浙江大学计算机学院
数字媒体与网络技术

Human Computer Interaction

Introduction

Related Courses

- 虚拟现实与数字娱乐
- 游戏程序设计
- 计算机图形
- 计算机动画
- 计算机视觉
- 数字视音频处理

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Textbook & References

- Steven Heim, The resonant Interface: HCI foundations for interaction design (李学庆等译，和谐界面，电子工业出版社，2008.)
- Jennifer Preece et al., Interaction design: beyond human-computer interaction design. John Wiley & Sons, Inc. 2019.
- Joseph J. LaViola, et al., 3D User Interfaces, 2017
- Alan Dix, et al. , Human Computer Interaction (蔡利栋等译，人机交互（第三版），电子工业出版社, 2006.)

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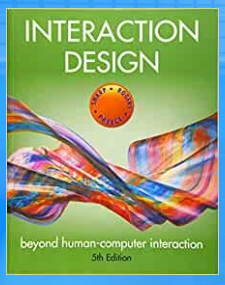
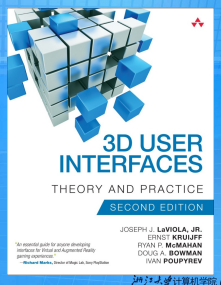
Textbook & References





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HCI

- What is it?

- from MMI to HCI

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HCI

- What happens when a human and a computer get together to perform a task
  - task: write document, calculate budget, solve equation, drive home,...

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Why is this important?

- Computers (in one way or another) now affect every person in society
- Product success may depend on ease of use, not necessarily power

Why is this important?

- Ease of use
  - kitchen knife

Why is this important?

- Ease of use
  - the world's largest Swiss army knife

Why is this importa

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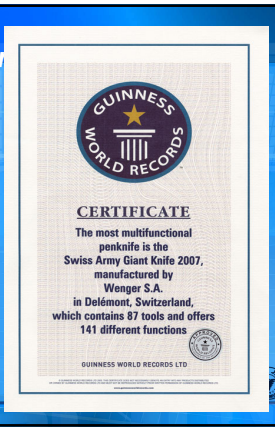
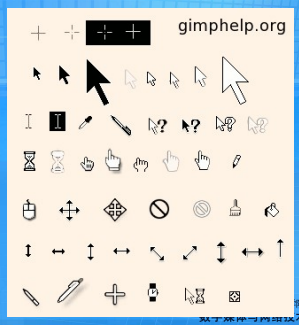


Why is this important?

- Ease of use
  - cursor



Central topic

- Interaction design
  - Not just a software interface on a desktop monitor!

Designing interactive products to support people in their everyday and working lives.

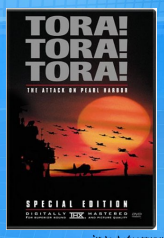
-- Jennifer Preece, Yvonne Rogers, Helen Sharp

Goals of Interaction Design

- Allow users to carry out tasks
  - Safely
  - Effectively — Having an intended or expected effect.
  - Efficiently — Acting directly to produce an effect; Acting or producing effectively with a minimum of waste, expense, or unnecessary effort.
  - Enjoyably

Goals of Interaction Design

- Allow users to carry out tasks safely, effectively, efficiently, and enjoyably.



Location! Location! Location!

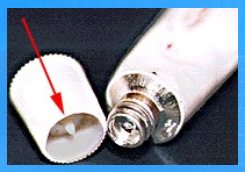
Goals of Interaction Design

- Allow users to carry out tasks safely, effectively, efficiently, and enjoyably.

User! User!! User!!!

Two Crucial Errors

- Assume all users are alike
- Assume all users are like the designer



Improving Interfaces

- Know the User!
  - Physical abilities
  - Cognitive abilities *
  - Skill differences
  - Cultural diversity **
  - Personality differences
  - Motivation
  - Special needs

Cognition: the mental process or faculty of knowing, including aspects such as awareness, perception, reasoning, and judgment.

己所不欲，勿施于人

One man's meat is another man's poison.

