Proposal for Ph.D. General Examinations

Stefan Marti
Speech Interface Group
May 2001

Introduction

In the past, the physical size and—as a consequence—the user interface design of mobile communication devices was often limited by the underlying hardware and network technology. However, ongoing component miniaturization and pervasiveness of wireless network infrastructure will allow for smaller and smaller devices, freeing designers from conventional form factors like telephone handsets. Mobile telecommunication devices of the future could have the size of a finger ring or an earring. What would be the most natural and comfortable ways for humans to communicate through such devices? Classical user interface paradigms like desktop GUIs cannot be applied to such small devices anymore. Would mobile multi-modal interfaces using speech and gesture be more appropriate?

I believe that future mobile communication devices will not only become small, but also more context sensitive, intelligent, and even autonomous. Therefore, humans will interact more with autonomous non-human entities, which can include both software and robotic agents. These systems will act on behalf of the user, serving her communication needs as well as assisting in everyday activities and professional tasks. In interacting with such agents, how much autonomous behavior do humans accept? What level of control do they need in order to feel comfortable? I believe that the level of autonomy has to be adjusted dynamically. Furthermore, such entities will have to be context sensitive to function autonomously. The most universal kind of context sensitivity may be the ability to apply common sense reasoning, but could common sense reasoning capabilities make user interfaces and the underlying autonomous agents more intelligent?

The main area of this examination will be about **User Interface Design for Small Mobile Communication Devices**. The context area will cover issues of **Human Interaction with Autonomous Entities**, and the technical area will be about **Common Sense Reasoning and Intelligent User Interfaces.**