The (IM)2 Newsletter
(IM)2 education, ICSI fellowships, (IM)2.AP becomes (IM)2.DI, (IM)2 in Berlin

The Infotronics group at HEVs developed the software and built the hardware of the Short Microphone Array prototypes.

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The (IM)2 Newsletter

Every month the (IM)2 Newsletter brings you the latest and hottest
scientific and administrative news about the (IM)2 NCCR and related topics

Coordinating and fostering (IM)2-related education

The (IM)2 Management Board has decided to coordinate and strengthen the education effort in the topics covered by (IM)2. Information is being collected about the various advanced undergraduate and graduate courses given in all academic institutions within (IM)2. The consolidated list will then be circulated. It will serve as a basis for identifying gaps in the offered courses, for allowing students to attend courses in other institutions, and for offering new courses based on the latest developments in the field. These efforts will build upon current agreements between institutions (for example UniGE-EPFL, UniFR-UniBE, etc).

ICSI Visitor fellowships

In the framework of the ongoing ICSI-(IM)2 exchange program, ICSI has opened a number of visitor fellowship positions for the fall of 2003 and for 2004. These positions are open to postdocs and PhD students working within (IM)2 as well as to outstanding undergraduate students who intend to continue their career with a PhD position within (IM)2.

Interested candidates should fill in the form at www.im2.ch/icsi-exchange.php and return it to IDIAP by May, 16. The form requires a description of the planned research at ICSI, which should fit one of (IM)2 and ICSI's key areas of research:

- New developments, applications or technology research concerning speech processing, and in particular robust speech recognition (e.g., for distributed speech recognition from cell phones and PDAs),
- Spoken language interaction in meetings (both analysis of interaction and of the spoken language properties),
- Computational linguistics, including algorithm and corpus development (such as semantic role annotation),
- Ubiquitous Computing, with particular emphasis on interfaces (e.g., speech).

Candidates must have a proficiency in spoken and written English, to facilitate interaction in a multinational project team. Applications by young female scientists are highly encouraged and will favored.

Decisions will be taken on the basis of:

- Quality of the proposed research, and match with current (IM)2 and ICSI research activities,
- The candidates Curriculum Vitae, especially as it reflects the scientific excellence and the ability to contribute substantially to the proposed project,
- Available ressources.

Decisions will be circulated by June, 13. Exact financial terms will be negotiated case by case, in particular based on the portion of the candidate's current salary that he/she will be able to maintain. The selected candidates will also receive, upon the acceptance at ICSI of a travel expense report (including the airline receipt), a travel expenses reimbursement (a round trip air fare ticket in economy class, from their home location to San Francisco, USA) up to 1,800 US $.

www.icsi.berkeley.edu

(IM)2.AP becomes (IM)2.DI, (IM)2.LH becomes (IM)2.IP

The Individual Project formerly known as (IM)2.AP (Application Project) has been redefined by its leader Prof. Rolf Ingold in collaboration with the (IM)2 management in order to focus more on UniFR team's interest and expertise. Document Integration will now be the major focus, with the objective of adding extra documents – electronic or paper – used during a meeting to the recordings of the smart meeting rooms. This includes scanning, OCR, indexing and especially synchronising the documents with the timestamped audio and video streams.

As a consequence of the new target of that IP, the ongoing integration effort at the Leading House, formerly known as (IM)2.LH, will now be called the (IM)2 Integration Project, (IM)2.IP.

IDIAP and (IM)2 featured at the Swiss Embassy in Berlin

As a followup to last year's August 1st celebration, which saw a replica of the Matterhorn built in the middle of Berlin, the canton of Valais was invited by the Swiss Embassy in Berlin for a reception with representatives of the economic, political and diplomatic worlds. After a general presentation by State Councilor Jean-René Fournier, Dr Jean-Albert Ferrez presented IDIAP and the (IM)2 NCCR, and showcased some research results.

The Swiss Embassy in Berlin

Events

(IM)2.IIR workshop   15.04.03
(IM)2.IIR holds regular meetings meant to show work in progress, and to foster discussions and exchanges. These informal talks are usually longer than typical conference talks. On April, 15th, however, a general IIR meeting will take place in Geneva (9h30, UniDufour, room 362) featuring talks by Ivana Arsic (EPFL), Maria Georgescul (UniGE), and Florent Monay (IDIAP), followed by a discussion regarding the IP: goals, issues, roadmap. For further details, please contact Prof. Thierry Pun, Thierry.Pun@cui.unige.ch.

(IM)2.ACP workshop   16.04.03
On April 16th in Bern, (IM)2.ACP will host an IP meeting aiming at strengthening the team distributed in several institutions (UniBern, ETHZ and IDIAP) and at setting the grounds for a common database for multimodal user authentication. For further details, please contact Prof. Horst Bunke, bunke@iam.unibe.ch.

