Magic Lounge: A Virtual Communication Space with a Structured Memory

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Networked computers, especially the advent of the Internet and rapidly growing range of mobile communication and computing devices, have made new forms of social interaction possible. Presupposing access to the world's information highways, people from all-over the globe can virtually come together somewhere in the so-called *Cyberspace*. The motivations for entering a virtual space can be as diverse as the interests of the participants. Some may join to chat, make new acquaintances or carry out joint and goal-directed activities.

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Others may engage in exchanging and sharing ideas, experience and knowledge on matters relating to their professions or hobbies. Yet others may share common cultural or political interests and even use *virtual meeting places* as arenas of civil discourse. Furthermore, new communities can emerge much more easily because people are no longer required to live in the same geographical neighbourhood.

Virtual meeting spaces represent a major step beyond the classical computer-user relationship. Rather than having a *single user interact with the machine*, the *computer-mediated user-user interaction* is becoming a new paradigm. Communicating through computers enables new services which facilitate taking part in cyberspace conversations, as well as assisting the participants in keeping trace of the communicative actions performed during conversations. We use the term *virtual meeting space* in a broad sense and consider that such spaces may simultaneously integrate traditional human-computer interaction processes (for instance, database or Web access) and also be related to what could be called a whole *group story* made of synchronous and asynchronous interactions.

Our working background is a European project called Magic Lounge[*] in which participatory design studies and sociological studies have been carried out. In Magic Lounge we are especially interested in the way how ordinary people use current technology, such as chat and audio conferencing, and we try to identify key concepts, services and functions that may drive the development of the next generation of computer-mediated communication systems. Among such concepts and functions are 1) a structured meeting memory, 2) a temporal meeting browser, and 3) the possibility to access the meeting place through heterogeneous communication devices. User needs regarding such services have been studied through questionnaires and tests with prototypical implementations. To demonstrate how the new services may be used in every-day scenarios, the project stand is divided into several zones: »at home", »on the street", and »at the beach". The following subsections provide an overview of the key concepts that have been identified and will be demonstrated in the exhibition space.

Virtual meeting places that can remember

Study of the current teleconferencing and groupware systems, as well as our own participatory design work with ordinary users have revealed a strong need for a structured memory. Our hypothesis is that a variety of added-value communication services can emerge from a system's capability to memorise information units that have been obtained from observing how people communicate and interact which each other in a virtual meeting place. While most of today's collaborative systems consist of a set of loosely coupled communication tools (audio/video conferencing tools, textual chat, shared white boards, and shared special-purpose tools, e.g. for voting or collaborative web-browsing) we suggest an architecture that is centered around the concept of a conversation memory that will keep track of all communication acts regardless of the media-specific tools that are used for communication, and that can be queried by newcomers or latecomers who want to know what has happened in a meeting so far. The conception of the Magic Lounge memory component foresees the recording of spoken and typed utterances as well as other interaction events, such as the mutual exchange of references to electronic documents, which may be part of the virtual meeting environment. The conception also comprises a set of different user interfaces

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for accessing the memory content from specific points of view and by means of different communication devices. In particular, a 'temporal meeting browser' allows users to navigate back and forth through recorded meetings and inspect individual contributions in a non-linear manner. Hence, a Magic Lounge recorded meeting is a structured collection of different types of contribution (such as audio chat, speech turn, textual chat, and log information) which should allow the user to mentally reconstruct the whole meeting including its meaning, dynamics and progress. A contribution to a meeting can indeed be any action by the users or the system itself.

Beyond the mere exchange of messages and data

An important insight was that a structured communication framework would be needed for the realization of many of the envisaged memory and communication support functions. The consortium adopted a framework that is based on the notion of referable objects (in the sense of objects to which one can refer to), communicative-acts and conversations. Essentially, communicative acts denote activities, such as exchanging audio or chat messages among the communication partners. By treating the communication acts as referable objects, it is possible to reconstruct the flow of activity between all the clients (humans and system components) at a higher level of abstraction, and to reveal the various relations that may exist between the single acts.

Getting the mobile users in

The increasing quest for mobility together with a large variety of new portable computing and communication devices - including PDA's, palmtop, and mobile phones with build-in micro computers - add another level of complexity to systems which are to support tele-communication and collaborative work. This is due to the fact that the devices used by different people may not have the same input and output capabilities. Limited screen real estate, lack of high resolution and colors, no support for audio and video are among the typical restrictions on the output site, whereas restrictions on the input site may be due to miniaturized keyboards and GUI widgets, tiny physical control elements, or sparse capabilities for the capture and recognition of gesture, voice and video input. The new generation of mobiles with built-in Internet connection will create a high demand for a technology that allows to enter virtual meeting places and to access existing information sources and applications in a user-friendly way. The Magic Lounge platform for hosting virtual meetings allows entering a meeting using heterogeneous communication devices, such as PCs, PDAs, and also mobile phones. Our technology for the automated design of information presentations allows flexible tailoring of both content and layout of WML pages in a way that suits the display restrictions of the target devices.

A user-centred design

Design and development of the Magic Lounge is based on user-centred design methodology. A selected group of users from a number of smaller Danish islands have been involved with the various aspects of the Magic Lounge design and development. The user participation has been through administering questionnaires, conducting workshops, interviews, and the use of the software prototypes. Besides this main Danish user group, other groups have also been utilised for testing specific aspects of the Magic Lounge software, or collecting users ideas for the design of specific system components, such as the Magic Lounge memory.

An architecture based on standards

Many of the current collaborative systems use proprietary solutions for their architecture which make modifications or extensions difficult. In Magic Lounge, we have decided that, when it was possible and available, our architecture would be based on standards. In this way, the communication infrastructure is based on CORBA (Common Object Request Broker Architecture) from the OMG (Object Management Group[1]). As objects are the basic building blocks of the system, the structured memory uses an object-oriented database which is conform to the standards supported by the ODMG[2] (Object Data Management Group) for API and request language (OQL - Object Query Language).

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[1] http://www.omg.org
[2] http://www.odmg.org