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Abstract

Exchange of short visits between partners is an important part of the SCHEMA network of Excellence. Most of the partners come from Universities or Research Institutes Laboratories, with a lot of PhD students and young researchers as members. Short visits encourage the active exchange of knowledge and information and the collaboration between academia and industry. The role of this WP is to constantly monitor the mobility of researchers inside the Network, publish the available positions, find such positions in industry, allocate researchers to relevant positions and evaluate the exchange procedure. In the framework of this WP, monitoring of the short visits between partners by using e-forms and lists on the Internet was developed and used. During this period, many short visits took place involving both SCHEMA members and non SCHEMA member academic institutions. The description of the short visits occurred in the second period of the SCHEMA project is reported in this document.

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1. Introduction and objectives

The main objective of this WP is to organize short visits between partners in order to exchange information, knowledge and experience.

These short-term exchanges between participants do not exceed two months and are focused on improving the systematic exchange of information. For example, the short visits have resulted to activities such as:

- New research areas (e.g. multimedia ontologies)

- Common research activities

- Joint publications and presentations

- Collaboration of PhD students with other partners

- Joint standards submissions

- Software development (e.g. Qimera)

- New affiliated members

- New proposals for research projects

The short visits already substantially contribute to industrial/research community collaboration within SCHEMA.

The document is organized as follow.

In Section 2 we have described in some detail the various short visits occurred in the last period of the SCHEMA project, whereas in Section 3 a summary of the mentioned short visits is reported. Concluding remarks are drawn in Section 4.

2. Reports of Short Visits

2.1.   Report on I3S Visit (June 1-2, 2003)

Participants: Prof. Benoît Macq (UCL), Prof. Michel Barlaud (I3S)

Title: Efficient navigation through quincunx mega images

Objective

The two main objectives of this visit were the discussion related to a joint publication and the exploration of the possibility for intensifying collaboration between UCL and I3S on standardization activities relevant to SCHEMA.

Description

Prof. Benoît Macq and Prof. Michel Barlaud discussed about the writing of the paper "Efficient navigation through quincunx mega images" for CBMI2003. They also discussed about the further development of the actual collaboration between the two universities on the topic of JPEG2000 for WP4 of the SCHEMA project.

Outcome

A joint publication to CBMI03 was finalized and it was decided that further joint publications on JPEG2000 were to be pursued.

2.2.   Report on UPC Visit (July 21-22, 2003)

Participants: Prof. Ferran Marques (UPC), I3S, UCL.

Title: Development of analysis tools for human-computer interfaces in the framework of medical applications.

Objective

Prof. Ferran Marques held a meeting with SCHEMA partners I3S, UCL at Imperial College in London to discuss the development of analysis tools for human-computer interfaces in the framework of medical applications.

Description

UPC is investigating image/video analysis tools for the analysis of human interaction in user interfaces for surgeons in haptic environments. The adequate description of the multimedia contents available in these environments might further expand video analysis and indexing applications to the biomedical field.

Outcome

Further collaboration in this field among UPC, I3S and UCL will be pursued.

2.3.   Report on British Telecom – UCL Visit (September 1, 2003)

Participants: Jerome Meesen (UCL), Dr. Li-Qun Xu (BT).

Title: Development of an interactive platform for video content visualization with semantic links

Objective

The main objective of this visit was to study and eventually develop an interactive platform for video content visualization with semantic links

Description

Jerome Meessen, a PhD student from UCL, visited Dr. Li-Qun Xu on 1st September 2003, following prior arrangement between Li-Qun and Prof. Benoit Macq. During the visit, the current state of the art on interactive platforms for video content visualization with semantic links was discussed and the possibility of further UCL/BT collaboration on the development of such an interactive platform was discussed.

Outcome

As a result of this visit, Jerome Meessen was offered a 3-month studentship by BT for working on the aforementioned SCHEMA-related theme.

2.4. Report on British Telecom - UNIBS Visit (September 1-2, 2003)

Participants: Dr. Sergio Benini (UNIBS), Dr. Li-Qun Xu (BT).

Title: Development of an automatic approach for semantic scene segmentation and content assets reuse based on AV spatio-temporal characteristics.

Objective

The main objective of this visit was to study and eventually develop some feature-based content analysis algorithms regarding video content understanding. In particular the aim was directed to develop techniques to enable queries towards extracting certain high-level semantic aspects from video program documents, such as the automatic recognition of logical story units along the video sequence.

Description

During this visit the attempt was to give a contribution to video content understanding, using jointly audio and visual information. In particular through the clustering of video contents based on low level both audio and visual vector quantization techniques, we addressed the problem of automatic video scene understanding in order to detect and index events for eventual summarisation purposes. Many video programs generated through content post-production chains have story (syntactic and semantic) structures that could be recognised through low-level visual and audio primitives. We proposed a novel content clustering approach to group visually similar video shots into compact structures. Analysing then visual clustering results, transitions between different clusters and combining them with audio processing output, we tried to find out the fundamental elements of the semantic structure, called LSUs (Logical Story Unit), the story line developing, and eventually recognise patterns (dialogue, progressive scene, audio hints, etc.) and repeats (visually similar video shots not local in time) all along the video sequence.