Improving Interfaces

- Know the User!
  - Physical abilities
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Improving Interfaces

- Know the User!
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Aims of the course

- Consciousness raising
- Design Critic
- HCI foundations

Syllabus

- Introduction
- Design principles & usability principles
- Conceptualizing interaction
- Identifying needs and establishing requirements
- Prototyping
- Interaction design models
- Evaluation
- Paper reading & Project demo

Grading

- Projects (50%)
- Final Examination (35%)
- Participation (10%+5%)

Aims of the course

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- Consciousness raising
- Design Critic
- HCI foundations

Useless Designs

- Invented by the French artist Jacques Carelman for coffee, not tea.
"Coffeepot for masochists" is what he called it.
- It is quite unusable, for the handle is on the same side as the spout.
- It appears on the cover of "*The Design of Everyday Things*" (Norman, 1988) ---------- (Normal, 2013)

Useless Designs

Useless Designs

Bad Designs
-Things that don't work the way you expect

Triathlon

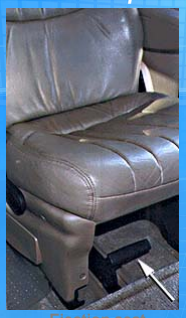
WARNING: TO MAINTAIN WATER-RESISTANCE, DO NOT PRESS ANY BUTTONS UNDER WATER

Bad Designs
-Things that get in your way

Grass grows by the inch, dies by the foot

"natural" design

Bad Designs
-Controls that have unexpected functions



Ejection seat

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Discussions: Good design or bad design

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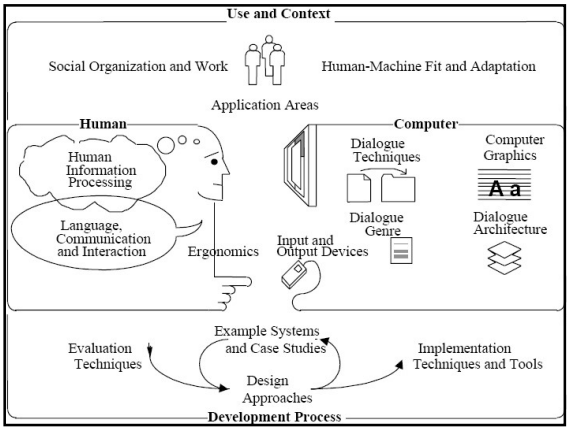

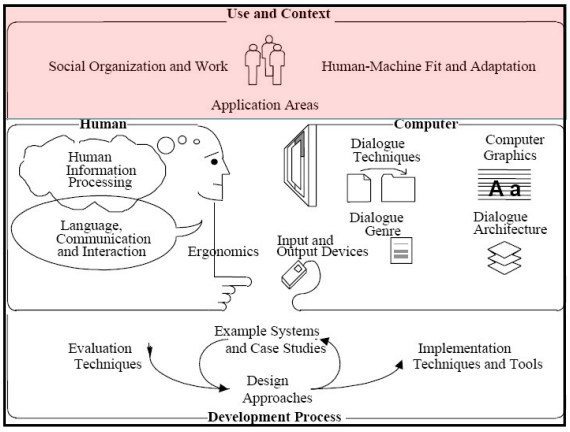

Use and Context of Computers

Problems of fitting computers, their uses, and the context of use together

- **Social organization and work**
  - humans are interacting social beings
  - considers models of human activity:
    - -- small groups, organizations, socio-technical systems
  - quality of work life
  - …

Use and Context of Computers

Problems of fitting computers, their uses, and the context of use together

- **Social organization and work**
- **Application areas**
  - characteristics of application domains, e.g. individual vs group work
  - popular styles
    - -- document production, communications, design, tutorials and help, multi-media information kiosks, continuous control (cockpits, process control), embedded systems (copiers, home appliances)

Use ar

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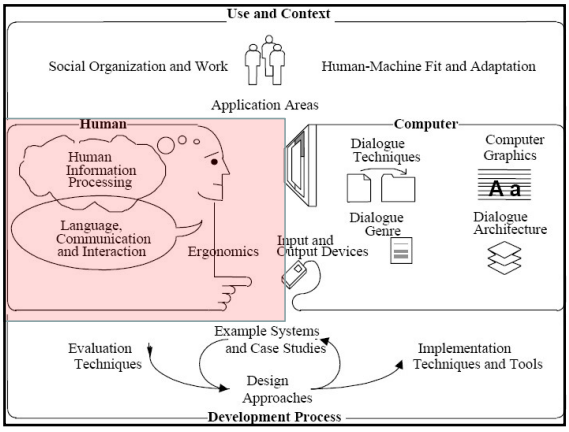


Human Characteristics

To understand the human as an information-processing system, how humans communicate, and people's physical and psychological requirements

- **Human information processing**
  - characteristics of the human as a processor of information
    - -- memory, perception, motor skills, attention, problem-solving, learning and skill acquisition, motivation, conceptual models, diversity...

