

Use of Intelligent Agents in Home Entertainment

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Abstract. The transition from analog to digital video is about to bring the expected convergence of television, computer and communication, however a suitable platform for delivery of multimedia interactive services has not emerged yet. In this paper the approach of the EMBASSI project in the field of easy content access and retrieval for home usage is introduced.

Introduction

An important agent metaphor that can be applied to computer-aided software engineering is the personal assistant metaphor [4,11]. The personal assistant is like a personal secretary and hides the complexity of difficult tasks by helping the user through the problem. These personal assistants are usually used in applications such as email, meeting scheduling, news filtering and book recommendations. With development of new technologies for digital audio/video delivery in Internet the need for a suitable platform of multimedia interactive services has emerged. Appropriate assistants for searching and browsing video content are required such that, even in huge volumes of information specific pieces can be located easily.

We concentrate in the project EMBASSI [1] on the problem of indexing, filtering and retrieval and copy right protection of digital video content based on the user's interest profile and using agent [2,5] technologies. In this paper our approach in the field of easy and multi modal content access and retrieval for home usage is introduced. Our assistants are integrated in the global architecture of EMABSSI and use its multi modal interfaces to perform shopping tasks for home users. Shopping Assistant provides a comfortable human-based interface to the online world.

EMBASSI Architecture

In an average household today, there are at least a dozen stationary electrical appliances for the kitchen and the laundry room, as well as for entertainment and telecommunication. Normally, these appliances and systems are based on different control philosophies. Modern appliances offer numerous functions to be controlled on the basis of existing technological possibilities.

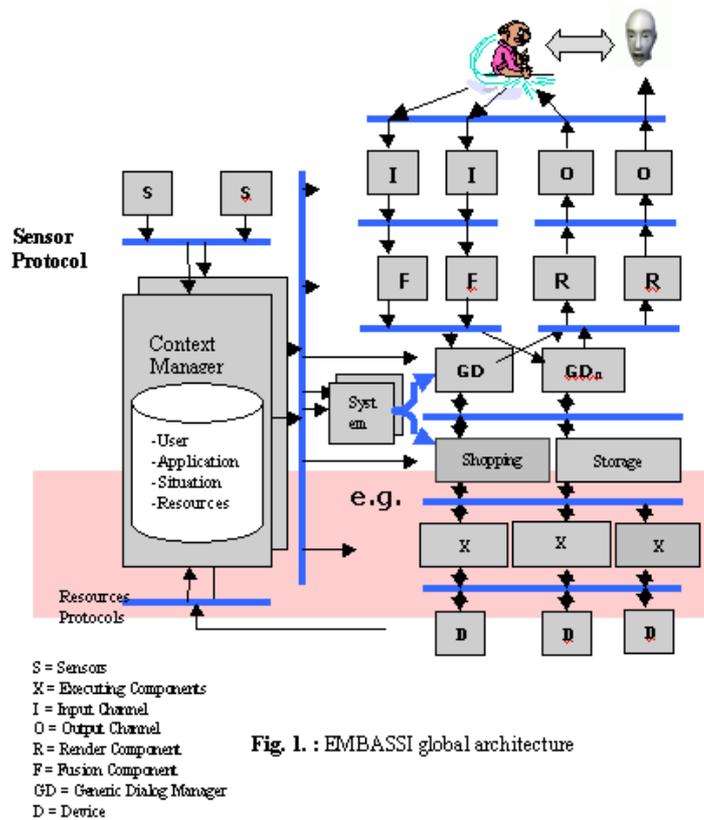


Fig. 1 : EMBASSI global architecture

We have to equip all appliances with more intelligence in order to simplify the service and to individualise their use. In EMBASSI, we address the following concepts:

- Human-based adaptive and user interface design;
- Use of multimodal and anthropomorphic interaction technology;
- Logical separation of appliance and operating unit;
- Creation of a comfortable control mechanism through the network;
- Compatibility of all EMBASSI capable systems and appliances.

EMBASSI architecture consists of different layers, from top to bottom, form a generic framework, in which the desired user interface can be configured by selection from a "modular kit " of innovative interfaces (see Figure 1). Shopping Assistant is integrated in the Assistant level of EMBASSI architecture illustrated above and use the multi modal interfaces of EMBASSI. We give below a short presentation of the evolved assistants and entities in shopping scenario.

Shopping Assistant

This is the central entity responsible for all kinds of information retrieval tasks on the Internet. Shopping assistant interacts with different other assistants and entities to retrieve and save the audio/video content. For search and retrieval of the videos we use mobile agents [5,9,10,2]. Mobile agents select videos from Internet video stores based on the user's profile and present them to the User. After the user choose her/his desired video, shopping assistant delegates the task of downloading of the videos to an storage assistant.