Outcome

The development of a prototype system implementing the proposed method is able to decompose video into basic story elements that can be organised to build structures that facilitate both hierarchical organisation and semantic understanding. It provides at the same time a compact representation, reflecting the story flow useful for further developing of efficient browsing tools for navigation of a video document in a digital library.

2.5.   Report on UCL Visit (September 28-29, 2003)

Participants: Prof. Ferran Marques (UPC), Prof. Benoit Macq (UCL), UCL researchers.

Title: Development of analysis algorithms for gesture recognition in a multicamera framework

Objectives

The main objective of this visit of Prof. Ferran Marques to UCL was to present and further develop analysis algorithms for gesture recognition in a multicamera framework.

Description

The proposed application is the production of a mixed-reality environment for entertainment purposes. UPC contribution is related to the analysis of video scenes with human silhouetes from which 3D skeletons are extracted to be applied in mixed-reality environments.

Outcome

As a result of this visit, further collaboration in this field between UPC and UCL will be pursued.

2.6.   Report on TUM Visit (October 8-10, 2003)

Participants: Vasileios Mezaris (ITI), Neil O'Hare (DCU), Marzia Corvaglia (UNIBS), Stephan Hermann (TUM), Raul Medina (TUM).

Title: Tutorial on MPEG-7 XM for integration of the software with the SCHEMA reference system.

Objectives

The main objective of the Munich lab visit was to explore the possibility, the advantages over other approaches, and the practical aspects of integrating the MPEG-7 XM (eXperimentation Model) with the SCHEMA Reference System, designed under Work Package 3. Furthermore, the lab visit was related to the preparation by the SCHEMA consortium of a joint contribution to the standards community in terms of feedback regarding the usability of MPEG-7 part 6 (reference software), which will be implemented as part of the SCHEMA reference system in WP3.

The SCHEMA Reference System is a system for indexing and retrieval of visual information, which is modular, so as to enable the combination of different tools (analysis modules, high-level descriptors, etc.) by the different partners and provide a common test-bed for the comparative evaluation of the various integrated modules. A first working version of the system, already developed and accessible via the web, makes use of four different segmentation algorithms, integrated with the help of common input/output specifications realized under the Qimera initiative, as well as proprietary low-level indexing features for performing content-based indexing and retrieval of still images. However, the use of proprietary features has been identified as somewhat limiting, since it makes difficult the reproduction of any experiments and comparative evaluation of the segmentation modules. To this end, the use of MPEG-7 compliant features has been proposed and has been adopted as a future direction of the work under WP3. For extracting and employing MPEG-7 compliant features, the use of the MPEG-7 XM software, which is a non-normative part of the MPEG-7 International Standard, has been proposed.

A SCHEMA partner, the Munich University of Technology (TUM), has carried out significant work on the specification and implementation of the MPEG-7 XM software. This experience of the Munich University of Technology motivated the Munich lab visit.

Description

The first day of the lab visit was devoted to a tutorial on the installation of the XM software on

computers running the Linux and Windows operating systems. Several minor modifications of the source code were required to overcome minor bugs and incompatibilities between different versions of the underlying system software (operating systems, compilers, required libraries). The installations were successfully completed on all three laptops (one Linux, two Windows).

In the second day, the completed installations were fine-tuned and were used for getting familiar with the structure of the code and for experimenting with some key features of the XM software. The issue of supported input and output formats was discussed; for the purpose of integration with the SCHEMA reference system and taking into account the adoption of the .ppm/.pgm format by the Qimera software, the supported .ppm and .pgm formats were deemed most appropriate. This was followed by some discussion on how the existing code could be used by the SCHEMA reference system. New modules recently developed by TUM, supporting the batch extraction of several low-level visual descriptors (namely, Color Layout, Color Structure, Dominant Color, Scalable Color, Edge Histogram, Homogeneous Texture, Contour Shape, and Region Shape) and their combined use by a new search and retrieval application, were made available to the participants and the laptop installations were updated with the new modules. The use of the new modules was demonstrated and experimentation with them was carried out.

The last day of the lab visit was devoted to the discussion of issues regarding the integration of the XM software with the SCHEMA reference system. Certain limitations of the current implementation of the XM were identified (e.g. one-to-one correspondence between input media files and described entities, even if the latter are only portions of the input files, e.g. image regions rather than entire images) and ways to work around them, for the purpose of integration, were discussed, along with useful features that could be introduced to the XM software in future versions of it.

Outcome

The installation of the XM software to the laptops of the participants and the valuable experience gained on issues pertaining the installation procedures and the usage of the XM software are important developments towards the goal of integration. Valuable discussions during the meeting made clear the advantages of this integration, as well as the difficulties that may be faced in this effort. This work will be followed by a first attempt to integrate the XM with the SCHEMA reference system.

2.7. Report on I3S Visit (October 19-20, 2003)

Participants: Prof. Benoit Macq (UCL), Prof. Michel Barlaud (I3S), Marc Antonini (I3S).

Title: Optimization methods for wavelet compression in the framework of acces to mega images. Active contour segmentation for annotation of sport sequences.

