Human Computer Interaction

Lecture 1:
Objective, Overview and Outcome

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HCI - What

- The term HCI stands for **H**uman-**C**omputer **I**nteraction
  - During its early years, it was known as the man-machine studies
- Sometimes the term Computer-Human Interaction (CHI) is also used

HCI

Human: a person who tries to accomplish a goal

Computer: runs applications (software) locally *versus* remotely

first game developed on PDP (1960s)

Interaction: “dialogue” between humans and computers

The interaction between user(s) and application(s) is achieved via an interface – user interface

API (Application Programming Interface)
versus
UI (User Interface)

Types of user interfaces:

conventional (classical) UI – *e.g.*, desktop

WIMP (Window Icon Menu Pointer) paradigm interaction via keyboard & mouse + additional devices graphical representations (bitmap *vs.* vectors) support provided by the OS kernel *vs.* a desktop system multi-tasking

Types of user interfaces:

Web interface

browser – limited controls provided by (X)HTML hypertext/hypermedia RIA (Rich Internet Applications) (a)synchronous interaction based on open standards availability – world-wide audience

Types of user interfaces:

mobile user interface

limited resources/features:
display resolution, memory, I/O, power etc.,
one task *vs.* multi-tasking, off-line *vs.* on-line,
context awareness services,
different business models ▸ *app stores*

Types of user interfaces:

natural UI

New interaction paradigms + new expectations, haptic, gesture, locomotion, auditory & voice, tangible UI, augmented and virtual reality, physical computing, ambient intelligence (AmI), emotion & persuasion,…