Human Characteristics

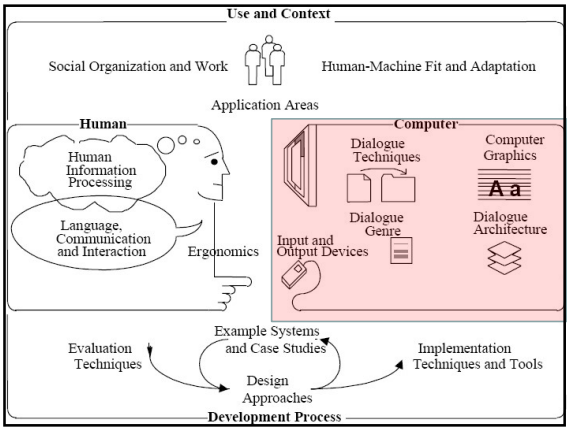
To understand the human as an information-processing system, how humans communicate, and people's physical and psychological requirements

- **Human information processing**
- **Language, communication and interaction**
  - aspects of language
    - -- syntax, semantics, pragmatics; conversational interaction, specialized languages

Human Characteristics

To understand the human as an information-processing system, how humans communicate, and people's physical and psychological requirements

- **Human information processing**
- **Language, communication and interaction**
- **Ergonomics**
  - anthropometric and physiological characteristics of people and their relationship to workspace and the environment
    - -- arrangement of displays and controls; cognitive and sensory limits; effects of display technology; fatigue and health; furniture and lighting; design for stressful and hazardous environments; design for the disabled...



Computer System and Interface Architecture

The specialized components computers have for interacting with people

- **Input and output devices**
  - -- mechanics and characteristics of particular hardware devices, performance characteristics (human and system), esoteric devices, virtual devices
- **Dialogue techniques**
  - -- the basic software architecture and techniques for interacting with humans
    - -- e.g. dialog inputs and outputs; interaction styles; issues

Computer System and Interface Architecture

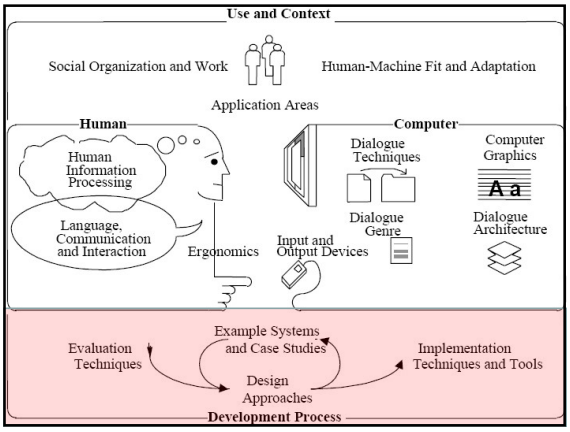
The specialized components computers have for interacting with people

- **Input and output devices**
- **Dialogue techniques**
- **Dialog genre**
  - --The conceptual uses to which the technical means are put
    - -- e.g. interaction and content metaphors, transition management, style and aesthetics
- **Computer graphics**
  - -- basic concepts from computer graphics that are especially useful to HCI

Computer System and Interface Architecture

The specialized components computers have for interacting with people

- **Input and output devices**
- **Dialogue techniques**
- **Dialog genre**
- **Computer graphics**
- **Dialogue architecture**
  - -- software architecture and standards for interfaces
    - -- e.g., screen imaging; window managers; interface toolkits; multi-user architectures, look and feel, standardization and interoperability



The Development Process

The construction and evaluation of human interfaces

- **Design approaches**
  - the process of design
    - -- e.g. graphical design basics (typography, color, etc); software engineering; task analysis; industrial design...
- **Implementation techniques and tools**
  - tactics and tools for implementation, and the relationship between design, evaluation and implementation
    - -- e.g. prototyping techniques, dialog toolkits, object-oriented methods, data representation and algorithms

The Development Process

The construction and evaluation of human interfaces

- **Design approaches**
- **Implementation techniques and tools**
- **Evaluation techniques**
  - philosophy and specific methods for evaluation
    - -- e.g. productivity, usability testing, formative and summative evaluation
- **Example systems and case studies**
  - classic designs to serve as example of interface design genres

Project Team

Thank you.