Description

Pr. Benoît Macq of the University of Louvain-la-Neuve attended a working meeting with Michel Barlaud and Marc Antonini at I3S. The goal of the meeting was twofold.

They discussed on new optimization methods for wavelet compression in the frame of access to mega images. Multistage lifting schemes optimization were discussed in depth. A new joint working plan was set for that purpose.

They discussed the application of active contour segmentation for annotation of sport sequences. A testbed was established. They discussed also the possibility to combine these efforts with the Qimera approach.

They intend to provide some high-definition sport sequence to SCHEMA, if possible in the next future.

2.8. *Report on TUM Visit (January 22-24, 2004)*

Participants: UPV, Dr. Stephan Hermann (TUM).

Title: Hardware implementation of the AddressLibrary.

Description

Some possibilities to collaborate were discussed on a hardware implementation for the AddressLibrary. The AddressLibrary is the image processing library from TUM. It is the basic software module used at TUM to implement and analyse image analysis algorithms. The AddressLibrary is used in the Qimera modules from TUM and the MPEG-7 reference software to extract descriptors from visual mediadata. Having a hardware implementation allows to accelerate these algorithms.

2.9. *Report on Karlsruhe Visit (January 24-25, 2004)*

Participants: Dr. Vassilis Papastathis (ITI), University of Karlsruhe.

Title: Brainstorming on multimedia ontologies.

Description

Semantic analysis of multimedia which is one of the major objectives of SCHEMA still remains an open research issue, since there is a lack of precise models and formats for object and system representation and due to the high complexity of multimedia processing algorithms. This makes the development of fully automatic semantic multimedia analysis and management systems a challenging task. This is due to the difficulty, often referred to as the semantic gap, of capturing concepts mapped into a set of image and/or spatiotemporal features that can be automatically extracted from video data without human intervention. The use of domain knowledge is probably the only way by which higher level semantics can be incorporated into techniques that capture the semantics through automatic parsing. Such techniques are turning to knowledge management approaches, including those based on Semantic Web technologies, to solve this problem. A priori knowledge representation models are used as a knowledge base that assists semantic-based classification and clustering. UoK has an extensive experience in the research and development in algorithms and tools for Semantic Web technologies. UoK has also applied these technologies and has an interest in the multimedia domain. During the visit, Vassilis Papastathis was informed on the current status of the Semantic Web technologies and tools, also for specific processes (e.g. ontology engineering) and presented the knowledge-assisted multimedia analysis approach. There was a brainstorming meeting on how multimedia ontologies containing multimedia features (e.g. MPEG-7) can be developed and used in the proposed framework. The meeting enhanced the relevant research activities in ITI and soon a presentation to a SCHEMA meeting and a relevant publication are expected.

2.10. *Report on UPC Visit (June 4, 2004)*

Participants: Walter Stechele (TUM), Philippe Salembier (UPC), Ferran Marqués (UPC), Josep R. Casas (UPC).

Title: Hardware acceleration for video analysis.

Description

TUM presented ongoing work on hardware acceleration for video object segmentation. TUM's

System-on-Chip platform for video signal processing consists of dedicated, statically and dynamically reconfigurable components, as well as an embedded RISC core and memory. Application-specific software libraries support control of dynamic reconfiguration of low level operations by high level instructions. Thus programmability is combined with high data throughput and low power consumption of hardwired circuits. Preliminary work presented here was focused on video object segmentation, which exploits the basic concept of the dynamically reconfigurable SoC platform. A library of software functions for image processing (AddressLib) was developed, which will be used as a starting point for the application-specific software parts of the platform.

UPC presented plans for their "Smart Room" project for both meeting and lecture scenarios. In the Smart Room, an array of video cameras and microphones is used to monitor all activities. A computer system should assist various needs of participants. This project requires deep investigation and development of new techniques for video analysis. In many cases, computational load is expected to be far beyond real-time capabilities of next generation computer systems.

Discussion was focused on the use of TUM hardware acceleration for Smart Room applications.

Conclusion
UPC and TUM will further evaluate the use of hardware acceleration in the Smart Room environment.

2.11. Report on UPV Visit (June 8, 2004)

Participants: Walter Stechele (TUM), Francisco Ballester (UPV), Vicente Herrero (UPV).

Title: Hardware for video analysis.

Description

UPV and TUM are cooperating on the design of a hardware accelerator for video processing. It is based on TUM's System-on-Chip platform for video signal processing, which consists of dedicated, statically and dynamically reconfigurable components, as well as an embedded RISC core and memory. Application-specific software libraries support control of dynamic reconfiguration of low level operations by high level instructions. Thus programmability is combined with high data throughput and low power consumption of hardwired circuits. Preliminary work was focused on video object segmentation, which exploits the basic concept of the dynamically reconfigurable SoC platform. A library of software functions for image processing (AddressLib) was developed, which will be used as a starting point for the application-specific software parts of the platform.

UPV's core competence is on FPGA implementation of video processing and related architectural optimizations. Currently two Erasmus students from UPV are working at TUM on the FPGA implementation. Current state and future plans for cooperation were discussed.

Conclusion
UPV and TUM plan to continue their cooperation with student exchange and extend it to cooperate in future European projects on video processing.

