IM2.HMI Q4 2008 Quarterly Report

IP Head: Denis Lalanne
Period: October - December 2008. **Date**: December, 2008. **Status: Completed.**

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0. PARTNERS
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IDIAP, Martigny: Andrei Popescu-Belis, Mike Flynn, Alexandre Nanchen, Quoc Anh Le
DIVA, University of Fribourg: Denis Lalanne, Florian Evequoz, Bruno Dumas
ISSCO, University of Geneva: Pierrette Bouillon

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1. ACTIVITY OVERVIEW
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During the last quarter of 2008, IM2.HMI has continued the development of offline and online meeting browsers and assistants. First, at the offline level, work has focused on personal access to information through emails. In particular, a thunderbird addon has been implemented to improve emails visualization. This will lead to a large user experiment to assess the use of social and thematic facets to browse personal information. Secondly, at the online meeting assistance level, a new research work has started on real-time document identification on the meeting table. This will enhance the smart meeting room with the ability to project in realtime the electronic version of the paper documents on the meeting table. Still concerning online meeting assistant, the new version of the Automatic Content Linking Device (ACLD), developed during this quarter, now receives ASR results from speech recognition (IM2.AP) and sends back results to a user interface, via the Hub (IM2.DMA). It now also performs web searches, in real-time, using the words from the ASR. Furthermore, a survey paper on multimodal interfaces and of IM2.HMI activities in this field has been accepted as a book chapter. Works on multimodal interfaces authoring also focused on the user evaluation of a modelling language. Third, work on user evaluation has concentrated on the automatic BET answering system. It has been improved for paragraph identification in the meeting transcript (60-70% accuracy) which already makes this tool potentially useful for humans performing BET-type tasks. Finally, a book on Human Machine Interaction, authored by IM2.HMI participants, surveying research activities in the field in Switzerland, and putting it in perspective with an international state of the art (taking the form of survey papers), has been accepted for publication.

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2. DESCRIPTION OF 3 MONTH ACTIVITY
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Theme 1: Offline meeting browsers

[F. Evequoz, UNIFR] During this quarter, we investigated further the ways to take benefit of the social network facet of PI to navigate through emails. This led to starting the developement of a Thunderbird plugin, which uses our social network extraction algorithm. Our purpose is then to apply hierarchical clustering on the social network data and use it to provide a new way of filtering and navigating through a

mailbox. On a theoretical point-of-view, we are currently formalizing the different categories of PIM tasks and to argue for the use of visualization as a valid and efficient way to perform some of them.

Theme 2: Online meeting browsers and assistants

[B. Dumas, UNIFR] Work on the HephaisTK multimodal toolkit during this quarterly focused on three specific tasks:

- adding variables management and transmission into the toolkit, in a way that the toolkit's users have easy access to fused data as well as raw data coming from the different recognizers;
- adding extended error management into the toolkit, with the goal of including graceful recognition and fusion error recovery;
- adding support for the Mitsubishi Research Labs' DiamondTouch multi-touch table.

[DIVA, UNIFR] In conjunction with IM2.DMA, new work has been performed on enhancing the meeting room to interact in real-time with documents. This project consists in identifying and recognizing documents placed on the room table in any position at real time. These documents are captured by cameras which are installed in the room sealing. Using one image of the first page of any document extracted by one camera, the identification phase enables to project on the room screen the pdf document starting by this page. The tasks achieved during this quarter are: Installation of 4 cameras in the Smart meeting Room roof; Configuration and Test of different cameras; Saving some sequence of videos where we include different positions of documents on the table (we work now off-line and using just one document on the table); Extraction of document image from the videos. Future works will target the identification of the document, compared to a database of pdf documents.

[DIVA, UNIFR] A master thesis on gesture recognition over a multi-touch table is on its way (Guillaume Gnaegi). Applications for small group meetings will be considered.

[IDIAP, A.Popescu-Belis] - A second version of the *Automatic Content Linking Device (ACLD)* has been completed during this period, in collaboration with IM2 and non-IM2 partners. The IM2.HMI contribution was mainly focused on the Query Aggregator, receiving ASR results from speech recognition (IM2.AP) and sending results to a user interface, via the Hub (IM2.DMA). The ACLD now works over all the scenario-based meetings of the AMI/IM2 Corpus, and performs also web searches, in real-time, based on the words from the ASR and a list of user-defined keywords that can be changed in real-time. A significant effort has been put in system integration over the entire system, using an improved version of the Hub (IM2.DMA).

