Developments

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Introduction

User-Centred Design (UCD) investigates design principles for people responsible for developing interactive software solutions. It places a special emphasis on the need to develop software that is usable, i.e., effective, efficient, and satisfying to use. It has been suggested that the way to achieve these qualities is to adopt a user-centred approach to software design and development. This approach normally involves a number of key activities throughout the development of the software, such as: involving users, obtaining their feedback on the design and use of the system, providing prototypes for users to try out, and, eventually, re-designing in the light of user feedback and comments. The benefits of this approach include increased productivity, enhanced quality of work, reductions in support and training costs, and improved user health and safety. Adopting a UCD process leads to more usable systems and products.

Due to the retirement of Prof. F.L. van Nes (programme manager IAP), Prof. D.G. Bouwhuis left UCD and took over the programme manager position of IAP. The whole UCD group would like to thank Prof. Bouwhuis very much for all his efforts and valuable contributions to keep UCD going. Since September 2000, Prof. Rauterberg has returned to his original position as the UCD programme manager.

Looking back on 2000, the following most relevant activities took place: (1) A new assistant professor, Panos Markopoulos, was recruited; (2) Paul de Greef started projects in the context of the ‘Token 2000’ research programme; (3) Mathilde Bekker started establishing and running a new laboratory infrastructure: the KidLab; and (4) Panos Markopoulos and Matthias Rauterberg will establish another new laboratory infrastructure: the LivingLab.

Projects

Co-presence

Panos Markopoulos has worked on re-defining the concept of co-presence as an affective benefit for users of telecommunication services. Currently, he is involved in a field study of the needs of users from tele-visit services.

LivingLab

Panos Markopoulos worked together with Matthias Rauterberg on proposing a concept and a research programme for a new laboratory infrastructure: the LivingLab. The results are summarized in the white paper in this APR (see page 53). As a practical application, Panos Markopoulos collaborated with Marima Vroubel and Mathilde Bekker in designing, developing, and testing FRIDGE: a prototype of a family messaging appliance that illustrates the concept of ‘information appliances’ as these are discussed by Norman for ex-
ample. This extends the work on the Visual Interaction Platform (VIP) by Wieger Wesselink and Paul de Greef.

**Extending the Unified Modelling Language (UML)**
The applicability of the UML for use by interdisciplinary teams involving designers was studied analytically. Several problems and needs of interaction designers have been identified, and an abstract syntax for extensions to the notation for task modelling that are consistent with its meta-model have been proposed. Further extensions are being investigated.

**Speech-based interfaces**
In collaboration with Leo Vogten (SLI) Mathilde Bekker investigated multi-user and multi-appliance issues of spoken language interfaces for Philips. They also did a further analysis of users’ recovery strategies when confronted with speech-recognition errors.

**Token 2000**
Mathilde Bekker collaborated with Ina Klein Teeselink and Paul de Greef in the Token 2000 project on a study to gather user requirements for a database with information of the Rijksmuseum in Amsterdam.

**KidLab**
Mathilde Bekker started up research on designing technology for children, including studies on adapting and applying UCD techniques to user requirements, gathering and evaluation phases of design.

**Usability design guide**
Mathilde Bekker, Ruud Janssen, Arnout Fischer and Prof. van Nes carried out a contract research project for Toolex Inc., (1) evaluating interfaces of two of their production machines, and (2) developing design guidelines for future implementation.

**Compositional usability**
Architectures for user-system interaction describe how user interfaces can be constructed in a modular way. Elementary interaction components form the basis for complex interaction components. These compounded interaction components are used to create even higher-level interaction components, on top of which eventually an entire user interface can be built. One of the architectures for user-system interaction is the Layered Protocol (LP) framework. Within the LP framework, interaction components (called ‘protocols’ in LP), are small user interfaces in their own right. LP recursively builds more abstract user interfaces on top of smaller-scale interfaces of a more physical nature. In LP, interaction protocols have a high level of independence. Lower-level protocols can be freely exchanged for other lower-level protocols, as long as they provide the same support for the higher-level protocols. The aim of this project is to study the usability of the constituent components of the interface separately, and to assess their contribution to the usability of the total interface. More specifically, the aim is (i) to develop observational evaluation techniques for measuring effectiveness, efficiency, and learnability of interaction components at various levels of abstraction in the interaction process; (ii) to determine how the usability of higher-level interaction components is influenced by the usability of their supporting lower-level interaction components and vice versa.
User acceptance of the electronic payment systems in e-commerce

The constant development of the electronic commerce in recent years makes the issue of how to pay for goods and services over open networks very important. The problem is that conventional ways of paying for goods and services do not work properly over the Internet. The problems of the electronic payment systems that we are facing at the present moment can be described as a failure to meet user requirements and needs in design and introduction of the systems. This results in user-unfriendliness and inefficiency of the existing and coming payment systems. In the design of electronic payment systems, not only the technological but also the user-related factors should be taken into account. The aim of this PhD project is to obtain and develop scientific and validated design knowledge for payment systems in an e-commerce environment. Therefore, this project will investigate factors that influence user acceptance of electronic payment systems for the mass customer.