2.12. Report on QMUL Visit (June 20-28, 2004)

Participants: E. Izquierdo (QMUL), EE Departments University Belgrade and University Novi Sad

Title: Fostering of ongoing cooperation between QMUL and Electronic Engineering departments in the Republic of Serbia and Montenegro

Objective: The objective of this research visit was to foster ongoing cooperation between the Multimedia and Vision Lab at QMUL and the two most prominent Electronic Engineering

departments in the Republic of Serbia and Montenegro. The visit served as platform for the presentation and dissemination of relevant research activities of the NoE SCHEMA and the Multimedia and Vision Lab at QMUL. Specifically, research work on Content-Based Semantic Scene Analysis and Information Retrieval. The visit also contributed to the beginning of additional jointly research projects within the scope of SCHEMA.

Highlights of the visit:

➤ Two research seminars were given by the visitor (Dr. Izquierdo) at the two visited Universities. The first talk focused on linear mathematical models for image processing and the second covered aspects of multimedia search and retrieval based on user relevance feed-back.

➤ Two presentations aiming at describing the scope and current research activities of the NoE SCHEMA

➤ Two research seminars with the group of Prof. Branimir Reljin, Electronic Engineering, University of Belgrade

➤ A research seminars with the group of Prof. Moncilo Miljus, Electronic Engineering, University of Novi Sad

➤ Attended PhD viva and research presentation from Vesna Zeljkovic

➤ Several brainstorming/discussion sessions with members of academic staff at the Electronic Engineering departments in Belgrade and Novi Sad to map their current research interest into a plan for further cooperation.

Outcome:

➤ Completion of a research paper partially supported by SCHEMA and submitted for publication to the IEEE Transactions (V. Zeljkovic, A. Dorado, Ž. Trpovski and E. Izquierdo, "Combining Illumination Invariance and Fuzzy Descriptors for Improved Building Detection", submitted to the IEEE Transactions on Circuits and Systems in Video Technology)

➤ Start of jointly work to produce a literature report on "Moving Object Detection in Video Sequences". This report is aimed at the provision of a state of the art review that will be incorporated in the next release of the SCHEMA state of the art report (State of the art in content-based analysis, indexing and retrieval, SCHEMA deliverable D2.1)

➤ Research plan for further jointly activities, including:

    o   Plan/prospective for both institutions to join the SCHEMA NoE as associated partner

    o   Joint efforts towards future FP6 initiatives

2.13.   Report on ITI Visit (July 26-30, 2004)

Participants: Yiannis Kompatsiaris (ITI), Babis Doulaverakis (ITI), Dasiopoulou Stamatia (ITI), Frédéric Precioso (I3S).

Title: Segmentation methods for indexing.

Description

CERTH/ITI is participating in 13 EC 6th Framework Programme IST projects and numerous other EC and National projects. CERTH/ITI demonstrates algorithms and results relating to image and video segmentation, indexing and retrieval, watermarking for indexing, user interfaces for retrieval, databases and authoring tools.

Laboratory I3S (P5) of the *Centre National de la Recherche Scientifique* (CNRS) and the University of Nice - Sophia Antipolis focuses its research on segmentation and compression of images and video sequences. Research in segmentation is done in the framework of multimedia, e.g., for MPEG-4 and MPEG-7 applications. The team was involved in several industrial contracts with the CNES and France Telecom R&D. In an international context, the team was involved in European project COST 211 and is currently part of European project COST 292 (SEMANA) and network of excellence SIMILAR (FP6). Besides European projects, current collaborations on active contours and joint segmentation/motion estimation include the *Université Catholique de Louvain* (UCL), the *Ecole Polytechnique Fédérale de Lausanne* (EPFL), and Boston University.

The partners made presentations on their respective areas of expertise: Segmentation using active contours and indexation and retrieval of multimedia content. Then they discussed the procedure to introduce I3S active contour methods in the object-based image search engine developed by ITI.

Conclusion
ITI and I3S plan to continue their cooperation. A Ph.D. student from I3S is going to spend the next year working on this topic as a postdoctoral research fellow.

2.14. Report on CNRS-I3S Visit (September 23-25, 2004)

Participants: Josep R. Casas (UPC), Michel Barlaud, Frédéric Precioso (I3S).

Title: Parametric active contours for image and video segmentation.

Description

The partners discussed some low-level aspects of image and video segmentation. Frédéric Precioso gave a presentation on the use of parametric active contours for image and video segmentation. He focused his talk on the theory and implementation of spline and smoothing spline active contours. The goal of this approach is fast and robust segmentation with a clear orientation toward real-time applications such as video surveillance, one of the working areas at the UPC.

2.15. Report on University of Karlsruhe (DE) Visit (October 22, 2004)

Participants: Prof. Jürgen Becker, M. Hübner, R. König, Jens Becker (Univ. Karlsruhe)
Prof. A. Herkersdorf, Dr. W. Stechele, Dr. T. Wild (TUM)

Title: Real-time video analysis.

