IM2.HMI Q3 2008 Quarterly Report

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0. PARTNERS
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1. ACTIVITY OVERVIEW
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During the third quarter of 2008, IM2.HMI has continued the development of offline and online meeting browsers and assistants. A tool called MyLink has been implemented to link web documents (e.g. minutes of a meeting) with personal information, highlighting automatically in the documents (e.g. minutes) the part that might interest a specific user according to his/her personal information and personal documents (using windows desktop search). Further, a novel online meeting assistant (Docobro) has been implemented, thanks to HephaisTK, which enables multimodal manipulation of information associated with physical documents by means of speech commands, RFID tagged object and standard keyboard/mouse. Finally, the Automatic Content Linking Device has been re-implemented in Java to improve robustness and enriched with the Google AJAX service in order to address queries over websites. Concerning user requirements and evaluations, a synthesis of the overall user centered activities since the beginning of IM2 has been produced in the form of a technical report. The special session on user requirements and evaluation at the MLMI 2008 workshop, co-chaired by IM2.HMI members, identified two complementary approaches, namely user-based vs. technology-based, tackling complementary two scenarios: meeting browsing vs. meeting assistance. Finally, the work on automatic BET answering has made an initial attempt, using lexical matching within an evolving window through the transcript, with an initial result slightly above random answering (60% vs. 50%). In the next quarter, works on offline and online meeting browsers and assistants will continue to improve: personal meeting browsing (using social network info), multimodal interaction in the meeting room (using hephaisTK), automatic content linking with query-over-website functionality, the automatic BET answering system, etc.

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

DIVA - Florian Evéquoz
During the last quarter, a paper presenting the PIM approach and the current prototype was submitted to VDA 2009. From the interface point of view, the timeline view of personal information was enhanced, allowing selection in the document-list view to be propagated to the calendar view and vice versa. On the other hand, email extraction mechanisms have been improved, adding metadata to allow a better tracking of contacts "lifetime", automatic detection of emails' main language, and numerous text retrieval updates to match the requirements needed by the integration with WDS.

MyLink (Fig. 1) is a bachelor student project supervised by Florian Evequoz and Denis Lalanne, in the context of personal information management in IM2.HMI. Its goal is twofold :
1. to link a textual document (e.g. the minutes of a meeting) with user personal information, i.e. to display local documents that are similar to the one currently opened with respect to the themes that appear in both (using windows desktop search).
2. to provide a graphical summary of a document by highlighting themes that are of user interest in the document and showing the places in the document where these themes get treated.

Fig. 1 On the left, MyLink showing a document with the main keywords (right panel) and user themes highlighted. On the right, a personal summary of the document, showing where user selected themes appear in the document, and local documents similar to the opened one.

Theme 2: Online meeting browsers and assistants

DIVA - Bruno Dumas
Work of third quarter 2008 on HephaisTK toolkit consisted in the development of a use case for the toolkit. This application, named Docobro, allows a user to visualize a number of documents, sort them by type or thematic, add a previously RFID-tag paper document to the virtual cloud of documents, and open its electronic representation. Docobro can be manipulated by means of standard keyboard/mouse, speech commands or RFID tagged objects. This application served as a showcase for the HephaisTK toolkit at IHM'08 conference in Metz, France.
Furthermore, the development of Docobro yielded numerous enhancements of the HephaisTK toolkit, among which:
- extended recognizers addition possibilities as well as modifications to the multi-agents architecture
- addition of a french speech recognition dictionary, alongside the english dictionary
- corrections to HephaisTK in order for the toolkit to be effectively cross-platform

Fig. 2 A user adds to the document cloud a new RFID-tagged article, by approaching the document to the RFID-reader in the UNIFR smart meeting room; the reference to the document appears in the document cloud, under "computer science" thematic. An "open" speech command while pointing to the label opens the electronic version of the document.

Automatic Content Linking Device (ACLD) - Idiap, A.Popescu-Belis

The Query Aggregator is the central part of the ACLD, which receives ASR results from a real-time speech recognition system (IM2.ASR) and sends the results to a User Interface (from external IM2 partner), via the Hub. The Query Aggregator was reimplemented in Java (from its previous version in Perl), thus making it more robust, more portable, and better integrated in the ACLD architecture, whose components are all in Java. The new QA is also more efficient, because the original Apache Lucene module that it uses is in Java as well. The QA was adapted to manage a new representation of keywords in the Hub, which allows the list of keywords (to be monitored by the QA in the ASR) to be updated in real time. Indeed, the QA now retrieves the list from the Hub in real-time.

In addition to queries over a set of documents, the QA is now also using the Google AJAX service in order

to address queries over websites as well. To limit the search space and increase the relevance of results, only search over a limited web domain (e.g. en.wikipedia.org) is used at present. This functionality is now under implementation.

