

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

IDIAP's new building is ready

To account for the activity increase at IDIAP, which recently grew from 40 to 60 people, and to offer enough office space and meeting and conference rooms for new researchers, the City of Martigny has invested in the construction of a new building in the backyard of the Villa Tissières. Totalling more than 700 square meters over two floors, the "Pavillon Dalle Molle" was built in a mere four months and offers 16 offices for one or two people, 5 larger offices for three people, one multimedia meeting room, a large conference room capable of hosting more than 70 people equipped for video-conferencing, and a cozy cafeteria.



Some of IDIAP's staff enjoying a late afternoon drink between the two buildings.

New researchers at IDIAP

Now that the space constraint has been lifted, IDIAP will welcome during the next few months many new staff members. Aside from PhD students and undergraduate students doing a short summer internship, a few seniors will strengthen the current research directions or open new ones.

Dr Pierre Wellner is the founder and CTO of Spiderphone (see www.spiderphone.com), a former Principal Member of Technical Staff at AT&T Bell Labs - Research, and was a Research Scientist at Rank Xerox Research Center (EuroPARC) and Xerox PARC. Pierre Wellner will join IDIAP's Speech Processing group in August, and will initiate new activities in the integration of multimodal systems and smart surfaces.

Dr Josè del R. Millán is a Research Scientist at the Joint Research Centre of the European Commission. His current main research interest is the development of adaptive biosignal-based human-computer interfaces integrated in wearable

systems, which he will pursue in the framework of the *Brain Machine Interface* white paper. Josè Millán will join IDIAP's Machine Learning group in September.

(IM)2.SA mini-workshop

On Friday, July 14th, the Computer Vision Laboratory BIWI at ETH Zürich of Prof. Luc Van Gool (see this issue's backpage) hosted a mini-workshop dedicated to the presentation and discussion of the 5 White Papers on scene analysis and demonstrations of some BIWI projects.

The 5 White Papers are :

MUCATAR : *People Tracking and Activity Recognition using Multiple Cameras*, by Dr Daniel Gatica Perez and Dr Jean-Marc Odobez, IDIAP

SLVT : *A Self-learning Visual Tracker*, by Prof. Luc Van Gool, ETHZ-BIWI

BEHAVE : *Behavioral Model-based Scene Analysis*, by Dr Jean-Philippe Thiran, EPFL-ITS, in association with Dr Michel Bierlaire, EPFL-ROSO

ITM2 : *Information Theoretical Multimodal Signal Processing*, by Dr Jean-Philippe Thiran, EPFL-ITS

ASIM : *Applied Stochastic Image Modeling*, by Prof. Pierre Vanderghenst, EPFL-ITS

The first three projects focus on various aspects of tracking people in video sequences. The various approaches often involve the original combination of standard tracking techniques with external knowledge to improve tracking accuracy. For example, BEHAVE will use discrete choice models to predict the behavior of each individual in a crowd. Based on these models, the tracker can adapt itself to each specific case. In turn, information extracted from the video is fed back to fine-tune the underlying behavioral models.

IP Status Reports

Following a decision of the (IM)2 Management Board, every IP Head now writes a consolidated quarterly status report about the activities of each IP and related White Papers. These status reports are archived on the local (IM)2 web site and available to all (IM)2 members.

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Events

IEEE ICME, Lausanne 26–29.08.02

This year's IEEE International Conference on Multimedia and Expo, takes place August 26-29, 2002 at EPFL, Lausanne. (IM)2 supports the Best Paper Award to be presented at the banquet. For more details, see www.icme2002.org.

CAST Event, Lausanne 27.08.02

During ICME, Cast - EPFL's Industrial Liaison Programme, is organising a meeting between academia and industry on "secure multimedia usage", see cast.epfl.ch.

