Human Computer Interaction and Usability

Human Computer Interaction (HCI) aims at making data exchange between people and machines less stressful and less prone to misunderstandings, and thus increasing efficiency of tasks that involve both: The human and the computer.

HCI research leads to a formalization of usability that is systematically enhanced and empirically supported. Moreover, from the scientific approach evolves a variety of tools and techniques that help in developing "better" interfaces. These are often suitable for immediate application in commercial software engineering, where usability should actually be regarded as a crucial factor. As a matter of fact, the very beginnings of the science of HCI were immediately application driven.

Though the goal of HCI is to improve the machines or more precisely their user interfaces, HCI research is centred on the human beings: It's the humans' characteristic physiology and psychology that provides input for the improvement of the machine's user interfaces.

While shared characteristics of human beings provide a fundamental basis for the design of usable interfaces, the recognition of inter-individual differences is important as well.

Not only human capabilities have their limits; the design of a proper user-machine interface requires comprehensive knowledge about the underlying technologies as well. For HCI, interface devices and interaction styles are of basic interest.

The science of HCI clearly aims at improving conditions and outcomes of computer related human work. This is a quite practical goal, but the way there involves broad scientific efforts. Roughly speaking, HCI scientists engage in three areas of research: Investigation on the human being as such, revelation and specification of problems inherent with today's interfaces, and the realization and evaluation of "visions" which often means breaking with traditional interaction styles and inventing new interaction devices.

Usability is a quality attribute that assesses how easy user interfaces are to be used. The word "usability" also refers to methods for improving ease-of-use during the design process.

When the meaning of usability is put into practical terms, it becomes easy to actually measure usability. To finally realize these principles, HCI research and application has developed a whole range of tools and techniques that support usability engineering.

We must create new techniques and use powerful, new technologies to significantly augment the skills that are necessary to convert data into information and to transform information into knowledge.

The aim of HCI research should be to understand the principles that are necessary for transparent interaction. What is it that allows users to conveniently and appropriately describe what they want to achieve with computer artefacts rather than having, or forcing them to structure, a solution within a given framework? HCI research should probably confront human-human communication as the first order approximation of information transfer, and study that. As development makes HCI more seamless with human-human interaction, success will be assured because interaction will then be transparent in the hand of the user, allowing the user to focus complete attention on the tasks at hand.

Even now, there is a tremendous diversity of problems that require HCI as an indispensable and generic component of their solutions. Challenges that exist include finding an abstract common user interface standard that provides reusable, generic interactivity and does so with little or no new learning across a seamless and transparent interface.

An overview of the knowledge of psychology applicable in HCI and the ability to design interactive software systems with regard to the psychological characteristics of the use will be presented.

In the lecture we will discuss also some problems of HCI development. Usability quality components will be presented and debate.

Practical examples of development and testing HCI for special groups like seniors or blind and visually impaired will be presented.