Mobile agent server SeMoA

Mobile agents are used for search and retrieval of video information from Internet based e-commerce online server. The Shopping Assistant may decide to send a mobile agent to perform the information retrieval tasks in order to minimize the communication costs of the transaction. In this case, the Shopping Assistant configures a SeMoA [9,10] agent and dispatches it to the agent server of the providers. SeMoA is a secure agent server developed by Fraunhofer-IGD focusing on the security requirements of mobile agent technology. The architecture of SeMoA is published mainly in [10]. After performing the tasks, the agent will return to EMBASSI and give the results to the Shopping Assistant.

Video Description and Retrieval

Mobile agents are configured depend on the user's wish or genre and send to the network for searching. In the envisaged scenario, a framework for the description of video content is required in order to support filtering and retrieval functionalities in the retrieval and storage system. In order to develop a suitable description scheme for video material, we propose a new data model to structure the audio/visual content elements. As format for the descriptions we propose XML [12]. Based on the descriptors a wide spectrum of possibilities can be offered to home users to search and retrieve, depending on the available set of XML based descriptors. EMBASSI provides the user with multi modal viewer tools to further select the really interesting videos from this subset. In addition, more refined queries can be made using keywords (e.g. searching for all videos form Tom hanks). The XML descriptors are used by software agents to automatically inspect the content of video databases. Those programs that show good matching with the profile of the user, stored on the video store database, will be selected for ordering.

Storage Assistant

Storage assistant is responsible for the management of all content storage and retrieval tasks in EMBASSI at home. This assistant is equipped with access control mechanisms. There exist one or more root users at home, who could define the access control lists for the storage assistant or permissions of the existing users. The storage assistant is used as a multi modal navigation system to help the user to identify video material of interest on the home video-storage. Online video server, which plays as a multimedia repository uses the same structures and descriptors. The storage assistant interacts with a agent based multimedia database system. The database is stored on the Hard Disk and is available using Kqml [2] Interfaces. Any request for storage of a new video or retrieval of stored video also involves database operations. When the shopping assistant selects a video for storage, the descriptive table of the transport stream containing the required video is analysed and parsed, and video specific information is generated. The client application runs on the Set Top Box and the user interface (avatar, GUI, speech recognition , etc.) is displayed on a TV.

Related Work

As e-commerce continued to expand, numerous institutes began to work on intelligent assistants for e-commerce applications. Jango [6], developed by Netbot, Inc., founded in May 1996, is an application for Windows95 or WindowsNT that works in browsers. A user enters the name of a product he is looking for and Jango automatically determines which stores and information sites are relevant. Tete-a-Tete (T@T) [7] is a project within MIT Media Lab's Agent-mediated Electronic Commerce (AmEC) Initiative. T@T's approach engages consumer-owned shopping agents and merchant-owned sales agents in integrative negotiations. Mindmaker's Intelligent Personal Assistant "Prody Parrot" [8] uses interactive multimedia to interact with the user.

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REFERENCES

1. EMBASSI (Elektronische Multimediale Bedien- und Service-Assistenz), <http://www.embassi.de>
2. Tim Finin, Yannis Labrou and James Mayfield, KQML as an agent communication language, in Jeff Bradshaw (Ed.), "Software Agents", MIT Press, Cambridge 1997
3. German Ministry for Education and Research <http://www.bmbf.de/>
4. Esteban Chávez, Rüdiger Ide and Thomas Kirste, Interactive applications of personal situation-aware assistants, *Computers and Graphics* 23(6) (1999) pp. 903-915
5. Pattie Maes, Agents that reduce work and information overload, *Communications of the ACM*, 37(7), July 1994
6. Jango Homepage: <http://www.jango.com>
7. tete-a-tete, <http://ecommerce.media.mit.edu/tete-a-tete/>
8. Mindmaker, <http://www.mindmaker.co>
9. Secure Mobile Agents Project, Fraunhofer Institute for Computer Graphics, Germany http://www.igd.fhg.de/igda8/projects/semoa/semoa_de.html
10. Volker Roth and Mehrdad Jalali, Concepts and Architecture of a Security-centric Mobile Agent Server, Fifth International Symposium on Autonomous Decentralized Systems, March 26-28, 2001 Dallas, Texas, U.S.A
11. Alfredo Pina, Eva Cerezo and Francisco J. Serón, Computer animation: from avatars to unrestricted autonomous actors (A survey on replication and modelling mechanisms), *Computers and Graphics* 24 (2) (2000) pp. 297-311
12. XML homepage <http://www.w3c.org/XML>