Description
The goal of the visit was to evaluate topics for further cooperation in the field of real-time video analysis between Technical University of Munich and University of Karlsruhe. Both Universities presented their current research in the field.
The presentations of TUM included hardware acceleration for video analysis algorithms and principles of organic computing for improved performance/power ratio.
The presentations of University of Karlsruhe concentrated on reconfigurable computing.
In the final discussions, common interest was identified in dynamically reconfigurable VLSI architectures for video processing. Both institutions will be looking for cooperation projects.

2.16. Report on I3S Visit (November 8-10, 2004)

Participants: Prof. Michel Barlaud (I3S), Eric Debreuve (I3S), Ariane Herbulot (I3S), Prof. Benoit

Macq (UCL), Annabelle Gouze (UCL), Cédric De Roover (UCL), Olivier Martin (UCL), Jean-Julien Filatriau (UCL).

Title: How to mix different segmentation methods.

Description

Laboratory I3S (P5) of the *Centre National de la Recherche Scientifique* (CNRS) and the University of Nice - Sophia Antipolis focuses its research on segmentation and compression of images and video sequences. Research in segmentation is done in the framework of multimedia, e.g., for MPEG-4 and MPEG-7 applications. The team was involved in several industrial contracts with the CNES and France Telecom R&D.

UCL is involved in SCHEMA by its participation to the contribution to standard part, with its work on JPEG2000 and openwatermark. UCL also works on segmentation. Two approach of segmentation are studied. A region based segmentation, and a level-set based.

The partners made presentations on their respective approach to segment and track persons in an image. The titles of the presentations were the following :

A. Herbulot : "Shape Gradient for Image Segmentation Using Information Theory".

C. De Roover and A. Gouze : "Fusion of binary partition tree for watershed segmentation".

O. Martin : "Dynamic Bayesian Networks for Multimodal Emotion Recognition".

Then they discussed the procedure to mix their technology by using I3S active contour methods and UCL region based methods. UCL planed to provide some results that could be integrated in the I3S active contour methods. Inputs and outputs of the different modules were determined so that the collaboration could continue by exchanging e-mail.

Conclusion

UCL and I3S plan to continue their cooperation. This cooperation will continue with the exchange of technology and with other short visits in order to use both different know-how.

2.17.   Report on QMUL Visit (November 25-26, 2004)

Participants: Prof. Ferran Marques (UPC), QMUL Staff.

Title: Invited panel.

Description

The goal of this travel was to be part of the invited panel on Content Production, Processing, Management and Preservation in the EU IST Symposium that was held at London during the European Workshop on the Integration of Knowledge, Semantic and Digital Media Technologies.

2.18.   Report on I3S Visit (December 1-4, 2004)

Participants: Prof. Riccardo Leonardi (UNIBS), Prof. Michael Barlaud, Frédéric Payan (I3S).

Title: Discussion on Scalable Video Coding.

Description

The partners discussed some problems related to scalable video coding techniques based on the wavelet transform. These theoretical issues were considered in the scope of 3-dimensional mesh compression with an optimized distortion-rate point of view. The distortion constraint is related to

geometrical accuracy in terms of a surface-to-surface distance.

2.19. Report on UCL Visit (December 8-10, 2004)

Participants: Ariane Herbulot (I3S), Prof. Benoit Macq, Cédric De Roover, Annabelle Gouze (UCL).

Title: Watersheds and active contours.

Description

This visit is a follow-up of the visit made by partners from the UCL on November 8-10, 2004, at I3S. The partners discussed the potential use of the watershed topological distance in the active contour framework based on a previous work that introduced the so-called "watersnakes".

2.20. Report on "Universidad Autonoma de Madrid" Visit (January 7-15, 2005)

Participants: E. Izquierdo (QMUL), Universidad Autonoma de Madrid and Telefonica Investigacion y desarrollo staff.

Title: Discussions on possible project proposals.

Description

Objective of the visit:
To discuss cooperation in the area of automatic metadata extraction from audiovisual content.
To foster cooperation between the MMV-Lab at QMUL, the Grupo de Procesamiento de Imagenes at AUM and Telefonica Labs in Madrid.
To visit the different research facilities in both sites: UAM and TID.
To attend a three days information from the IST EU in the area of semantic content analysis.
To plan further cooperation.

Highlights of the visit:
On Friday the 7th a jointly meeting was held at TID premises.
On Monday the 10th a meeting with representatives of key Spanish industrial players in content processing at the premises of the Spanish telecommunication ministerial.
Tuesday the 11th, meeting at TID premises to discus future cooperation.
Wed. 12th, meeting with UAM, TID, EU representatives and other Spanish players.
Thur. and Friday 13th and 14th, research visits to the premises of UAM and TID.

Main outcomes of the visit:
Two project proposals in the area of automatic extraction of semantic metadata from audiovisual content.
Concrete plan for a second STSM this time at QMUL. A delegate from UAM will spend two week at the MMV-lab in London in a jointly research project.

2.21. Report on IBM Zurich Lab Visit (January 20, 2005)

Participants: Ton Engbersen, Maria Gabrani (IBM), Andreas Herkersdorf, Walter Stechele (TUM)

Title: Various discussions on possible cooperation.

Description

IBM is interested in highly reliable servers for large database applications. IBM has presented requirements for server development and trends for future nanometer technologies. TUM has presented MPEG-7 based visual search and retrieval techniques and ideas for robust implementation. Both partners have shown their interest for further collaboration in a framework of European projects.