Theme 3: User requirements and evaluations

A synthesis of all the user centered activities within IM2, from its beginning, has been produced in the form of a technical report.

A special session on "User requirements and evaluation of multimodal meeting assistants/browsers" was organized at the MLMI 2008 workshop (by Idiap, DIVA/UniFr, and two other non-IM2 partners). Following the call for papers, five papers have been selected for presentation, and have been published in the MLMI proceedings. The session included a panel discussion co-chaired by Denis Lalanne. The discussion identified two complementary points of view, namely user-based vs. technology-based, which are both useful to make progress on meeting technology, and have many connection points. It appeared that the main scenarios of use are now well-identified: meeting browsing vs. meeting assistance (assistance to users can be offered to increase the efficiency of attendance, or to provide help with content that is relevant to a meeting). The current challenge that has been identified is to determine the level of performance that isrequired from technologies in order to generate acceptable user-satisfaction (e.g., in some cases, ASR output offers comparable performance to human transcript, for instance for automatic summarization).

The work on automatic BET answering (*Idiap* - Quoc Anh Le) has made an initial attempt at answering questions by maximal lexical matching within an evolving window through the transcript. Brute force optimization through exploration of a large part of the parameter space (including size of window and transition length) has not shown particular maxima. Therefore, the results are not yet significantly above random answering (60% vs. 50%), therefore a more elaborated approach is currently envisaged (see future work).

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3. FUTURE WORK
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Theme 1: Offline meeting browsers

DIVA - Florian Evéquoz

1. Determine precisely the tasks of PIM where visualization would increase efficiency
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

DIVA - Bruno Dumas

1. Integrate advanced error management 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

Finish the query-over-website functionality for the Query Aggregator. Integrate with the other components of the ACLD in order to produce the second version of the overall system.

Theme 3: User requirements and evaluations

Implement a two-step method for automatically answer BET questions: first identify the relevant section from a meeting where the answer is likely to be found, and then proceed to a more fine-grained analysis of this section in order to identify the answer, or more exactly - given our formulation of the problem - to find the correct alternative among the two BET questions.

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4. PUBLICATIONS
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- Popescu-Belis A., Boertjes E., Kilgour J., Poller P., Castronovo S., Wilson T., Jaimes A. & Carletta J. (2008) - The AMIDA Automatic Content Linking Device: Just-in-Time Document Retrieval in Meetings. *Machine Learning for Multimodal Interaction V (Proceedings of MLMI 2008, Utrecht, 8-10 September 2008)*, LNCS 5237, Springer-Verlag, Berlin/Heidelberg, p.272-283.
- Matena L., Jaimes A. & Popescu-Belis A. (2008) - Graphical representation of meetings on mobile devices. *Proceedings of MobileHCI 2008 (10th International Conference on Human-Computer Interaction with Mobile Devices and Services)*, Amsterdam, p.503-506.
- *Denis Lalanne and Andrei Popescu-Belis, "*Overview of IM2 achievements in user-centric design, system integration and evaluation of meeting assistants and browsers", IM2 technical report, *September 2008*.

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5. MISCELLANEOUS
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Florian Evequoz, Denis Lalanne and Rolf Ingold. A Visual and Interactive Index to Personal Information Combining Temporal, Social and Thematic Facets. Poster presented at *IM2-Affective Sciences Summer Institute 2008 in Riederalp*.

Bruno Dumas, Denis Lalanne, Rolf Ingold. "The HephaisTK Multimodal Interfaces Creation Toolkit : Architecture and Scripting Language." Riederalp, September 2008. This poster presented HephaisTK, a project which targets (a) the development of novel multimodal fusion mechanisms and (b) the creation of an open-source toolkit allowing the rapid creation of multimodal interfaces.

Denis Lalanne (DIVA group) and Rene Sommer (Logitech) gave a 3h tutorial to introduce Human Computer Interaction to 40 high school students at the Cybercamp 2008 organized at the University of Fribourg in July 2008. They discovered the world and evolution of the human-machine interfaces: from ENIAC, the world's first computer, up to multimodal interfaces.

The HephaisTK was showcased at IHM'08, Metz, France by Bruno Dumas.

Lalanne D. and Popescu-Belis A. gave a presentation on "Meeting assistants: User requirements,

evaluations, and novel applications" at the *IM2 Scientific and Advisory Board*, 10 September 2008, Utrecht.

Popescu-Belis A. gave a presentation on "Towards an automatic content linking device: online document retrieval and display during meetings" at the *Joint IM2 and Affective Sciences Summer Institute*, 1-3 September 2008, Riederalp.