**HCI with Software Engineering**

Introduce the Topic

* What is it
  + HCI (human computer interaction) is the study of how people interact with computers and to what extent computers are or are not developed for successful interactions with human beings
  + A user interface is how human interacts with a computer, and HCI goes beyond designing screens and menus that are easier to use and studies the reasoning behind building specific functionality into computers and the long term effects that systems will have on humans
* Many computer users today would argue that computer makers are still not paying enough attention to making their products “user-friendly”
  + However, computer system developers might argue that computers are extremely complex products to design and make and that the demand for the services that computers can provide has always outdriven the demand for ease of use
* Is a very broad discipline that encompasses different specialties with different concerns regarding computer developer:
  + computer science is concerned with the application design and engineering of the human interfaces
  + sociology and anthropology are concerned with the interactions between technology, work and organization and the way that human systems and technical systems mutually adapt to each other
  + ergonomics is concerned with the safety of computer systems and the safe limits of human cognition and sensation
  + psychology is concerned with the cognitive processes of humans and the behavior of users
  + linguistics is concerned with the development of human and machine languages and the relationship between the two
* as computers become more and pervasive in culture, designers are increasingly looking to ways to make interfacing with devices easier, safer and more efficient

History

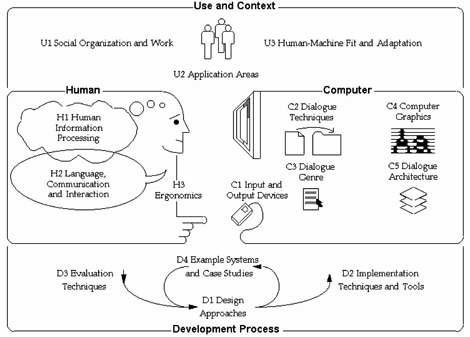
* HCI arose as a field from intertwined roots in computer graphics, operating systems, human factors, ergonomics, industrial engineering, cognitive psychology and the systems part of computer science
* Computer graphics was born from the use of CRT and pen devices very early in the history of computers
  + This led to the development of several HCI techniques
* Out of this line of development came a number of important building blocks for HCI
  + Some of these building blocks include the mouse, bitmapped displays, personal computers, windows, the desktop metaphor, and point and click editors

Present details about it (including code and non code based examples)

Provide Pointers to additional material on the topic for interested readers

Example of HCI

* developing a prototype of an interface that is evaluated and then rebuilt and reassessed iteratively until the final interface has been designed
* the user is seen as being integral to this process
* many issues are highly debated such as: methods that are most effective or economical, the point at which these methods should be applied or the value of prescribing a methodology at all
* Three major design approaches within HCI
  + User centered design
  + Cognitive modeling
  + Participatory design



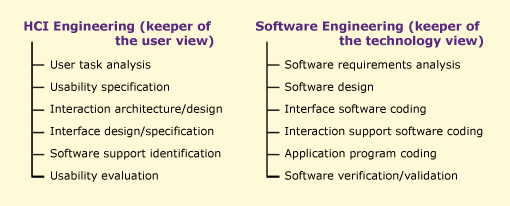
* Interaction between users and computes occurs at the user interface, which includes both software and hardware
* Figure shows how the humans interact with the computers
  + From computer science perspective, the focus is on interaction and specifically on interaction between one or more humans and one or more computational machines
  + The classical situation that comes to minds is a person using an interactive graphics program on a workstation
  + Because HCI studies human and a machine in communication, it draws from supporting knowledge on both the machine and the human side
  + On the machine side, techniques in computer graphics, operating systems, programming languages, and development environments are relevant
  + O the human side, communication theory, graphic and industrial design disciplines, linguistics, social science, cognitive psychology, and human performance are relevant
  + Of course, engineering and design methods are relevant

Why should software developers care about this topic?

* Software engineering must work together with HCI to produce a product
  + methodologies should reveal the relevant points of contact between the disciplines
* Methodologies produced by the two disciplines vary greatly in their effectiveness in providing direction for combining methods (or techniques) from both disciplines
* HCI is seen as useful for the development of the software requirements
* Software Engineering, Usability and Programming Languages is a multi-perspective group focusing on a single problem: how to help people develop software that is effective and accurate
* Interaction with human beings is increasingly recognized and promoted as an important aspect of software systems and products
* More and more professionals in the computing industry call for integrating HCI engineering with software engineering

Other information

* Engineering Development Life – cycle with Added HCI Practitioners and Specialists
  + Task analysis, user modeling, formal interface specifications, dialogue design tools, formal evaluation techniques and standards for documents are used to produce useful interactive software
* The waterfall approach will not work for the development of user interfaces since a user interface can’t be specified without repeated testing with users
* An experimental approach is necessary because there is not a sufficiently firm theory of human cognition and behavior from which a theoretically based interface design could be constructed



References

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