2.22. Report on UCL Visit (February 2, 2005)

Participants: Prof. Ferran Marqués (UPC), Prof. Benoit Macq (UCL)

Title: Video sequence analysis for human behaviour.

Description

In this meeting we discussed new techniques for the analysis of video sequence towards the goal of characterizing the behavior of the people in the scene. UPC presented a method for analyzing the gestual behavior in still images (detection of the basic elements) while UCL presented the extension of the technique to the temporal domain (tracking of the basic elements). The possibility of writing a common journal paper was discussed as well

2.23. Report on University of Stockholm Visit (February 7, 2005)

Participants: Dr. Yiannis Kompatsiaris (ITI).

Title: Knowledge-assisted multimedia analysis.

Description

Aim of this short visit was the exchange of ideas and discussion on a knowledge-assisted multimedia analysis framework. The discussions resulted in a novel approach being identified, based on knowledge assisted multimodal analysis and annotation of multimedia using an ontology infrastructure. More specifically, semantic concepts within the context of the chosen application domains could be formalised in ontologies, extended with qualitative attributes of the semantic objects (e.g. colour homogeneity), multimedia processing methods (e.g colour clustering), numerical data or low-level features (e.g. colour models, MPEG-7 descriptors also defined in the ontology), and linked to resources with relevant concepts commonly used for linguistic processing. Semantic Web technologies (e.g. the OWL language) could be used for knowledge representation, including rules to describe how tools for multimodal analysis should be applied according to different object attributes and low-level features. Rules describing spatiotemporal relations of objects could also be defined. The possibility of collaboration between the two parties involved in the discussions, both within SCHEMA and under the auspices of future projects extending the work carried out within SCHEMA was eventually examined.

2.24. Report on UPC Visit (February 7-11, 2005)

Participants: Dott. Eric Debreuve (I3S), Dott. Christian Ferran Bennstrom, Prof. Josep R. Casas (UPC).

Title: Image and video segmentation.

Description

The Signal Processing group, department of Signal Theory and Communications of the Universitat Politècnica de Catalunya (UPC), has a strong background in image and video processing aiming at content analysis and understanding. Their experience ranges from low level segmentation techniques to spatiotemporal context recognition.

Eric Debreuve made a presentation about segmentation using active contours: "An overview of active contours". Then, through a series of discussions scheduled daily with different people, he had the opportunity to learn many details about the methodology and the challenges of the group, as well as to share experience about segmentation. The methodology mostly focuses on binary partition tree image and video representation, region merging, and tracking. The main challenges of the group are image retrieval in the framework of database query by example (Schema NoE) and spatiotemporal context recognition for intelligent assistance of meeting attendees (Smart Room related activities). In relation to the latter, Josep Casas proposed a tour of the UPC Smart Room, an experimental meeting room equipped with cameras and microphone arrays feeding a cluster of video and audio processing computers.

Christian Ferran and Eric Debreuve also took the opportunity to share their experience in completing their assignment for the evaluation of the SchemaRS segmentation algorithms.

2.25. Report on University of Karlsruhe (DE) Visit (February 7-8, 2005)

Participants: Dott. R. Ohlendorf (TUM), Prof. Jürgen Becker, M. Hübner (Univ. Karlsruhe).

Title: Real time video analysis.

Description

The goal of the visit was to exchange ideas on real time video analysis applications on embedded CPU cores in FPGAs. Both partners presented ongoing work on Hardware/Software partitioning and performance evaluation, using Xilinx FPGAs with embedded MicroBlaze CPU cores running under Linux.

2.26. Report on Tech. Univ. and Heinrich Hertz Institut Berlin Visit (February 10-15, 2005)

Participants: E. Izquierdo, Queen Mary University of London, T. Sikora, P. Hellwich, Technische Universitaet Berlin, S. Pastoor, C. Gruenheit, T. Meiers, Heinrich Hertz Institut Berlin.

Title: Various discussions.

Description

Objective of the short visit:
- To discuss cooperation in the area of semi-automatic multimodal media annotation;
- To work in a jointly (non-funded) research project with HHI on relevance-feedback, 4 days;
- To foster cooperation between the MMV-Lab at QMUL, Technische Universitaet Berlin and Heinrich Hertz Institut Berlin;
- To visit the different research facilities in both sites: TUB and HHI;
- To plan further cooperation.

Highlights of the short visit:
- On Thursday the 10th a jointl meeting QMUL-HHI was held at HHI premises;
- On the 11th , 14th, 16th and 17 working session on relevance feedback at HHI;
- On the 15th jointly seminar at TUB and lecture at HHI (by E. Izquierdo);
- Friday the 18th, meeting at TUB premises to discuss future cooperation and visit to the media

processing labs.

Outcome:
- Two project proposals in the area of automatic extraction of semantic metadata from audiovisual content;
- Concrete plans for a second short visit in 2005.

2.27. Report on Department of Telecommunications Budapest Univ. of Technology and Economics Visit (February 17-21, 2005)

Participants: E. Izquierdo, Queen Mary University of London, Prof. Csaba A. Szabo, Budapest Univ. of Technology and Economics.

