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CONSTRUCTION OF THE MULTIMEDIA MEDIATION SYSTEMS

Masao Sakauchi
Institute of Industrial Science, University of Tokyo
7-22-1 Roppongi, Minato-kû, Tokyo, 106-8558, Japan
sakauchi@sak.iis.u-tokyo.ac.jp

Introduction

Rapid expansion of multimedia information space based on video or image data is being realized by means of various distribution tools. Three types of multimedia information spaces (or environments), i.e. "in the real-world", "in the digital broadcasting stream" and "on the network" are especially promising. On the other hand, from social and economic viewpoints, importance of information processing techniques which can create real value for human activity or life should be surely recognized.

Considering these two backgrounds, we are now developing a new multimedia database system, named the Multimedia Mediation Systems as application-oriented middleware for realization of functions, services demanded by human and society.

In the speech, the framework of the Muletimedia Mediation Systems, the basic functions for realizing three types of concrete Multimedia Mediation Systems, i.e. Real-world type multimedia System, Stream type Multimedia System and Network type Multimedia System will be discussed with several embodiments, mainly based on our research project (http://shinpro.sak.iis.u-tokyo.ac.jp/index-e.html).

H. Arisawa et al. (eds.), *Advances in Visual Information Management*

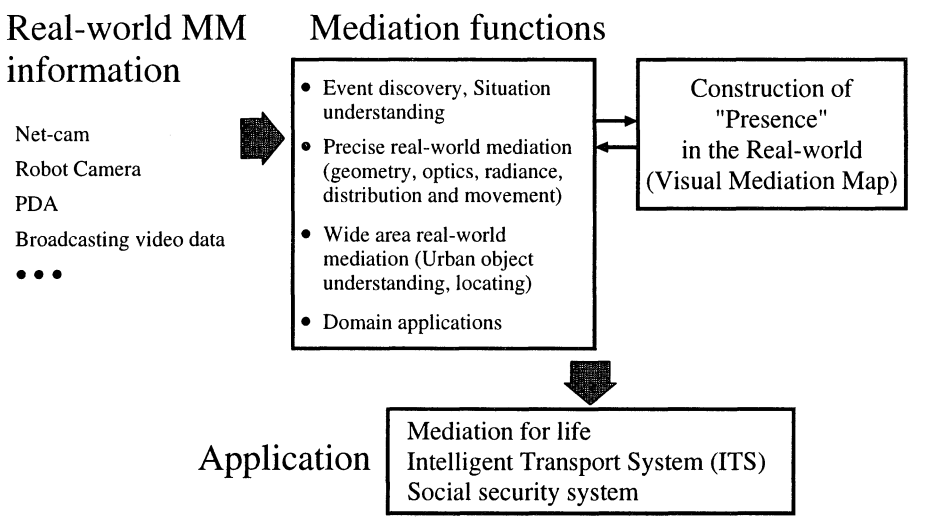

Figure 1 Basic mediation functions for Real-world type MMS

1. THREE TYPES OF "MULTIMEDIA ENVIRONMENT"

<Real-world type MMS>

Many promising ITS (Intelligent Transport System) applications require realtime acquisition of traffic condition in the roads. The earthquake at Kobe in 1995 taught us the importance of realtime acquisition of our city information for disaster mitigation. On the other hand multimedia communication technology enables us to establish a new type of database which collects and analyzes realtime situations (video information) to tell us "What's going on in the city" on realtime basis. Let's call such type as "Real-world type MM Environment".

Though this type of systems generally have not been considered as databases system, they have promising possibility to realize new services and business with realtime integration of real-world situations and existing another databases.

The first our target is the Real-world type Multimedia Mediation System to cope with these situatoins. Fig.1 shows basic mediation functions for the Real-world type MMS. The target multimedia data include various data from robot cameras, mobile units or network sites, reflecting realtime situations in the real-world, such as town scenes or traffic on the roads. ITS, various applications for town life, social security systems

are examples of target applications. Following concrete research results will be presented in this talk:

- Development of event discovery/situation understanding by real world video data
- Development of Precise realworld mediation functions
- Development of Wide area realworld mediation functions
- Domain-oriented applications (ITS, GIS etc.)

<Stream type MMS>

Needless to say, one of the typical leaders of multimedia information (contents) providers is broadcast combined with communication. Commercial-based satellite digital broadcasting with over hundreds of channels have already started in USA, Japan, Europe and Asia. Another digital broadcasting in the form of ordinary surface wave TV, or Fibernet communication or even on the Internet also have already been or will be started. In such situations, where we'll be able to enjoy hundres or thousands of broadcasting channels, much more user-oriented and intelligent access to such tremendous amount of "contents stream" will be required.

