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## DATABASE OF GRAPHS FOR BENCHMARKING GRAPH MATCHING ALGORITHMS

IT IS WIDELY RECOGNIZED IN THE IAPR SCIENTIFIC community the central role played by benchmarking and the consequent need of building suitable databases to be used as common data for comparing the performance of the proposed systems. In this framework, as a result of the activities of the IAPR TC-15 (Graph Based Representation in Pattern Recognition), we would like to inform the community that a new database has been made available to researchers.

The database is a huge collection of graphs realized by Mario Vento and his research group within the Intelligent Systems and Artificial Vision Lab. (SIVALab) of the Dept. of Computer Science and Systems of the University of Naples. The aim of this collection is to provide the graph research community with a standard test ground for the benchmarking of both isomorphism and sub-graph isomorphism algorithms.

The graphs have been randomly generated according to five different generation models, each involving different possible parameter settings. As a result, 84 diverse kinds of graphs are contained in the database. Each type is represented by thousands of pairs of graphs for which an isomorphism or a graph-subgraph isomorphism relation holds, for a total of 145,600 graphs.

The generated graphs belongs to five different categories: - randomly connected graphs,

- ◆ regular meshes (in 2D, 3D and 4D),
- ◆ irregular meshes,
- ◆ bounded valence graphs,
- ◆ irregular bounded valence graph

and range from a few nodes up to 1000 nodes. Details of the graph properties can be found in the documentation.

THE DATABASE, AUTHORED BY P. FOGGIA, C. SANSONE and M. Vento, is free, and has been made available both on a CD, distributed at the 3rd IAPR-TC15 Workshop on Graph-based Representations (GbR2001, Ischia May 23-25, 2001), and on the web page: <http://amalfi.dis.unina.it/graph>.

The database is completed with the documentation in both browseable (HTML) and printable (PDF) formats, the source of the software used for the generation and a graph matching library (VFLib-2.0) implementing several algorithms (Ullmann's, Schmidt & Druffel's, VF, VF2), also provided as source code.

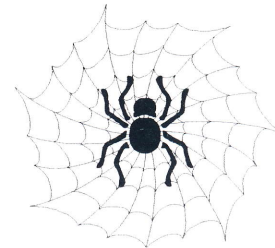
The database is still growing with other kinds of graphs. Please do not hesitate to contact us for further details.

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## NOTICE BOARD

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### DEADLINE WINTER EDITION

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FROM



**Technical Committee 14**

LAST NOVEMBER, WE ANNOUNCED THAT TC14 WAS IN the process of proposing a new name, to cover new topics. This process is now completed. TC14 has significantly expanded its activities from the time it was formed to cover the topic of image processing. For instance, TC14 organizes the Audio- and Video-based Biometric Person Authentication conference, which clearly includes both audio and image signal analysis. Researchers in Artificial Olfaction, who use pattern recognition methods in their application, have also recently expressed an interest to be a part of the IAPR. But there is no TC that directly maps to their interest. TC14's activities closely matches their interest but the name image processing does not reflect its full scope. For all these reasons, after substantial discussion, the IAPR ExCo proposed a name change for TC14. According to the IAPR C&B, this proposition was submitted to the Governing Board, which approved it by majority vote. Thus, the new name of TC14 is **Signal Analysis for Machine Intelligence**.