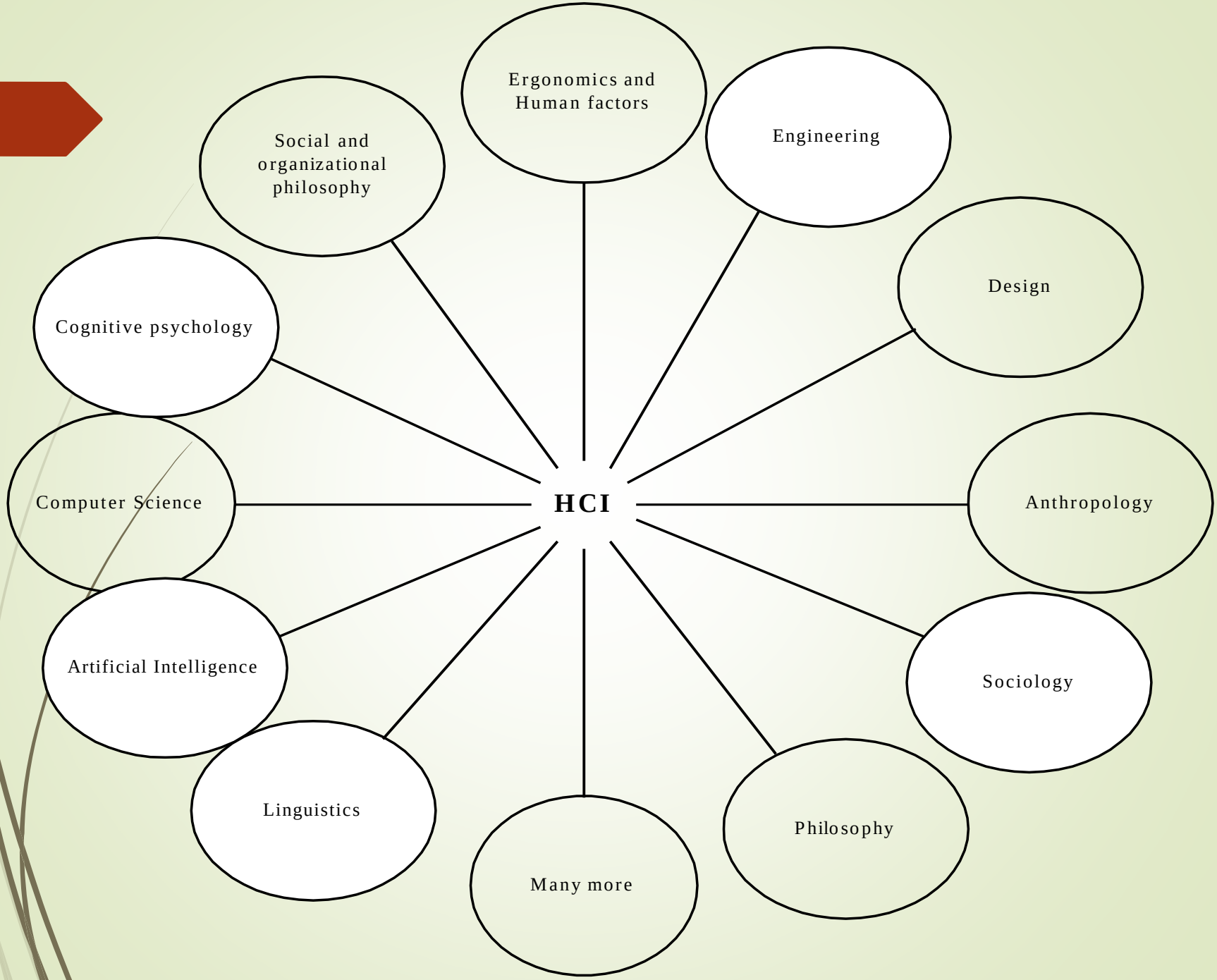
Working Definition of HCI

- Definition according to ACM SIGCHI (Association for Computing Machinery- Special Interest Group on Computer–Human Interaction)

  Human-computer interaction is a discipline concerned with the design, implementation and evaluation of interactive computing systems for human use and with the study of major phenomenon surrounding them

Nature of the Field

- HCI is interdisciplinary
  - No single discipline
- Next slide shows the various area of studies that contribute to the field


HCI
Ergonomics and Human factors
Engineering
Social and organizational philosophy
Design
Cognitive psychology
Computer Science
Anthropology
Artificial Intelligence
Sociology
Linguistics
Philosophy
Many more

HCI: Which Discipline?

- It is emerging as a special concern within several disciplines, each with different emphasis
  - Computer Science (application design and engineering of human interfaces)
  - Psychology (application of theories of cognitive processes and the empirical analysis of user behavior)

HCI: Which Discipline?

- Sociology and anthropology (interaction between technology, work and organization)
- Industrial design (interactive products such as Cell phone, Washing machine, Microwave oven etc.)
- According to ACM SIGCHI, Computer Science is the basic discipline and other disciplines serve as supporting disciplines

Course Objective

- In this course, we shall learn about the ways to design “good/user-friendly” interfaces/interaction
  - Issues to be considered
  - User-centered design approach
  - Evaluation methods
  - Ways to design and assess interactive systems.
  - Ways to reduce design time through cognitive system and task models.
  - Procedures and *heuristics* for interactive system design.

Course Overview

- In particular, we shall learn about the following
  - (Unit-1) How interactive systems are designed and evaluated in practice
  - (Unit-2) How to reduce design time and effort through the use of cognitive, system and task models
  - (Unit-3) Guidelines and heuristics for interactive system design
  - (Unit-4) How to collect and analyze empirical data to take design decisions
  - (Unit-5) How to model a user task and analyze it using different task modelling techniques
  - (Unit-6) How task can be implemented using Cognitive architecture and Some case studies and introduction to object oriented programming

Course outcomes of Human Computer Interaction

Course Outcomes
CO1: Students will be able to understand what interaction design is, describe various historic HCI paradigm, what is the difference between good and poor design, describe the usability of product, then describe who is involved in the process of interaction design. How to characterize the user experience in terms of usability, learn basics of GUI design and understand prototyping techniques.
CO2: Students will be able to understand the GOMS family of models and how we use this model to build and evaluate the application.
CO3: Students will be able to understand the universal design principles to designing HCI systems, different factors required to design an interface by following certain rules, standards and guidelines also the techniques that are used to collect and analyze the data on or off field.
CO4: Students will be able to understand the different methods of empirical research, what are the research question formulation techniques, how to design experiment and perform data analysis.
CO5: Student will be able to understand how to model a user task and analyze it using different task modelling techniques and also design a dialog between user and system using Finite state machine.
CO6: Students will be able to understand how different user and system task can be accomplish using cognitive models, describe importance of cognitive architecture , describe the model human processor and its subtypes, describe the concept of oops and why do we use OOM for user interface design.