

IM2 Newsletter

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News

IM2 Summer Institute 2010 September 13rd - 15th 2010, Saanenmöser (Gstaad)

Themes: Collaborating, socializing and networking

<http://www.im2.ch/summer-institute-2010>

Cover Story

IM2 researchers involved in a new European FP7 Project called "HUMAVIPS"

HUMANOIDS WITH AUDITORY AND VISUAL ABILITIES IN POPULATED SPACES

Jean-Marc Odobez and Daniel Gatica-Perez (Idiap Research Institute), are partners in the FP7 HUMAVIPS project (Humanoids with auditory and visual abilities in populated spaces), which started in February 2010.

The project is coordinated by Radu Horaud (INRIA Grenoble, France), and also involves the Technical University of Prague (Czech Republic), Bielefeld University (Germany), and Aldebaran Robotics, a french company that develops and manufactures the Nao robot (see picture).

The objective of HUMAVIPS is to endow humanoid robots with audiovisual abilities for exploration, recognition, and interaction, such that they exhibit adequate behavior when dealing with a group of people. Humanoids expected to collaborate with people should be able to interact with them in the most natural way. This involves significant perceptual, communication, and motor processes, operating in a coordinated fashion. Consider a social gathering scenario where a humanoid is expected to possess certain social skills. It should be able to explore a populated space, to localize people and determine their status, to decide to join one or two persons, to synthesize appropriate behavior, and to engage in dialog with them.

Humans solve these tasks routinely by integrating the often complementary information provided by multisensory processing, from low-level 3D object



positioning to high-level gesture recognition and dialog handling. However, designing cognitive systems that understand the world from unrestricted sensorial data, recognize people's intentions and behave like them are extremely challenging problems that will be addressed in the project.

The research in HUMAVIPS will emphasize the role played by multimodal perception with principled models of human-robot interaction and of humanoid behavior. The contribution of the Idiap team in the project will rely on and extend the experience gained in the context of IM2, from the extraction of nonverbal cues (head pose and speaking activity) in real conditions to the modeling and contextual understanding of people interactions (focus of attention, conversation analysis) and relationships (e.g. estimation of social states and relations) from multimodal nonverbal cues.

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IM2 researchers invited to give lectures at the Summer School AERFAISS'2010

AERFAISS'2010, JUNE 7-11 IN BENICÀSSIM, SPAIN

The AERFAI Summer School 2010 (AERFAISS'2010) organized by the Spanish Association for Pattern Recognition (AERFAI) in collaboration with the Institute of New Imaging Technologies of the University Jaume I of Castellón. This is the fifth edition in a series of AERFAI Summer Schools devoted to a wide range of topics in the fields of Pattern Recognition and Machine Learning.

Stéphane Marchand-Maillet (University of Geneva) and Daniel Gatica-Perez (Idiap Research Institute) have been invited to give lectures on Pattern Recognition and Learning in Multimedia Systems. Their talks will directly mirror their involvement in IM2. Dr. Gatica-Perez is proposing a talk on "Human Activity Modelling from Mobile Phone Sensors" so directly related to Social Signal Processing (IM2 IP1-Integrated Multimodal Processing and IM2 IP3-Social Signal Processing and Dr. Marchand-Maillet will give a talk on "Multimodal Data Fusion" (IM2 IP1-Integrated Multimodal Processing).

The focus of this year's Summer School is to study the most relevant approaches to Pattern Recognition and Machine Learning in Multimedia Systems. This event is open to any researcher or PhD-student who is interested in learning or refreshing their knowledge about the most successful approaches in the fields of object & human-action detection/categorization and recognition.

The Summer School 2010 is organized as a five-days intensive course to be held June 7-11 in Benicàssim (Spain). Leading experts in the field shall present each tutorial, followed by a practice session with specific software in order for participants to gain a better understanding of the theory. A non-formal poster session will also be organized for the participants to present their current research and interact with their scientific peers.



Sessions:

Session 1 - Interactive Video Retrieval

Dr. Cees G.M. Snoek, University of Amsterdam

Session 2 - Learning with Structured Inputs and Outputs

Dr. Christoph Lampert, Institute of Science and Technology, Vienna

Session 3 - Multimodal Data Fusion

Dr. Stéphane Marchand-Maillet, Computer Vision and Multimedia Lab, University of Geneva

Session 4 - Human Action Recognition

Dr. Ivan Laptev, Institut National de Recherche en Informatique et en Automatique, Paris-Rocquencourt

Session 5 - Recognition and Features

Dr. Krystian Mikołajczyk, Centre for Vision, Speech and Signal Processing, University of Surrey

Session 6 - Human Activity Modelling from Mobile Phone Sensors

Dr. Daniel Gatica-Perez, Idiap Research Institute, Martigny

Session 7 - New Challenges in Machine Learning

Prof. Ethem Alpaydin, Bogaziçi University, Istanbul

More information at: <http://www.aerfaiss2010.uji.es>

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Completed Thesis, Guillaume Heusch, Idiap Research Institute

BAYESIAN NETWORKS AS GENERATIVE MODELS FOR FACE RECOGNITION

On Jan 15 2010, Guillaume Heusch successfully defended his PhD thesis entitled "Bayesian Networks as Generative Models for Face Recognition".