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The Infotronics group at HEVs

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The Infotronics group was established in 1996 as one of two applied research and development groups within the department of electrical engineering at HEVs. Its 33 collaborators (of which 11 lecturers and 9 permanent staff) concentrate on data acquisition, communication and control systems. The group is organised into three teams, focussing respectively on instrumentation and control, embedded systems, and distributed systems.

The team who worked on the Short Microphone Array: Daniel Duay, Dr Gilbert Maître, Jean-Pierre Gehrig, Charles Praplan, Christian Briguet, and Dr Joseph Moerschell showing the first SMA prototype.

The Infotronics' group contribution to (IM)2 is the Short Microphone Array (SMA) front end and processing node development within the Real Time Microphone Array project lead by IDIAP. The objective is to develop a hardware platform and associated low level software linking a set of 8 microphone inputs and as many loudspeaker or line outputs to high performance DSPs capable of real time spatial filtering, SNR enhancement and speech analysis or synthesis tasks. A dual Tiger-SHARC board forms the basis of the SMA hardware. These DSPs are currently the most powerful number crunching engines available, with 1.5GFLOPs peak computing power in 64bit floating-point arithmetic. Using a Firewire bus, the system can be made modular, i.e. multiple units may be interconnected and a central PC may control and distribute or collect data streams through the network. The basic software package developed for the SMA allows the application programmer to handle the audio in- and outputs through a driver, and to communicate with a PC using the Firewire bus. An API on the PC makes available a class of control and data streaming functions. Future additions to the SMA platform may include pan-tilt-zoom camera control or even image acquisition functions.

Major projects in the field of instrumentation and control

High quality data acquisition of seismic signals: For a scientific mission to Mars, an acquisition and signal processing front end is developed for seismic data logging. SNR in excess of 120dB is achieved in seismic bandwidths (<10Hz). The electronics is optimised for low power consumption, mass and volume. Multi-rate brick-wall filtering is used to optimise data resolution with respect to communication bandwidth.

Micro-position sensing and control applied to tip-tilt mirror laser pointing devices and to atomic force microscopy: Several projects deal with nanometric capacitive, inductive or optical position sensors, interface circuits and control loop implementation. The laser pointing devices studied are used for free space optical beam steering for data communication and for eye-motion tracking in ophthalmology.

Fermentation processes: The objective is to reconstruct on-line biomass growth information from a set of measurements of characteristic liquid and gaseous phase constituent concentrations, and to use this information for the optimisation of growth rate and yield through appropriate feed control of the reactor.

A newly starting project will address real-time signal acquisition and processing techniques for medical research. The goal is to realise a sensing and processing platform based on programmable logic that may serve as a basis for portable assistance device development, in particular for cardiovascular monitoring and stimulation.

Embedded systems activities

The digital hardware development part of these projects is done in close collaboration with the embedded systems designers. Several collaborators work in the field of VHDL design for programmable logic circuits. Various IP cores have been developed in the group amongst which a PCI bridge, an SPI interface, GPS signal synchronisation and a scalable minimal processor targeted at real time data intensive computing applications, e.g. filtering and control algorithms. System on chip developments have been done up to a complexity of more than 1 million system gates, including parallel operation of several ALUs.

Besides programmable logic, the embedded systems group has developed together with industrial partners a complete time measurement equipment for sports events, e.g. ski competitions, and wireless access control equipment e.g. for skiing domains. DSP based systems are being developed various applications e.g. for Doppler velocimetry applied to retina blood flow detection.
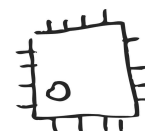
Distributed systems projects

Projects of the distributed systems team deal with the networking of embedded devices and their integration into IT environments.

Web-enabled devices: a Web services framework containing an HTTP(S) server, an XML parser and a SOAP library is implemented in 32-bit and 8-bit embedded systems with TCP/IP connectivity. The integration of these so-called web-enabled devices into IT environments like SunONE or Microsoft .NET and their conformance with W3C standards has been thoroughly tested.

WPANs: Bluetooth (IEEE802.15.1) Wireless Personal Area Networks (WPANs) have been used in several projects. A Zigbee (IEEE802.15.4) WPAN demonstrator will be developed. The distributed systems team focuses itself on the software implementation of WPANs protocols on low resources embedded devices.

UML-based designed methodology for embedded systems: The distributed systems team has a field experience in using UML and UML based tools to develop software for embedded systems. In a new project called hardware software co-development, an embedded system is modelled in UML, letting developers choose in a late stage what will be implemented in hardware and in software.

jm

infotronic.hevs.ch