Human Computer Interaction (HCI-5313)

Agenda

- Introductions
  - Me
  - You

Introductions

- Instructor
  - **Kidane Meb.**
    - **kidmeb@gmail.com**
  - College of EEC
  - Computer Science MSc.

- Research areas
  - Human-Computer interaction
  - Internet of Things(IoT)
  - Interface programming with flutter

- Formative

  experiences…
  - Industry – java …

Introductions

- Your turn
  - Intern experience?
  - Why interested in an HCI class? Why you choose this CSE5313 ?
  - What best skill do you bring to a project team?

Course Information

- Books
  - ***Human-Computer Interaction*, by Alan Dix, Janet Finlay, Gregory Abowd, and Russell Beale**. Prentice Hall, 2004.

  - ***The Design of Everyday Things*, by Donald Norman**. Currency/Doubleday, 1990.

Course Information

- Grading
  - Group project, 4 parts (25%)
    - More details soon…
  - Mid-term exam, quiz (30% total)
    - Note: ??
  - Home works (10% total)
  - Participation (5% total)
    - Class involvement and peer review
    - Includes project involvement/effort
 - Final Exam(30 % total)

Resources

- Previous courses, courses elsewhere, info on the web
- HCI Digital Library
- Books
- Web sites
- Standards documents
- Go further
  - Move beyond lectures & book
  - Further courses
  - Step into research

(HCI-5313)

HCI What?   HCI Why?

- What happens when a human and a computer system interact to perform a task?

  - task - write document, calculate budget, solve equation, learn about **Ethiopia**, drive home, make a reservation, land a plane…

- Why is this important?

  1. Computer systems affect every person
  2. Safety, satisfaction, utility is critical
  3. Product success depends on ease of use

- A workable definition of HCI is
  - "A set of processes, dialogues and actions through which a human employs and interacts with a computer"
- A focus on the research themes
  - "A discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them"
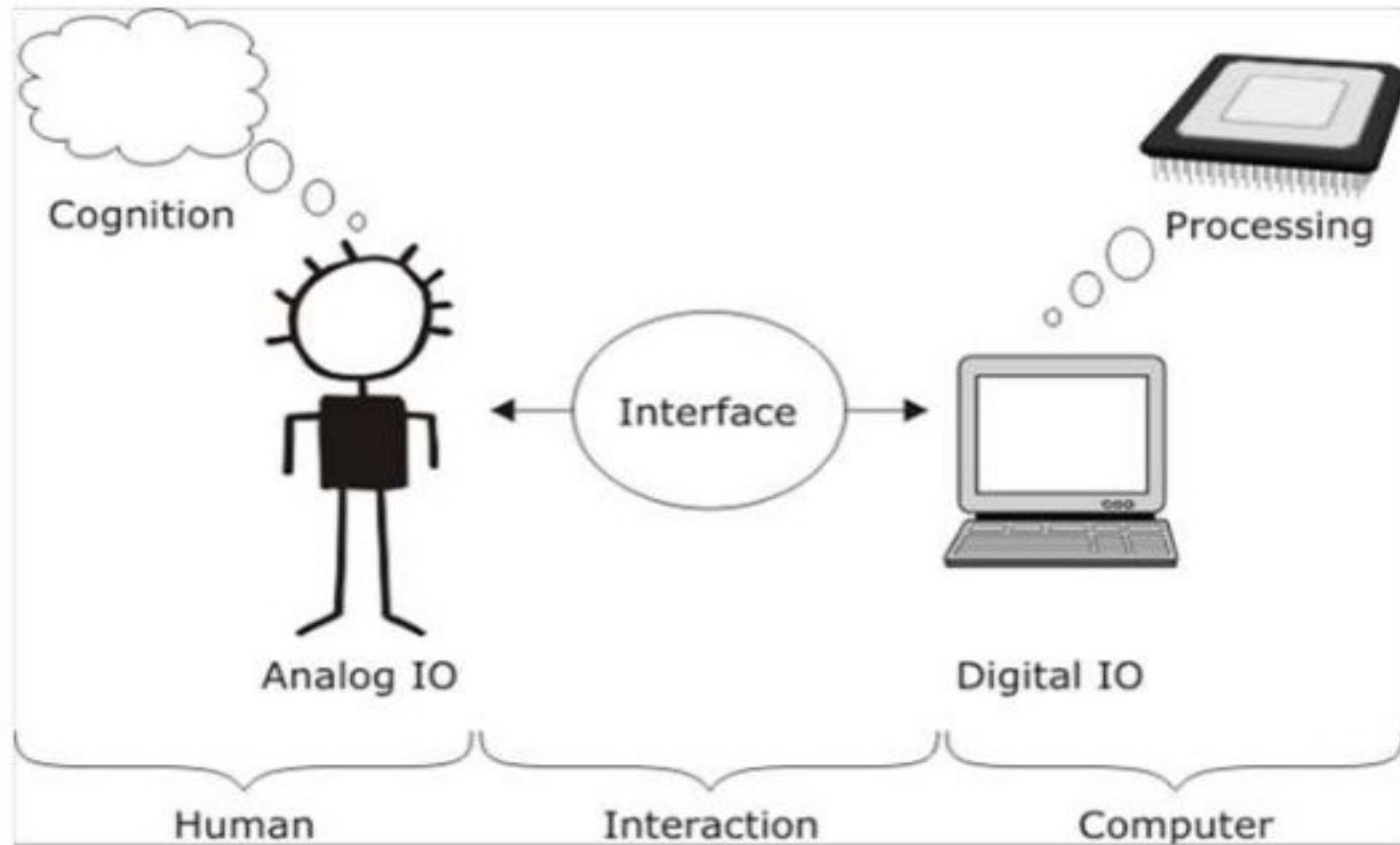
© Worboys and Duckham (2004) *GIS: A Computing Perspective*, Second Edition, CRC Press

