Human computer interaction with mobile devices

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http://www.dcs.gla.ac.uk/mobile99/

The second international workshop on human-computer interaction with mobile devices took place on 30th August, 1999 as part of the IFIP INTERACT '99 conference held in Edinburgh, UK. We had over 60 participants with an almost equal mix between academic and industrial attendees from within Europe, North America and Asia.

The first workshop had been held in Glasgow the year before and was one of the first to bring together researchers interested in how to design usable interfaces for mobile computers. It was such a success that we decided to run another – this was obviously an area where there were many problems and many people looking for solutions.

The growth of the mobile computing market is rapid. The take-up of mobile telephones and personal digital assistants has been dramatic – huge numbers of people now own a mobile device of some kind. But there are still big problems with usability – it is hard to design interfaces and interactions with devices that have small or no screens and limited computing resources. This is becoming worse as more and more complexity is being integrated into these small devices.

In some ways, designing for mobile devices is like turning back the clock on computing. We are back in a time of small screens (often black and white), slow processors and slow network connections. These problems have all been solved for desktop computers but the same solutions cannot be easily applied to mobile devices – people are not going to carry around large screens and power-hungry processors. We have to come up with new solutions that will allow us to get information into and out of our devices more easily and in a wide range of different situations. This is what the workshop was all about.

We had twenty-five submissions to the workshop and had to restrict this to eleven papers and six posters for the actual day. Authors of accepted submissions were then allowed to re-submit for inclusion in this special issue so that we have thirteen of the papers and posters here.

The topics covered are broad. Several papers look at the design of mobile products and the use of mobile computers in real situations. Brown, Sellen and O'Hara focus on the capture of requirements for a hand-held scanner called CapShare. Hjelmeroos, Ketola and Räihä consider the design issues faced by the creators of the Nokia 9000 Web browser, and particularly the problems of consistency that made the design difficult. McManus discusses the problems of using mobile technology if insufficient care is taken to ensure that the devices are suitable for the users, tasks and contexts. Eldridge, Lammming *et al.* show an alternative, positive view as they describe the design process of their Satchel system which went to great lengths in involving users, their tasks and contexts of use in the design. Koskinen discusses the differences in use of Email and the Short Message Service (SMS) available on GSM mobile phones. Although the two methods of communicating have many similarities, what they are used for differs.

Several papers deal with the problems of input and output on mobile devices. Goldstein, Chincholle and Backström present innovative solutions for the restrictions on input in mobile devices by using an instrumented glove that allows typing without a keyboard. Dunlop and Crossan stay with the standard keypad on a mobile telephone but add a predictive text-entry system that significantly reduces the number of key-presses needed to enter words. To overcome the limitations of screen size Walker and Brewster show how non-speech sound presented in three-dimensions can be used for output on mobiles. Their sonic progress bar that moves around the user's head requires no screen space at all - freeing space for important visual information.

Computing systems in cars are becoming more common and there are two papers investigating the particular issues this raises. Graham and Carter examine the use of speech input versus manual control for the operation of in-car devices such as telephones and entertainment systems. Koppinen compares a range of in-car interface designs, using different screen sizes, distances from the user and buttons, to assess their effectiveness.

Finally, three papers look at architectural issues to support the use of mobile devices. Dix, Ramduny *et al.* focus on architectural solutions to the problems of network delay that can occur when using mobiles on the move. Rist looks at how to support users working together on collaborative tasks using a range of heterogeneous devices – from PDAs and mobile telephones to desktop workstations. One way this can be facilitated is by an architecture that can tailor the information displayed to suit the device – the Magic Lounge system. Schmidt shows that by designing devices which

know about their context, interaction can be improved. He presents the ContextNotePad system that can, for example, turn the device on when the user is holding it and change font size if the device is moving.

The wide range of topics covered really shows that this is an area of research where there are many interesting problems. The limitations caused by small screens make designing interfaces hard and the multiple contexts of use make it difficult to know what people will want to do with their devices. The workshop generated lots of discussion and ideas towards solutions to both of these problems.

Steve and Mark