Seminar Title: **A Systematic Approach to Building "User-Friendly" Software**
Presenter: Matt Boardman, B00068260

ABSTRACT

Research Approach

This seminar shows the work of Daniela Fogli and Antonio Piccinno [5] to create a "Software Shaping Workshop" (SSW) methodology for user interface design. Two cases studies are presented: the first from industrial manufacturing [5], and the second from medical sciences [3] by the same authors with Maria Francesca Constabile and Piero Mussio.

Introduction

The field of Human-Computer Interaction (HCI) explores the interactions of humans and computers through software and hardware interfaces, such as a Graphical User Interface (GUI) [5]. Human beings often become frustrated with computers: for example when software behaves intrusively, or when processes are complicated enough to break a user's concentration or train of thought [5]. Proper user interface design can alleviate these negative emotions. Involving expert users on an advisory level is sometimes practiced in the industry, one example of this is AutoCAD™ drafting software by Autodesk, Inc. [1], which has customized packages available for civil, electrical or mechanical engineers and architects. However, since domain experts are, by definition, expert representatives of the target user community and have an in-depth knowledge of the terminology and rules of the problem domain, they can also be employed as active participants in the design process [5].

Software Shaping Workshop Methodology

The SSW methodology takes its name from the "shaping" or creation of "workshops," such as might be employed by an artisan or blacksmith [5]. SSW is a hierarchical approach to software design, where software designers create application building-blocks and a user interface that allows experts in the particular problem domain to create user interfaces for end-users [3, 5]. This approach is referred to as "meta-design" in relevant literature [e.g. 2, 3, 4, 5], and results in a collaborative network of workshops (see e.g. Figure 1). The notation and terminology of the end-user is employed in the finished application, and different views of the same data and processes are available to facilitate collaboration between groups of users [3]. The approach encourages reusability, since the interfaces are created from components designed by the software development team [5]. By limiting user options to those required to perform specific tasks, the learning curve for these "light" applications [3] is gentle and avoids big jumps in complexity as users' needs evolve [5]. Finally, by employing simple design techniques such as

drag-and-drop, the domain experts have no need to learn programming skills [5].

Results

The ETA Consulting group creates industrial manufacturing software for factory automation [5]. As a case study, the SSW approach was adopted through the addition of a mechanical engineer, a domain expert in the area of factory automation but not in software design. A software interface was developed by software engineers to allow the mechanical engineer to create user interfaces for assembly line workers by integrating pre-built components through simple drag-and-drop actions.

A second case study considered medical practitioners collaborating on a chest x-ray [3]. Using the SSW approach, radiologists (experts in x-ray analysis) and pneumologists (experts in diagnosing pneumonia) worked with HCI experts and software design experts to create two "light" applications tailored to either a radiologist or a pneumologist. In this scenario, a radiologist examines a patient's chest x-ray and finds a suspicious area of pleural effusion which may indicate pneumonia. The area is circled using a pen tool and annotated with a text note. The pneumologist is then alerted, reviews the notes from the radiologist, and performs a diagnosis.

Conclusions

The SSW methodology allows expert users to become active participants in the software design process, by employing naturally applicable terminology and contexts to the specific application [5]. The approach facilitates precise, technical communication between users, domain experts and software developers, and has been studied in industrial manufacturing [5], medicine [3] and earth sciences [2].

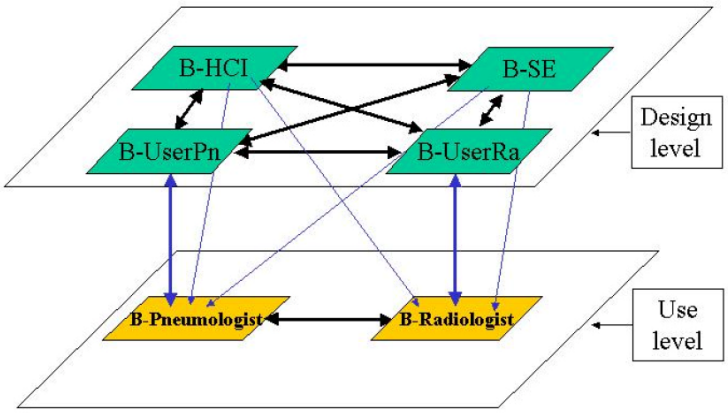

Figure 1: From [3], a case study in the field of medicine where radiologists and pneumologists collaborate to create "light" applications specific to the particular domain expert. This figure shows the interaction between experts as a "network of workshops," in which each workshop is a tailored user interface specific to a particular user group.

References

[1] Autodesk, Inc., "Products," 2005, [http://usa.autodesk.com].

[2] P. Carrara, D. Fogli, G. Fresta, P. Mussio, "Toward overcoming culture, skill an situation hurdles in human-computer interaction," Universal Access in the Information Society, 1(4), 2002, pp. 288-304.

[3] M.F. Costabile, D. Fogli, P. Mussio, A. Piccinno, "End-user development: the software shaping workshop approach," In: H. Lieberman, F. Paternò, V. Wulf (Eds.), End User Development – Empowering People to Flexibly Employ Advanced Information and Communication Technology, Kluwer Academic Publishers, 2004 (in press).

[4] G. Fischer, "Beyond 'Couch Potatoes': From Consumers to Designers and Active Contributors," First Monday, 7(12), 2002, [http://firstmonday.org/issues/issue7_12].

[5] D. Fogli, A. Piccinno, "Environments to support context and emotion-aware visual interaction," Journal of Visual Languages and Computing, 16(5), 2005, pp. 386-405.

[6] Maplesoft (Waterloo Maple Inc.), "Maple" Software, 2004. Maple example modified from: Department of Mathematics, "Maple Examples," University of Utah, 1995, [http://www.math.utah.edu/lab/ms/maple].

[7] Melbourne PC User Group, Image of duck with computer (Unknown original source), 2005 [http://groups.melbpc.org.au/~berwick].

[8] Microsoft Inc., "Microsoft Office 2003" Software, 2003.

[9] W. Shakespeare, "The Tragedy of Hamlet – Prince of Denmark," Washington Square Press, 1623/1992. Image of Shakespeare: Drama Libraries, University of Washington, [http://www.lib.washington.edu/subject/Drama/shakespeare.html].

[10] SSi Robotics, Image of Industrial Robot, 2005, [http://www.ssirobotics.com].