Basic mediation functions for this Stream type MMS are shown in Fig.2. In this case, target multimedia data include video stram in digital broadcasting, video contents etc.. New interactive video services and personal media services are examples of target applications. Following concrete functions will be presented as this embodiment.

- Proposal and Realization of the framework of MM data description and Utilization
- Automated describing functions of video streams
- Data collaboration/Data Retrieval/Event discovery for video stream
- Creation of new interactive broadcasting services and applications
- High performance architectures for huge multimedia data space

<Network type MMS>

The third target is mediation functions for the Network type MMS for the WWW space in a Internet. In this case, mediation functions for realizing advanced search engine or mediation for solution include Event discovery (data mining), data retrieval, data collaboration or interface for mediation. Some examples will be presetned in this talk.

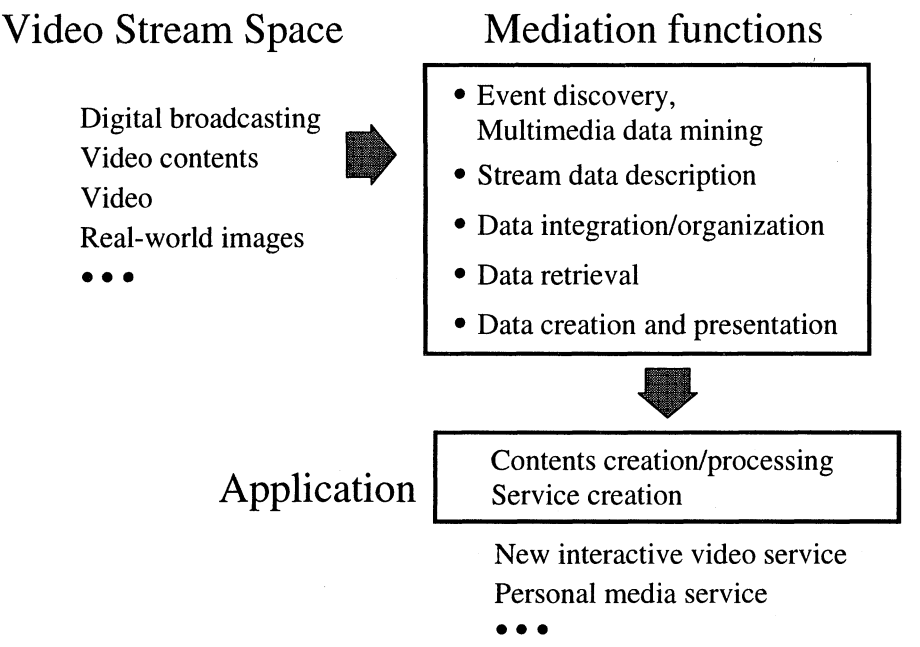

Figure 2 Basic mediation functions for Stream type MMS

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Author's Biography

Director General & Professor Institute of Industrial Science, University of Tokyo, Japan.

Graduated from Tokyo Univ., Dept. of Electrical Engineering in 1969. Obtained MS and PhD degree from Tokyo University (Electronics Engineering) in 1971 and 1975, repectively. Full-time lecturer of Electrical Engineering of Tokyo Univ. from 1975-1976. Associate Professor of the Faculty of Engineering, Yokohama National University (Computer Science) from 1976-1978. Associate Professor of the Institute of Industrial Science, Univ. of Tokyo (Image Processing and Database) from 1978-1988. Have been a Full Professor of the Institute of Industrial Science, Univ. of Tokyo since 1988. Director of Center for Conceptual Processing of Multimedia Information, IIS in 1994. Director General, Institute of Industrial Science. University of Tokyo from 1998.

Research activities are in the areas of Multi-media databases, Multimedia Systems, Image Processing and understanding, spatial Data Structures, and Geographical Information systems.

The general chairman of 4 International Conferences and Workshops, Including the IEEE International Workshop on Machine Vision and Machine Intelligence (1987), IAPR and IEEE International Conference on Document Analysis and Recognition (ICDAR '93) (1993). Program Chairman of 3 International Conferences, Including IEEE International Conference of Multimedia Processing and Systems (IEEE Multimedia 96) (1996), ITSC 99 (1999). Organizing committee and Program committee member of May International conferences. Chairman of the technical committee on Machine Vision and Machine Intelligence, IEEE IE society (1985-1992). Associate editor of IEEE Multimedia Magazine, (1993-99) IEEE trans. on Industrial Electronics (1984-1992). Editor in chief of Transactions on Information and Systems of Institute of Electronics, Information and Communication Engineers (IEICE) in Japan (1989-1991).

Chairman of the technical committee on Image Engineering of IEICE of Japan (1993-). Chairman of the technical committee on Functional Graphics Processing of IEICE. (1987-1993). Chairman of the technical committee on Application Techniques of Image Processing of Institute of Television Engineers of Japan (1987-1993).