In his PhD thesis, Guillaume Heusch proposed to use the generic framework of probabilistic graphical models for face recognition. He investigated more precisely directed graphical models (Bayesian Networks) as opposed to undirected graphical models (Markov Random Fields), and focuses his work on a particular aspect of face recognition: face authentication.

He investigated more particularly: (1) the modelling of a face image using a Bayesian Network and its evaluation using an objective performance measure, and compares this system to the state-of-the-art (SOTA) on several databases, and (2) the effect of adding auxiliary information (color, resolution, geometry) to the Bayesian Network and performing similar evaluations. To complete his work,

he proposed an efficient preprocessing algorithm to improve the performance of the proposed model.

The obtained results are very good and are reaching or even outperforming the state-of-the-art. Guillaume Heusch followed very strict evaluation procedures and experiment protocols on well-known benchmark databases, leading to unbiased results. He made an important effort for developing an efficient implementation of the proposed algorithms within an open source machine vision library to support his work.

This is an important and concrete result of his thesis work that can be used directly and benefit the entire research community in the field of face recognition.

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An IM2 PhD student, Efi Kokiopoulou, received the 2009 EPFL Doctoral Thesis Award

THESIS: GEOMETRY-AWARE ANALYSIS OF HIGH-DIMENSIONAL VISUAL INFORMATION SETS.

Efi is a postdoctoral research associate at the Seminar for Applied Mathematics (SAM) within the Department of Mathematics at ETH, Zurich, working with Prof. Daniel Kressner. She completed her PhD studies in December 2008 at the Signal Processing Laboratory (LTS4) of the Swiss Federal Institute of Technology, Lausanne under the supervision of Prof. Pascal Frossard. Her research interests focus on Pattern Recognition, Computer Vision and Numerical Linear Algebra.

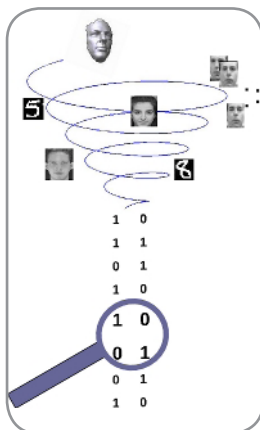
In March 2010, she has been nominated to receive the 2009 EPFL Doctoral Thesis Award during the "Magistrale 2010" at the EPFL which will be held on October 9th 2010. This award is bestowed to an outstanding PhD thesis as for its originality, impact of the results and presentation.

Thesis abstract:

Over the last fifteen years we have been experiencing a revolution in the amount of data that we collect and publish. This very fact creates a grand challenge: How can we create useful knowledge out of this data deluge? This question that refers to the problem of data analysis, lies at the heart of this thesis. We focus on the problem of pattern classification in the analysis of high-dimensional visual information sets that come from modern multimedia applications. High dimensions stem from the representation of data in high-dimensional vector spaces, such as the number

of pixels of an image, the numerous frames of a video sequence or the several points in a 3D point cloud.

The thesis proposes new methods for the analysis of visual pattern manifolds based on sparse geometric expansions and graph models. The thesis' contribution is three-fold. First, it leverages the use of sparse representations towards invariance with respect to geometric pattern transformations as well as for classification-aware dimensionality reduction. The proposed method is guaranteed to find the globally optimal solution of the associated non-convex optimization problem, when the pattern transformation consists of a synthesis of translation, rotation and scaling. Second, it proposes graph-based methods for pattern classification with multiple observations in both centralized and distributed environments and third, it designs fast consensus methods for distributed data analysis and classification in multimedia sensor networks.



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IM2 researchers invited to give talks at the 10 PLUS-VIPS School

ADVANCED COURSES ON COMPUTER VISION, PATTERN RECOGNITION AND IMAGE PROCESSING JULY 18-22, 2010, ITALY

The workshop will be held on December 3th, 2010, at Fondazione Mediaterraneo in Sestri Levante, Italy. The registration deadline is 30th April 2010. Late applications will still be considered on a single basis.

This school follows the series of intensive courses, aimed at PhD students and researchers in the areas of Computer Vision, Image Processing, and Pattern Recognition. It is organized and sponsored by the PLUS (Pattern analysis, Learning, and image Understanding) laboratory of the Istituto Italiano di Tecnologia, Genova (Italy) jointly with the VIPS (Vision, Image Processing, and Sound) lab of the University of Verona. The course on "**Social Signal Processing: State of the Art and Prospects**" is residential, spanning 5 days, so that attendees can install a more productive interaction with the lecturers.