**Technical Committee 3**

AS ANNOUNCED IN FEBRUARY, TC3 HAS ALSO BEEN IN A renewal process, which has also now been completed. TC3 was actually comprised of two parts, neural networks and machine learning. Prior to becoming a part of TC3, the machine learning group had already established itself as a strong research group through its activities outside IAPR. Machine learning covers sub-symbolic and symbolic learning methods such as rule induction, case-based reasoning and genetic algorithms as well as data mining. Since these topics are of interest to a significant fraction of IAPR membership, a proposal was made by TC3 to create a new technical committee (TC17) exclusively addressing machine learning and data mining topics. Computational Neural Networks (CNN) are computational models inspired by the human cognitive abilities. Since the early nineties a new term, known as Computational Intelligence (CI), has been introduced, that also includes Fuzzy Logic and Evolutionary Computation. During the past thirty years, CNNs and CI models have been applied to many Pattern Recognition problems. In view of this, the proposal included a renaming of TC3 itself, to emphasize the new central scope of this technical committee. According to the IAPR C&B, this proposition was submitted to the Governing Board, which approved it by majority vote. Thus the new name and scope of TC3 is **Neural Networks and Computational Intelligence** (TC chair Marco Gori, with Nabeel Murshed named coordinator for Computational Intelligence), and a new technical committee, TC17, has been created on

**Machine Learning and Data Mining** (TC chair Petra Pernert).

**Technical Committee Financial Support**

WE WOULD LIKE TO REMIND ALL TECHNICAL COMMITTEES OF the possibility they have to ask the ExCo for financial support for running their activities. We also urge those TCs who have not set up a web page or whose web site is dormant to be active and set up these information channels. This will help in publicizing your activities and in increasing your TC membership.

**May ExCo Meeting - Capri**

AS ANNOUNCED IN THE LAST NEWSLETTER, AN INFORMAL ExCo meeting was held in Capri during IWVF4 in May, with those ExCo members who attended this workshop. Most standing committees and technical committees sent us an interim report for this meeting, which proves the vitality of the community.

A number of points were discussed in Capri, and the discussion on several of these points continued through email after the meeting. These points, on which the ExCo is working now, include:

- a drive to promote memberships from Africa
- the need for a better formalization of the factors to be taken into account by the C&M committee when deciding on IAPR sponsorship for scientific events
- the preparation of an official IAPR review form for ICPR conferences and possibly other major conferences sponsored by the IAPR.

**Next ExCo Meeting**

AN OFFICIAL EXCO MEETING IS PLANNED TO BE HELD IN Seattle in September, during ICDAR'01. All these points, and a number of other issues, will be discussed at this meeting, and we therefore hope that we will have much interesting news to report to you in the next newsletter.

**GOVERNING BOARD REPRESENTATIVES**



The Secretariat regrets an error in Volume 23 No 1 published in January this year. In the list of Members of the Governing Board, the representatives of Belarus and Belgium were condensed into one entry.

The list should have read:

- |                |  |
|----------------|--|
| <b>Belarus</b> | Prof S Ablameyko<br>abl@newman.bas-net.by            |
| <b>Belgium</b> | Dr Ir C Perneel<br>Christiaan.Perneel@twma.rma.ac.be |

We apologise to the individuals and the countries concerned.





## FORUM

*Gabriella Sanniti di Baja*

### WHICH CONFERENCE TO SUBMIT/ ATTEND?

**Y**OU CERTAINLY RECEIVE BY EMAIL, FREQUENTLY, A number of Call for Papers for various conferences. Some of them are conferences that have gained in the years a solid reputation and, possibly, would be successful also without any sort of advertisement, e.g., the ICPR conferences, just to make an example known to all IAPR members. Other conferences are regularly organised and, especially when focussing on a specific thematic, have a qualified and faithful audience, other conferences are occasional events. And, certainly, not all the Call for Papers we receive by email regard conferences in our activity field (a number of them contribute to increase our junk mail).

A better way to have a global view of the events going on in our field is to look at some of the lists of conferences in PR & CV available in internet (a list of all IAPR sponsored meetings is maintained by Michal Haindl at <http://www.iapr.org/iapr-conf.html>. A very good larger list, including also non-IAPR sponsored meetings, is maintained by Keith Price at <http://iris.usc.edu/Information/Iris-Conferences.html>. Of course, when checking the list to plan submissions/attendance we should also keep an eye on the calendar with our activity schedule.

