stimulate user with audio/video.*

2. *Present high-level diagrams.*

3. *Show details in hypertext.*

VIII. **Virtual reality (pp. 244-249).**

A. Create illusion of participation.

B. Provide cognitive sense of presence.

Virtual Reality, cont'd

C. Physical I/O.

  1. 3D projections or shutter glasses.

  2. Joystick controls.

  3. Headsets (can be problematic).

Virtual Reality, cont'd

D. Perspectives.

   1. First person direct control,
               e.g., flight simulations.

   2. Third person control via avatar,
               e.g., games.

Virtual Reality, cont'd

E. 2D versus 3D.

   1. Does 3D help with productivity?

   2. Does it help with engagement?

   3. Is it more fun?

Virtual Reality, cont'd

F. Design issues.

   1. Degree of realism.

   2. Type of i/o.

   3. Cognition of navigation.

   4. What it takes to "suspend disbelief".

IX. **Information Visualization (pp. 249-251).**

A. Visual abstraction for large data sets.

B. Alternate views for complex data.

Visualization, cont'd

C. Application areas.

1. Geographic data.

2. Algorithm animation.

3. Many other attempts, e.g.,
   Marketmap, newsmap.

Visualization, cont'd

D. R&D issues.

   1. Appropriate spatial metaphors.

   2. 2D versus 3D (again).

   3. Do visualizations really work?

X. **Web-based UIs (pp. 251-258).**

A. Vanilla versus multi-flavor.

B. Nielson says vanilla.

C. Many others say glitz.

D. The world jury is *way out*.

Web-based UIs, cont'd

E. Plead to your own jury, i.e.,

    a. ***know your users***

    b. know what you want from them

Web-based UIs, cont'd

F. Do people read any of this?

    1. Recent research says around 20% of it.

    2. See useit.com for discussion.

Web-based UIs, cont'd

G. Design issues.

   1. Gazillions of guidelines.

   2. Copious research.

Web-based design issues, cont'd

3. Increasingly like non-web UIs.

4. *May be* organized around

    a. *Where am I?*

    b. *What's here?*

    c. *Where can I go?*

XI. **Speech (pp. 258-260).**

A. Used successfully in certain applications.

B. IVRs coming along
        (Interactive Voice-Response systems).

Speech, cont'd

C. Research and design issues.

1. *Much* still to do.

2. Parsing remains a major problem.

3. Genuine conversation is difficult.

Speech R&D, cont'd

4. Speech APIs quite complicated, e.g.

    a. Sun's *FreeTTS* synthesizer

    b. CMU's *Sphinx-4* recognizer

    c. CMU's *Speech Graffiti*

XII. **Pen, gesture, touch (pp. 258-260).**

A. Pen-based products started in 90s.

B. Much R&D continues.

Pen, gesture, touch, cont'd

C. R&D issues:

   1. Distinguishing gestures.

   2. Gesture accuracy, efficiency,
           vis a vis keyboard and mouse.

XIII. Appliance UIs (pp. 264-5)

   A. Your toaster and frig with brains.

   B. Design issues:

      1. Keep it simple (*really*, this time).

      2. Tradeoffs between hard vs soft UIs,
         e.g., *knobs,levers* vs *LCD*.

XIV. 21st Century UIs (Sec 6.3.3).

A. We'll cover later in the quarter.

B. Also visualization and speech in more depth.