CIS 443/543
User Interfaces

Lecture 2: What is Usability?

Goals of this Course

• Learn how to design useful, usable and safe interactive software
  – Human-centered software design & development
  – Evaluation of usability
• Understand why systems and people fail to work and play together
  – Basic issues of human psychology & sociology
  – Common design flaws and how to avoid them

Key Concept

• What is usability?
  “Intuitive”?
  “Natural”?
  “User friendly”?
• Problem
  Vague
  Subjective
  Can’t be measured or tested
  Can’t be used for design
What can we learn about usability from simple everyday things?

Examples of Everyday Objects and their usability

- These are 35 mm slides which show
  - different types of doors and door handles
    - ordinary interior house door
    - refrigerator door
    - exterior and interior doors of public buildings
  - different types of scissors
    - ordinary paper scissors
    - sewing scissors
    - kitchen meat scissors
    - folding scissors
  - diskette
  - automobile driver’s console
  - answering machine

Lessons Learned

- Form follows function (use)
- Form follows human physical anatomy and behavior
- Form follows average or stereotyped person
- Form follows custom (culture)
- “Intuitive” interface just means the designer matched the design with what people expect!
Causes of Problems with Usability

• FUNCTIONALITY PROBLEM
  – What are the functions this object can perform?
  – Will it do what I want?
• CONTROL PROBLEM
  – Which control or sequence of controls do I use to get what I want?
• FEEDBACK PROBLEM
  – How do I know I got what I wanted?
• CONTEXT PROBLEM
  – Am I using the right functions at the right time?

How do we get usability into a system?

• 1.2 Usability Requirements
• 1.3 Usability Measures
• 1.5 Universal Usability
Chapter 1.2 Usability requirements

- **Usability requirements** are formed during the requirements analysis phase of design
  - Early phase of software development
- **Usability requirement definition**
  - Evolving detailed description of what the system should do and why with regards to human behavior
  - Does not describe how the system should do it such as the detailed system design
- Other requirements: functional, hardware, etc.

Example of a usability requirement

- Proposed system: Kiosk for rapid transit system
- Sample Functional requirement
  - User must be able to buy a ticket
- Sample Usability requirements
  - User must be able to buy typical trip ticket in 2 minutes
  - Blind user must be able to buy typical trip ticket unassisted in 4 minutes

Usability requirements analysis

- Ascertain the user’s needs
  - Determine what tasks and subtasks must be carried out
  - Include tasks which are only performed occasionally. Common tasks are easy to identify.
  - Functionality must match need or else users will reject or underutilize the product
Usability requirements analysis

- Promote standardization, integration, consistency, and portability
  - Standardization: use pre-existing industry standards where they exist to aid learning and avoid errors (e.g. the W3C and ISO standards)
  - Integration: the product should be able to run within the system
  - Consistency: - compatibility across different product versions
    - compatibility with related paper and other non-computer based systems
    - use common action sequences, terms, units, colors, etc. within the program
  - Portability: allow user to convert data across multiple software and hardware environments

Chapter 1.3 Usability measures

- Definition: a usability measure allows us to objectively assess the effectiveness of a usability requirement
- Define the target user community and class of tasks associated with the interface
- 5 human factors central to evaluation:
  - Time to learn: How long does it take for typical members of the community to learn relevant tasks?
  - Speed of performance: How long does it take to perform relevant benchmarks?
  - Rate of errors by users: How many and what kinds of errors are made during benchmark tasks?
  - Retention over time: How frequently does the ease of learning help improve user retention?
  - Subjective satisfaction: Allow for user feedback via interviews, free-form comments and satisfaction scales
- Other factors
  - Fatigue
  - Enjoyment
  - Safety

Usability measures (cont.)

- Usability measures are taken during UI evaluation
  - Using mockups or prototype system
  - Methods
    - Predictive methods such as average time to perform actions
    - Usability evaluation using real users
- Trade-offs in design options frequently occur between usability requirements.
- Changes to the interface in a new version may create consistency problems with the previous version, but the changes may improve the interface in other ways or introduce new needed functionality.
What is a usability?

- Usability requirements + usability measures
  - systematic process that develops usable systems for specific users in a specific context

- Better than
  - user-friendly
  - easy to use
  - accessible
  - comprehensible
  - intelligible
  - idiot proof
  - intuitive