**I**F I GO BACK TO THE BEGINNING OF MY OWN ACTIVITY, which IS not exactly the Mesozoic, planning submissions/attendance was not difficult. Only a few conferences per year among which to select. Nowadays, the scenario is quite different. In year 2001, 36 good quality conferences were listed at <http://iris.usc.edu/Information/Iris-Conferences.html> (and the list is, though quite complete, obviously not exhaustive). For sure, I would have liked to submit/attend many of them, say 24. Which leads to a couple of conferences per month. And for each conference I should have planned, say, about a week out of office. At this point, at least two fundamental questions immediately arise: 1) When could I find the time to work to submit contributions to a couple of conferences per month? This is especially true, if we consider that our research/professional activity is not only submitting to conferences. 2) Where could I find a budget to allow me to attend that many conferences? This is becoming a quite complicated problem because registration fees are rising recently (maybe conference organisation is becoming more a business transaction than scientific matter? Or it's just a problem affecting European researchers, being most of the registration fees expressed in US \$?). Thus, we have to make careful selection and planning.

Are we happier now or we possibly prefer a smaller number of higher quality events? One of the risks that I see in the increasing number of events is that the average quality of the

contributions accepted/presented decreases and that the same contributions are presented at different conferences. We cannot blame Members of the Scientific Committees if their referee reports are not as deep as it would be in case of journal submissions. They often receive too many papers to review in a too short time! The Authors themselves have very tight schedules and, to fulfil the conference deadlines, sometimes submit papers that are not the result of a complete investigation.

### *What do you think?*

## ICPR 2002 - QUEBEC CITY

AUGUST 11-15 2002

**The organization of the next ICPR 2002 is going well. The Organizing Committee has received good news from several sponsoring organizations which have given us their contributions in the past weeks.**

A new layout of the WWW page (at <http://www.icpr2002.gel.ulaval.ca>) will soon be released with details on the Technical Tracks, Call for Participation, paper submission and review process, Tutorial submission, registration fees, accommodations, companion events to ICPR 2002, and touristic information on the Quebec City area. Meanwhile, preliminary information is still available on the current WWW page at the same address.

An electronic and hard copy Call For Participation will be issued in the coming weeks and will be disseminated to the community. The ICPR 2002 Organizing Committee invites researchers to prepare to submit their latest research results to the ICPR 2002 Technical Tracks listed below for review: A software environment for supporting electronic paper submission and review has been set up and relevant information will appear on the Call For Participation and will be sent to members of the Technical Program

#### **Track 1: Computer Vision and Robotics**

Co-Chairs:

Kim Boyer, Ohio State University, USA

Henrik Christensen, Royal Institute of Technology, Sweden

Yoshiaki Shirai, Osaka University, Japan

#### **Track 2: Pattern Recognition, Neural Networks, and Document Analysis**

Co-Chairs:

Horst Bunke, University of Bern, Switzerland

Gabriella Sanniti di Baja, Istituto di Cibernetica, Italy

#### **Track 3: Image and Signal Processing**

Co-Chairs:

Murat Kunt, Ecole polytechnique fédérale de Lausanne, Switzerland

Robert Woodham, University of British Columbia, Canada

#### **Track 4: Biomedical and Multimedia Applications**

Co-Chairs:

Nicholas Ayache, INRIA - Sophia-Antipolis, France

Linda Shapiro, University of Washington, USA

**Deadline for paper submission: 01/12/01**

**Deadline for tutorial submission: 15/01/02**

**Camera ready papers and author registration: 15/04/02**



# The Norwegian Society for Image Processing and Pattern Recognition (Norsk forening for bildebehandling og mønstergjenkjenning, NOBIM) <http://www.nobim.no>

**T**HE NORWEGIAN SOCIETY FOR IMAGE PROCESSING AND Pattern Recognition was founded in 1984 at a meeting in Sundvollen where all groups in Norway, working in this field, were gathered. This year (2001) it has about 135 personal members and 25 company members. The purpose is to promote the scientific and technological development of image processing and pattern recognition in Norway.