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Human

- *Users, single, group working together, sequence*
- *Users(s) tries to complete a task*
- *The person at using the system and the other people they work to communicate with.*
- *End user of program*
- *Other (friends, collaborators, coworkers)*

Computer

- *Technology, not just desktop computer*
- *Systems*
    - *Large scale computers*
    - *Process control*
    - *Embedded systems*
- *The machine or network of machines to run the system.*
- *A machine program runs on.*
- *Often split : clients and servers*

Interaction

- *Communication, direct/indirect*
- *Dialogue + feedback / batch*
- *Task oriented*
- *The interface that represents the system of the user.*
- *User tells the computer what they want*
- *Computer communicates result*

Why do we need to understand Humans in HCI?

- *Humans are* *limited in their capacity* *to process information.*
- *This has important implications for* *design*
- *Interacting with technology is* *cognitive*
- *Human Information Processing is referred to as* *cognition*

Course background

- HCI is a Multi-disciplinary subject but it has an intrinsic relationship as a subfield to computer science.
  - What fields does HCI more covered ?
  - ✓ Computer Science
  - ✓ Psychology (cognitive)
  - ✓ Communication
  - ✓ Education
  - ✓ Anthropology
  - ✓ Design (e.g. graphic and industrial)

Course background

- Until the late 1970s, only IT professionals and dedicated hobbyists interacted with computers. This changed disruptively with the emergence of personal computing in the later 1970s.
- Then hci becomes an area of research and practice that emerged in the early 1980s

- HCI is initially as a specialty area in computer science embracing cognitive science and human factors engineering

Course background

- Late 1970 saw the emergence of a big field:
  - Cognitive science or psychology
    - Mental processes of human
  - Cognitive Engineering
    - Studying people interaction with objects
- It also saw the emergence of a small field
  - Personal computing
    - needed to expand and succeed was to make computers more accessible and easy to learn and manipulate by the average user
    - Optimize usability: more people have an access to computers

Course background

– Allows us to apply what we learn from cognitive psychology in a practical and useful way; with the emerging potential of the potential computing.

– was born to make computers more accessible to the average user.

– Now, its being used to make the internet ,each other, and the information online more accessible.

Interfaces in the Real World

- Not just computers!
  - VCR
  - Wristwatch
  - Phone
  - Copier
  - Car
  - Plane cockpit
  - Airline reservation
  - Air traffic control
  - Running shoes!

Goals of HCI

- Allow users to carry out tasks
  - Safely
  - Effectively
  - Efficiently
  - Enjoyably

Goals of HCI

- When People interacts with technology :
    - Every one is searching ,retrieve ,process and get knowledge using all current technologies, i.e. cellphones ,iPods and mp3 etc.
    - Then hci figured out that how the technology makes
        - Simple
        - Accessible
        - useful
        - Affordable
    - Value sensitive design.

