Human Computer Interaction - An Overview

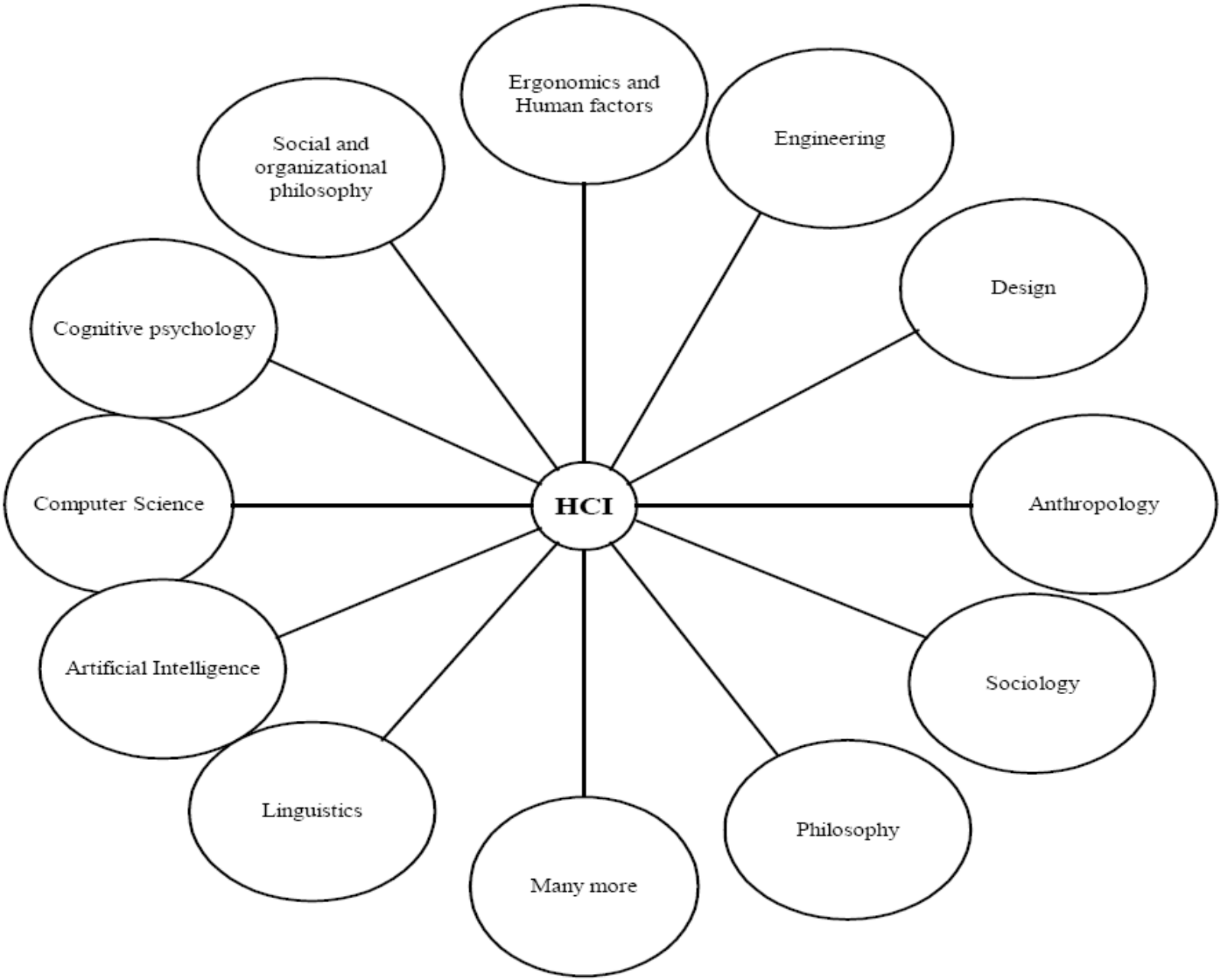
Professor Ram Mohana Reddy Guddeti
Information Technology Department
NITK Surathkal, Mangalore, India

Overview of HCI

- HCI stands for **Human-Computer Interaction, earlier it was known as the man-machine studies**
- Sometimes Computer-Human Interaction (CHI) is used
- HCI Definition as per ACM SIGCHI: Human Computer Interaction (HCI) is a discipline deals with the Design, Implementation & Evaluation of Interactive Computing Systems for Effective Use by Humans and with the study of major phenomenon surrounding them

Interdisciplinary Nature of HCI

- HCI is an interdisciplinary and multidisciplinary area that deals with several disciplines, each with different emphasis
- Computer Science & Engineering and Information Technology (Application Design and Engineering of Human Interfaces)
- Psychology (Application of Theories of Cognitive Processes and the Empirical Analysis of User Behaviour)
- Sociology and Anthropology (Interaction between Technology, Work and Organization)
- Industrial Design (Interactive products such as Airport's Self-Service Check-In Kiosk, Automated Teller Machine, Bank Passbook Printing Kiosk, Cell Phone (Smartphone), Microwave Oven, Smart TV, Vending Machine, Washing Machine, etc.)


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

Computer (Oxford English dictionary)

- Computer – It is an electronic device (system) which is capable of receiving information (data) in a particular form and of performing a sequence of operations in accordance with a predetermined but variable set of procedural instructions (program) to produce a result in the form of information or signals

- Computing – The use or operation of computers

Examples of Computing Systems

- Desktop, Laptop and Tablet PCs
- Smartphones
- Wearable Digital Pedometer
- Microwave Oven
- Touch Operated Smart TV (Internet TV)
- Automatic Ticket Vending Machine
- Automatic Coffee/Tea/Beverages Vending Machine
- Automatic Snacks Vending Machine
- Airport's Self-Service Check-In Kiosk
- Automated Teller Machine
- Bank Passbook Printing Kiosk
- Washing Machine etc.

User-Centric Design of Computing Systems

- It should be noted that the computing systems mentioned in the previous slide are not some specialized equipment to be used by the experts in a specialized environment; but these are meant for a very large group of people, majority of these people do not (and need not) have technical domain knowledge of these electronic gadgets

- The questions are: "How to Build the Product (Electronic Computing Systems) for a Very Large Group of People"

- "How Can We Design these Products such that the Users of the Product find those Easy to Use?"

User-Centric Design: Definition

- User-Centric Design (UCD) - It is defined as the "Process to Design an Electronic Product, which satisfies the definition of a Computing System, in which the Users' Needs and Expectations are taken care of, while considering the Users' Characteristics and their Background"

- Three Key Elements of User-Centric Design are:
  - (i) Design of Interactive Electronic Products that Satisfies the Definition of a Computing System
  - (ii) The Products are to be used by the Users (need not be Technology Experts i.e. Non-experts)
  - (iii) The Design Process takes care of the users' needs and expectations, by considering the users' characteristics and their background, so as to make the product "Easy to Use"

User-Centric Computing

- User-Centric Computing refers to the Computation of User Interface (UI) Layout and Transitions, by taking the Human Behaviour and Cognition into account
- Similarly the emphasis should be on the design rather than the computation; however computation gives us much more power in terms of saving the design time and effort as well as creating an "Adaptive Interface"
- User-Centric Product: Four Key Aspects of the Design
  - Design Elements that are Acceptable to the Users,
  - Design Layouts that meet the Users' Expectations,
  - Helps the User to Perceive the "System State",
  - Design Interaction that fulfils the Users' needs, while considering their desired 'System States' into account