Description

Objective of the short visit:
- To discuss cooperation in the area of semi-automatic multimodal media annotation;
- To foster cooperation between the MMV-Lab at QMUL and the Budapest Univ. of Technology and Economics;
- To visit the different research facilities of the Budapest Univ. of Technology and Economics;
- To plan further cooperation.

Outcome:
- A project proposals in the area of medical Imaging;
- Concrete plans for a second short visit in 2005.

2.28. Report on IBM Böblingen Visit (March, 17-18, 2005)

Participants: Dr. P. Roth (IBM), Andreas Herkersdorf (TUM).

Title: Discussions on possible collaborations.

Description

TUM has presented concepts for highly reliable servers to be built in future nanometer technologies. Server applications are MPEG-7 based visual search and retrieval techniques. IBM has presented requirements and needs for server architectures. Both partners are interested in further collaboration in European projects.

2.29. Report on I3S visit (April 20-21, 2005)

Participants: Prof. Benoit Macq, Cédric De Roover, (UCL), Prof. Michel Barlaud, Eric Debreuve, Ariane Herbulot (I3S).

Title: Watersheds and active contours.

Description

The partners discussed about the publication of their common results in segmentation. The common paper called "WATERSHED-DRIVEN ACTIVE CONTOURS FOR MOVING OBJECT SEGMENTATION" has been accepted for publication at ICIP 2005. The camera-ready version of the paper has been written during this short visit.

2.30. Report on Edacentrum Visit (April 26-27, 2005)

Participants: Dr. Haase (edacentrum, organizer), W. Stechele (TUM), 200 participants from German electronics industry and research.

Title: Dissemination Visit to edacentrum.

Objective

Edacentrum organized a workshop on design and application of advanced electronic systems. One goal of the workshop was to bring together industry and advanced research labs in Germany. TUM has presented work on visual scene analysis, visual search and retrieval, and related implementations in real-time applications, i.e. surveillance and driver assistance. Cooperations in joint research projects are under discussion with partners from German universities, e.g. University Tübingen and University Kaiserslautern., as well as with industry partners, e.g. Infineon.

2.31. Report on ENST – Telecom Paris Visit (April 27-28, 2005)

Participants: Xavier Giró (UPC), Montse Pardàs (UPC), ENST – Telecom Paris.

Title: Image/video representation for Content based Image Retrieval.

Objective

Two talks about Content Based Image Retrieval were given in this meeting in Telecom Paris.

Description

Talk 1: Image and video sequences representation for content based retrieval: An analysis technique is presented to detect instances of classes (objects) according to their semantic definition in the form of a Description Graph. Classes are defined as combinations of instances of lower level semantic classes and allow the definition of a Semantic Tree that organizes classes in semantic levels. The detection algorithm follows an approach relying on Binary Partition Trees as a description of the image.

Talk 2: MPEG7 overview: The motivation, scope and objectives of the MPEG7 standard are presented. The system tools and Description Definition Language will be described. Finally, the Multimedia Description Schemes (Visual and Audio tools) were presented.

Outcome

Further collaboration in this field among UPC and ENST will be pursued.

3. Summary of Short Visits

In this Section a summary of the described short visits is reported.

Host Name / Institution	Visiting Name / Institution	Period	Subject
Prof. Michel Barlaud (I3S)	Prof. Benoît Macq (UCL)	June 1-2, 2003	Efficient navigation through quincunx mega images
Imperial College, London	Prof. Ferran Marques (UPC), I3S, UCL	July 21-22, 2003	Development of analysis tools for human-computer interfaces in the framework of medical applications.
Dr. Li-Qun Xu (BT)	Jerome Meesen (UCL)	September 1, 2003	Development of an interactive platform for video content visualization with semantic links
Dr. Li-Qun Xu (BT)	Dr. Sergio Benini (UNIBS)	September 1-2, 2003	Development of an automatic approach for semantic scene segmentation and content assets reuse based on AV spatio-temporal characteristics
Prof. Benoit Macq (UCL), researchers of UCL	Prof. Ferran Marques (UPC)	September 28-29, 2003	Development of analysis algorithms for gesture recognition in a multicamera framework
Stephan Herman, Raul Medina (TUM)	Vasileios Mezaris (ITI), Neil O'Hare (DCU), Marzia Corvaglia (UNIBS)	October 8-10, 2003	Tutorial on MPEG-7 XM for integration of the software with the SCHEMA reference system
Prof. Michel Barlaud (I3S), Marc Antonini (I3S)	Prof. Benoit Macq (UCL)	October 19-20, 2003	Optimization methods for wavelet compression in the framework of acces to mega images. Active contour segmentation for annotation of sport sequences