Key concepts of HCI

- Usability
- Cognetics- locus of attention
- Affordance
  - What sort of operations and manipulations can be done to an object
  - Crucial is the perceived affordance
- Visibility
  - Mapping between controls and effects should be sensible and meaningful
  - feedback
- Task orientation- fit, analysis

First principle of HCI (**Usability**)

- Crucial issue in this area!
- Combination of
  - Ease of learning
  - High speed of user task performance
  - Low user error rate
  - Subjective user satisfaction
  - User retention over time

First principle of HCI (**Usability**)

- useful
  - Accomplish what is required (functional, does things)

- usable
  - Do it easily and naturally without error (does the right things)

- used
  - Make people want to use it (be attractive, acceptable to organization)

HCI How?

- How do we improve interfaces?

1. Educate software professionals
2. Draw upon fast accumulating body of knowledge regarding H-C interface design
3. Integrate UI design methods & techniques into standard software development methodologies now in place

UI Design/Develop Process

- Tao of User-Centered Design
  - Analyze user's goals & tasks
  - Create design alternatives
  - Evaluate options
  - Implement prototype
  - Test
  - Refine
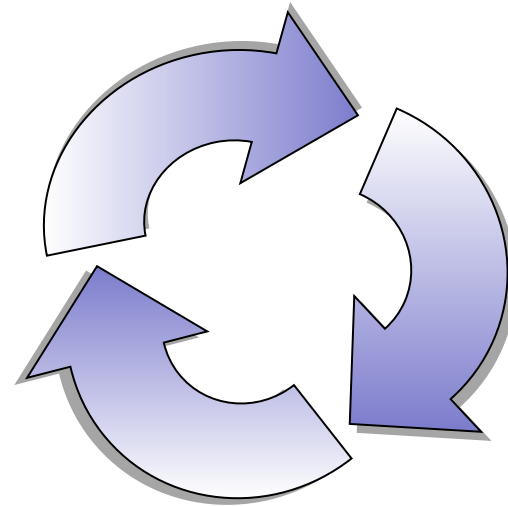
Above All Else...

- Know the User!
  - Physical & cognitive abilities (& special needs)
  - Personality & culture
  - Knowledge & skills
  - Motivation

- Two Fatal Mistakes:
1. Assume all users are alike
2. Assume all users are like the designer

Design Evaluation

- "Looks good to me" isn't good enough!

- Both subjective and objective metrics

- Some things we can measure
  - Time to learn
  - Speed of performance
  - Rate of errors by user
  - Retention over time
  - Subjective satisfaction

Course Overview

- Human abilities
- Evaluate an existing system
  (without involving users)
- Design for success
- Dialog & interaction styles
- Evaluate your design (with users)

Group Project

Semester-long team effort

Group Project

- Design and evaluate an interface
  - 0 - Team formation & topic choice
  - 1 - Understand the problem space
  - 2 - Exploring the design space
  - 3 - Prototype
  - 4 - Evaluation

- Main 4 parts worth ~10% each
- Presentation, documentation ~ 5%

Group Project Details

- Part 0 - Topic definition
  - Identify team & general topic
  - Create web notebook (on T-square)
  - Suggestion: Pick a population and pick a technology; check out intersection
- **Part 1 - Understanding the problem**
  - Describe tasks, users, environment, social context
  - What are implications for design?

Group Project Details

- **Part 2 - Design alternatives**
  - Storyboards, mock-ups for multiple different designs
  - Explore, push boundaries of design space
  - Explain decisions

- **Part 3 - System prototype & eval plan**
  - More detailed prototype (semi-working ok)
  - Plan for conducting evaluation

Group Project Details

- **Part 4 - Evaluation**
  - Conduct formal evaluation with example users
  - Use appropriate methods
  - Analyze results of evaluation
  - Characterize what's working and what's not

Presentations

- Midterm poster session
  - Feedback on ideas, whole class period
  - After Part 2 (near midterm)
  - Other students and "expert" gallery (hopefully)

- Final poster session (___ days)

Project Teams

– You decide
– Diverse is best!
– Consider schedules

Project Topics

- Semester theme: "Innovative Interfaces in Everyday Life"
  - ?? What does this mean ??

- General Topic:
  - "Phase 0" of the project
  - Set up web notebook on T-square

What Makes a Good Project

- Typically:
  - Access to domain experts & users
  - "Real" clients
  - Interesting human issues
  - Rich domain for design

- Theme has a LOT of range for topics

Previous Topic Ideas

- Mobile/handheld (cars, tour guides, etc.)
- Wedding planner
- GIS
- Calendar agent (speech)
- Audio / Web sites
- Domain that you know well

End of Chapter 1