Speakers:

- Daniel Gatica-Perez, Idiap Research Institute (Switzerland)
- Alessandro Vinciarelli, University of Glasgow (Scotland) and Idiap Research Institute (Switzerland)

This course is an introduction to Social Signal Processing, the field aimed at bridging the social intelligence gap between people and machines. At its core, social intelligence consists of sensing nonverbal behavioral cues displayed by people around us (facial expressions, gestures, vocalizations, postures), interpreting these

cues in terms of social signals (relational attitudes like interest, hostility, empathy, agreement and disagreement, or dominance), and displaying as a response natural, consistent behaviors (interest for those we are interested in, or hostility for those we are hostile to). From a scientific point of view, this results into three core objectives:

1. Detection of nonverbal behavioral cues using sensors including microphones, cameras, proximity detectors, or others.
2. Inference of social signals from nonverbal behavioral cues.
3. Synthesis of social signals through different forms of embodiment in artificial agents, avatars, or synthetic voices.

The course focuses on the first two questions and provides an introduction to the main scientific and technological problems and the existing work for two major scenarios, namely face-to-face interaction (meetings, conversations, etc.) and large scale social interaction (daily life of populations sensed with mobile devices). This interdisciplinary research has the potential of significantly advancing several domains related to automatic monitoring, including video surveillance, ambient intelligence, marketing, office space design, and architecture and urbanism. More information at: <http://sspluschool.wordpress.com>

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News

IM2 Summer Institute 2010

September 13rd - 15th 2010, Saanenmöser

The IM2 Summer Institute will be held in Saanenmöser (GOLFHOTEL Les Hauts de Gstaad) from September 13rd to September 15th 2010.

The focus of this year's Summer School will be about collaboration. All IM2 IP partners are more than welcome to attend this event. Consider this event as a good opportunity to build your network and chat with other partners.

The registration is now open. More information at: <http://www.im2.ch/summer-institute-2010>

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2 PhD open positions in the Viper group

University of Geneva

The Viper group of the Department of Computer Science of the University of Geneva is seeking two PhD Researchers on Distributed Information Indexing and Retrieval.

The two positions are within the Swiss National Science Foundation (SNFS) project for Large Scale Indexing and Retrieval of Multimedia Collections. The project focuses on the issues of high performance, distributed and parallel computation in the process of multi-modal information indexing and content abstraction. The first PhD topic is dedicated to distributed data processing and indexing, while the second is centered around parallel machine learning and data-mining algorithms.

The Viper group on Multimedia Information Management (<http://viper.unige.ch>) is part of the Computer Vision and Multimedia Laboratory. The Viper group initially specializes on visual information management and has now extended its activities on multimedia information management.

More information at : <http://viper.unige.ch/doku.php/jobs>

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Conference at EPFL

26th - 27th April 2010, EPFL Lausanne

The 1st International Workshop on Standards and Technologies in Multimedia Archives and Records (STAR) will be held at EPFL Lausanne, the 26th and 27th April 2010.

The ability to effectively manage and protect digital multimedia content in creation, collection, preservation, and dissemination is increasingly crucial as digital technology continues to produce vast amounts of valuable and irreplaceable knowledge and information. The big questions are: Can data generated yesterday be searchable and displayable by hardware and software today and in future? Will digital content created today be accessible and presentable throughout its lifecycle (i.e. also tomorrow)? How to deal with the large number and quite different incompatible multimedia archives? How to ensure some level of interoperability among them? What are the requirements for multimedia long term archival in general? What do we cover today in standards and what and where are the gaps?

To answer these questions the workshop aims to bring together archive professionals with technical experts working in the research, development and standardisation in order to assist the alignment of user needs with the availability of technical solutions.

More information at:
<http://mmspl.epfl.ch/page38962.html>

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IM2 partner in the IAPR committee

IAPR: International Association of Pattern Recognition

This year Dr. Sébastien Marcel has been nominated as a Committee member of the Italian Chapter of IAPR for the selection of the best 2010 PhD thesis in pattern recognition in Italy.

The International Association for Pattern Recognition (IAPR) is an international association of non-profit, scientific or professional organizations (being national, multi-national, or international in scope)

concerned with pattern recognition, computer vision, and image processing in a broad sense. Normally, only one organization is admitted from any one country, and individuals interested in taking part in IAPR's activities may do so by joining their national organization.

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New IM2 Financial Manager

Idiap Research Institute

Ed Gregg has replaced Sandra Micheloud, who left Idiap for a similar position with Cortex SA. Ed Gregg has been with Idiap since January of 2004, working closely with Pierre Dal Pont and Sandra Micheloud in the financial and accounting department.

As of March 1, 2010, he has assumed the responsibilities as Financial Manager.

Valérie Devanthery
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Selected publications

Model and score adaptation for biometric systems: Coping with device interoperability and changing acquisition conditions.

N. Poh, J. Kittler, S. Marcel, D. Matrouf, and J.-F. Bonastre

In IEEE International Conference on Pattern Recognition, 2010.

Boosted binary features for noise-robust speaker verification.

A. Roy and S. Marcel

In Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2010.

Visual Attention, Speaking Activity, and Group Conversational Analysis in Multi-Sensor Environments.

D. Gatica-Perez and J.-M. Odobez

In H. Nakashima, J. Augusto, H. Aghajan (Eds.), Handbook of Ambient Intelligence and Smart Environments, Springer, 2010.

An alternative scanning strategy to detect faces.

V. Subburaman and S. Marcel

In Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2010.