Theme 3: User requirements and evaluations

[DIVA, UNIFR] A joint seminar (departments of Computer Science & Psychology) on User Evaluation has started with 3 students in computer science and 10 students in psychology. Within the seminar, various work are pursued, e.g. comparative study of job interviews in 1) face-to-face, 2) over the phone, 3) using a video conferencing system.

[IDIAP, Quoc Anh LE and A.Popescu-Belis] The work on *automatic BET answering* has completed the two foreseen stages: identification of the paragraph, in a meeting transcript, which is most likely to disambiguate between the two alternatives of a BET question (based on lexical similarity, including n-grams), then actual disambiguation based on a finer-grained analysis of the paragraph. The results of passage identification are in the 60-70% accuracy range, which already makes this tool potentially useful for humans performing BET-type tasks.

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3. FUTURE WORK
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Theme 1: Offline meeting browsers

[F. Evequoz, UNIFR]
1. Finish work on theoretical grounds: tasks of PIM and role of visualization for PI
2. Connect the timeline-view to the social-network based view (from email archive) (report from last quarterly)

Theme 2: Online meeting browsers and assistants

[B. Dumas, UNIFR]

1. Go on with advanced error management integration in HephaisTK and SMUIML
2. Work on integration of HephaisTK toolkit into the Fribourg Smart Meeting Room (reported from last quarterly report)

[IDIAP, A. Popescu-Belis and Majid Yazdani] Refine the query aggregator mechanism using conceptual indexing - topic of a PhD work currently starting im IM2.HMI - Majid Yazdani arrived in December 2008.

Theme 3: User requirements and evaluations

[UNIFR & IDIAP] A journal article surveying the overall IM2 activities in this domain from the start of the NCCR.

[IDIAP] Write-up of report and paper on automatic BET answering. Experiments with manual vs. ASR transcripts, and with automatic summaries of variable length.

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4. PUBLICATIONS
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Denis Lalanne, Jürg Kohlas eds. (2009). – *Human Machine Interaction*, LNCS 5440, State-of-the-Art Survey, Springer-Verlag, Berlin/Heidelberg, 315 p. (in Press).

Dumas, B., Lalanne, D., Oviatt, S. *Multimodal Interfaces: A Survey of Principles, Models and Frameworks.* In Denis Lalanne, Jürg Kohlas eds. (2009). – Human Machine Interaction, LNCS 5440, State-of-the-Art Survey, Springer-Verlag, Berlin/Heidelberg, pp. 1-25.

Brodbeck, D., Mazza, R., Lalanne, D. *Interactive Visualization - A Survey.* In Denis Lalanne, Jürg Kohlas eds. (2009). – Human Machine Interaction, LNCS 5440, State-of-the-Art Survey, Springer-Verlag, Berlin/Heidelberg, pp. 26-46.

Mugellini, E., Lalanne, D., Dumas, B., Evequoz, F., Gerardi, S., Le Calve A., Boder, A., Ingold, R., Abou Khaled, O. *MEMODULES as tangible shortcuts to multimedia information.* In Denis Lalanne, Jürg Kohlas eds. (2009). – Human Machine Interaction, LNCS 5440, State-of-the-Art Survey, Springer-Verlag, Berlin/Heidelberg, pp. 103-133.

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5. MISCELLANEOUS
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The poster "WotanEye: Personal Information Management through Interactive Visualizations " was presented by Florian Evequoz at IDIAP, Martigny, during the 12. november 2008 IM2 site visit.

The poster "The HephaisTK Multimodal Interface Creation Toolkit: Architecture and Scripting Language" was presented by Bruno Dumas at IDIAP, Martigny, during the 12. november 2008 IM2 site visit.

Lalanne D. & Popescu-Belis A. (2008) - Meeting assistants: User requirements, evaluations, and novel applications. Presentation at the IM2 Annual Review Meeting, 12 November 2008, Martigny.

Popescu-Belis A. (2008) - Towards an automatic content linking device: online document retrieval and display during meetings. Presentation at the IM2 Annual Review Meeting, 12 November 2008, Martigny.

Le Q.A. & Popescu-Belis A. (2008) - AutoBET: towards automatic answering of BET questions for meeting browser evaluation. Poster for the IM2 Annual Review Meeting, 12 November 2008, Martigny.