Dr. Stephan Hermann (TUM)	Staff from UPV	January 22-24, 2004	Hardware implementation of the AddressLibrary
Staff from University of Karlsruhe	Dr. Vassilis Papastathis (ITI)	January 24-25, 2004	Brainstorming on multimedia ontologies
Philippe Salembier (UPC), Ferran Marqués (UPC), Josep R. Casas (UPC)	Walter Stechele (TUM)	June 4, 2004	Hardware acceleration for video analysis
Francisco Ballester (UPV), Vicente Herrero (UPV)	Walter Stechele (TUM)	June 8, 2004	Hardware for video analysis
University Belgrade and University Novi Sad Staff	E. Izquierdo (QMUL)	June 20-28, 2004	Fostering of ongoing cooperation between QMUL and Electronic Engineering departments in the Republic of Serbia and Montenegro
Yiannis Kompatsiaris (ITI), Babis Doulaverakis (ITI), Dasiopoulou Stamatia (ITI)	Frédéric Precioso (I3S)	July 26-30, 2004	Segmentation methods for indexing
Michel Barlaud, Frédéric Precioso (I3S).	Josep R. Casas (UPC)	September 23-25, 2004	Parametric active contours for image and video segmentation
Prof. Jürgen Becker, M. Hübner, R. König, Jens Becker (Univ. of Karlsruhe)	Prof. A. Herkersdorf, Dr. W. Stechele, Dr. T. Wild (TUM)	October 22, 2004	Real-time video analysis
Prof. Michel Barlaud (I3S), Eric Debreuve (I3S), Ariane Herbulot (I3S)	Prof. Benoit Macq (UCL), Annabelle Gouze (UCL), Cédric De Roover (UCL), Olivier Martin (UCL), Jean-Julien Filatriau (UCL)	November 8-10, 2004	How to mix different segmentation methods
QMUL Staff	Prof. Ferran Marques (UPC)	November 25-26, 2004	Invited panel

Prof. Michael Barlaud (I3S)	Prof. Riccardo Leonardi (UNIBS)	December 1-4, 2004	Discussions on Scalable Video Coding
Prof. Benoit Macq, Cédric De Roover, Annabelle Gouze (UCL)	Ariane Herbulot (I3S)	December 8-10, 2004	Watersheds and active contours
Prof. Benoit Macq (UCL)	Prof. Ferran Marqués (UPC)	February 2, 2005	Video sequence analysis for human behaviour
Staff from Universidad Autonoma de Madrid and Telefonica Investigacion y desarrollo	E. Izquierdo (QMUL)	January 7-15, 2005	Discussion on possible project proposals
IBM Zurich Lab, Ton Engbersen, Maria Gabrani (IBM)	Andreas Herkersdorf, Walter Stechele (TUM)	January 20, 2005	Discussions on possible cooperation
University of Stockholm	Yiannis Kompatsiaris (ITI)	February 7, 2005	Knowledge-assisted multimedia analysis
Dott. Christian Ferran Bennstrom, Prof. Josep R. Casas (UPC)	Dott. Eric Debreuve (I3S)	February 7-11, 2005	Image and video segmentation
Prof. Jürgen Becker, M. Hübner (Univ. of Karlsruhe)	Dott. R. Ohlendorf (TUM)	February 7-8, 2005	Real time video analysis
Prof. T. Sikora, P. Hellwich, Technische Universitaet Berlin S. Pastoor, C. Gruenheit, T. Meiers, HHI Berlin.	E. Izquierdo, QMUL	February 10-15, 2005	Various discussions
Prof. Csaba A. Szabo, Budapest Univ. of Technology and Economics.	E. Izquierdo, QMUL	February 17-21, 2005	Various discussions
IBM Böblingen, Dr. P. Roth (IBM)	March, 17-18, 2005	Andreas Herkersdorf (TUM)	Discussions on possible collaborations
Prof. Michel Barlaud, Eric Debreuve, Ariane Herbulot (I3S).	Prof. Benoit Macq, Cédric De Roover, (UCL)	April 20-21, 2005	Watersheds and active contours
Edacentrum, Dr. Haase (edacentrum, organizer, 200 participants from	W. Stechele (TUM)	April 26-27, 2005	Dissemination Visit to edacentrum

German electronics industry and research			
ENST– Telecom Paris	Dott. Xavier Giró (UPC), Montse Pardàs (UPC)	April 27-28, 2005	Image/video representation for Content based Image Retrieval

4. Conclusions

Exchange of short visits between partners has been an important part of the SCHEMA Network of Excellence.

The most important outcome of these short visits has been the active exchange of knowledge and information, and the collaboration between academia and academia and industry.

These meetings contributed towards developing new research collaboration and activities.

The following activities were performed during these visits:

- Development of an automatic approach for semantic scene segmentation and content assets reuse based on AV spatio-temporal characteristics;

- Optimization methods for wavelet compression in the framework of acces to mega images. Active contour segmentation for annotation of sport sequences;

- Discussion on the possible hardware implementation of the AddressLibrary;

- Discussion on the problems related to the hardware acceleration for video analysis;

- Study of segmentation methods for indexing;

- Discussion on the problems related to real-time video analysis;

- Discussion on knowledge-assisted multimedia analysis;

- Discussion on how to mix different segmentation methods;

- Discussion on Scalable Video Coding;

- Brainstorming on multimedia ontologies;

- Discussion on image and video segmentation.

Moreover, other general discussions were carried out:

- Tutorials on MPEG-7 XM for integration of the software with the SCHEMA reference system,

- Invited panels,

- Discussions on possible project proposals.