IEEE NNSP'02, Martigny 4–6.09.02

The 2002 IEEE International Workshop on Neural Networks for Signal Processing is organized by Prof. Hervé Bouldard (IDIAP). For more details, see eivind.imm.dtu.dk/nns2002

DAGM'02, Zürich 16–18.09.02

This year's German Conference on Pattern Recognition is organized by Prof. Luc Van Gool (Vision Group, ETHZ). The focus is on image processing and computer vision, but other aspects related to (IM)2 will also be covered. For more details, see dagm02.vision.ee.ethz.ch.

The conference will be followed on 19 and 20 September 2002 by a joint workshop to informally discuss the results of several European projects investigating into Cognitive Vision processes and systems (COGVIS, COGVISYS, ACTIPRET, DETECT, VISATEC, LAVA, CAVIAR and VAMPIRE). For more details, see cogvis.vision.ee.ethz.ch.

(IM)2 Summer Institute 3–4.10.02

On October 3 and 4, Martigny will host the first (IM)2 internal workshop. This will be the perfect opportunity to look back on the first months of the NCCR, to identify gaps and overlaps in the various research plans, and to tighten the links among the researchers at a time when – hopefully – all positions will have been filled. Further information and registration details will be available on the local pages of the (IM)2 web site.

The Computer Vision Laboratory BIWI @ ETHZ

BIWI, shorthand for the Computer Vision Laboratory at the Department of Information Technology and Electrotechnical Engineering of the ETH in Zurich, is a proud member of the IM2 consortium. We mainly contribute to the SA (Scene Analysis) project, through work on segmentation/grouping and tracking.

In this overview of our research, we focus on the non-medical research in the group. The 5 main topics are:

1. tracking and gesture analysis
2. motion capture and animation
3. texture analysis and synthesis
4. multi-camera environments
5. object recognition

In the area of tracking and gesture analysis, we work on marker-less tracking for Virtual and Augmented Reality. BIWI is combining the strengths of condensation and mean shift trackers and, in the context of IM2, is developing self-learning trackers. BIWI also develops affine trackers, that deal with out-of-plane rotations in real-time. Gesture analysis apps include surveillance and human-machine interfaces. They are based on the tracker technologies.

BIWI also captures humans in 3D. We do faces, hands, and whole bodies. A first research issue is the development of the 3D capture techniques in their own right. We develop systems that can measure thousands of 3D points in real time. Secondly, the acquired 3D motions need to be analysed. Finally, observed body dynamics are reversed, in order to obtain realistic animations. The work on face animation is the most advanced at this point and has recently found its first users in Hollywood!



BIWI built a tool to animate static face models. The animation takes account of the face's physiognomy.

Textures are often used to simulate surface roughness. Simple texture mapping cannot create the self-shadowing or self-occlusion effects of real surfaces, however. BIWI develops compact texture models that include such effects. Hierarchical approaches allow us to model intricate textures that defy direct analysis and synthesis. Combined with our unsupervised texture segmentation techniques, structures like complete landscapes can be generated automatically.

BIWI is developing several multi-camera systems, that observe humans and analyse their behaviour in 2D and 3D. An example project is a clever cave, that watches the user and sends their 3D model over a network to another user, in a similar cave. This allows the users to virtually meet in a chosen 3D environment. We also investigate into automatic camera hand-over, e.g. for tele-teaching and surveillance.

In the area of object recognition, BIWI focuses on methods to handle large changes in viewpoint and illumination conditions. An example application is automated video annotation, where a supervisor indicates an object once, and the system goes out to detect the other occurrences of that object within the same or other videos.



A tracker that combines the advantages of condensation and mean shift tracking is able to follow players even if they make fast turns or occlude each other.

People

The BIWI team is about 40 people strong, of 15 different nationalities. The group is led by professors Luc Van Gool and Gabor Szekely. The postdoctoral researchers involved in the project are Esther Koller-Meier and Tomas Svoboda. The PhD researchers currently working on the project are David Serby, Andreas Turina and Philipp Zehnder.

More information about BIWI can be found at www.vision.ee.ethz.ch.

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