Fraunhofer Institut
Integrierte Publikations- und Informationssysteme

INVITE

Intuitive Human-Technology Interaction for the Interlaced Information World of the Future

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Goal

IPSI's aim is to help users cope with the growing amount of information in today's knowledge-based society. Particularly in the context of mobile applications, it turns out that human computer interaction is a focal point, as users demand that mobile devices must, to an even higher degree than stationary devices, be easy to use, with an intuitive and efficient user interface. Therefore our research is concerned with the issue of how to enable users to work with mobile devices in a simple and easy-to-learn fashion.
In the INVITE project, information is presented in an intuitive way, interaction becomes multimodal, and active intelligent support functionality greatly increases the attractiveness of user interfaces. INVITE provides several demonstrators that foster creative processes including, as a particular example, support for customer consultation in online banking. This is achieved through an intuitive interface offered to users that mimics the personal face-to-face atmosphere of traditional bank consultation appointments. With this and other applications we always aim at providing a solution that fits the expectations of mobile users, i.e. its system requirements must be appropriate to mobile devices, and it must address specific needs of mobile users. In INVITE, we have selected 3D facial models for user interaction as a particular focal point of our project work.
IPSIS's MOBILE division provides to the INVITE project a set of instruments for creating 3D animated cartoon sequences. In particular, we have developed a virtual reality based system for the creation of facial expressions. The API of this system allows a variety of applications to handle instances of an animated 3D cartoon-like VRML face model, and it includes functions for rather complex expressions. It is implemented in such a way that even designers (i.e. non-programmers) can easily create expressions such as joy or anger. Emotion patterns can easily be reused for other faces without programming skills. Our system is designed to be used primarily by designers, and not only by specialized programmers.
A central research contribution of IPSI is an algorithm that makes it possible to overlay mouth expressions with one or more simultaneous emotions, thus various such combinations may be stored in an expression library. Extending this approach, we have developed an "algebra" of facial expressions allowing us to combine several expressions and obtain new ones. Building on this still image algebra research, we have developed expression algebra operators for animations.
The interactive work environment for motion control is object oriented, i.e. each part of the face such as nose, eye or lip may be controlled individually. Manipulation, control, and synchronization of objects are handled by a simple programming interface that allows for direct access to the MPEG-4 facial animation parameters (FAPs) of the VRML model. This is in line with our general approach to follow, where possible, established standards in order to extend our solutions' scope of applicability.
During the course of our INVITE work, we repeatedly received reassurance of the essential role that human machine interaction plays in mobile information systems. Towards the conclusion of the project, we have embedded our results in a web dialogue application.

Partners

The INVITE Consortium is formed by 19 German partners, including BMW, Mini, DZ Bank, cenit, empolis, heiler software, IDS Scheer, infoman, ISA, linguatec, UID, SCHEMA, STRATOS Software, University of Dortmund, OFFIS, iaw, FAW, Fraunhofer IAO and Fraunhofer IPSI.

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