## *The current board members of NOBIM are:*

### **Chairman**

Ivar Austvoll, Stavanger University College

### **Deputy Chairman**

Ketil Bø, Ceetron ASA, Trondheim

### **Secretary**

Yngve Birkeland, University of Tromsø

### **Treasurer**

Ragnar Bang Huseby, Norwegian Computing Center, Oslo

### **Advisory Board**

Knut Kvaal, Agricultural University of Norway

Tage Røsten, Statoil Research Center, Trondheim



*Ragnar B. Huseby (left) and Ketil Bø*

**E**ACH SECOND YEAR NOBIM ORGANIZES A SCIENTIFIC conference and in the years in between there is an Industry Seminar. To the conferences, a principal speaker from abroad is invited. In the year 2000 the conference was held in Trondheim with Dr. William K. Pratt as invited speaker, Prof. Allan Aasbjerg Nielsen from Technical University of Denmark was the invited speaker in 1998 at the conference in Oslo. In 1997 the conference and industry seminar was combined and held in Tromsø. Then the invited speaker was Rama Chellappa from University of Maryland, USA. Each second year the Scandinavian Conference on Image Analysis, SCIA, is held. This arrangement is a co-operation between the sister organizations in the Nordic countries (Norway, Sweden, Finland and Denmark). NOBIM was responsible for the 4<sup>th</sup> SCIA in Trondheim in 1985, the 8<sup>th</sup> SCIA, held in Tromsø in 1993 and this year the 12<sup>th</sup> SCIA in Bergen. The SCIA's have

participants from all over the world, but most come from European countries, in addition to the Nordic countries. The 12<sup>th</sup> SCIA in Bergen was a great success although the number of participants was a bit less than expected. There were 102 accepted papers, 56 were presented orally and 46 as posters. It lasted 4 days, with sessions on Biomedical applications, Computer Vision and Image Processing in general, Industrial applications, Machine Vision, Motion, Multimedia, Pattern Recognition and Remote Sensing.



*Prof. Jussi Parkkinen (Finland) and Dr. Ing. Ivar Austvoll at SCIA 2001 in Bergen.*

**A**T THIS YEAR'S BANQUET A PRIZE OF NOK 10000 WAS awarded for the best PhD dissertation (in Image Processing) from the Nordic countries the last two years. The winner was Kjersti Engan from Stavanger University College. The Proceedings from SCIA 2001 is available from our treasurer ([Ragnar.Huseby@nr.no](mailto:Ragnar.Huseby@nr.no)).

NOBIM's newsletter is called PIKSEL'n and is distributed to the members in addition to the IAPR newsletters. NOBIM has also published accounts of publications and organizations each second year. These will in the future be transferred to our web pages (<http://www.nobim.no>).

Our most important challenge the coming years is to increase the number of members and to promote the interest in image processing and pattern recognition in Norway. There is very much competition among the different research groups at Norwegian Universities and Colleges. It can be difficult to get the best, and a sufficient number of graduate students. It has also been hard to find interest for applications in Norwegian industry.

The annual membership fee is set to NOK 150 for personal members (NOK 50 for students) and NOK 600 for companies. The membership application can be done online.



# UKRAINIAN ASSOCIATION ON INFORMATION PROCESSING AND PATTERN RECOGNITION – UASIPPR

**T**HE UKRAINIAN ASSOCIATION ON INFORMATION Processing & Pattern Recognition (UAsIPPR in Ukrainian UAsOIRO) was founded in November 1992 and was recognised by the Ukrainian Government in March 1993. UAsIPPR, a member of IAPR, is a voluntary public creative scientific organisation which unites research teams of institutions, organisations as well as citizens of Ukraine on a voluntary basis and a community of interests to achieve the goal and tasks provided by the UAsIPPR Constitution.

Now UAsIPPR unites more than 300 researchers. It carries out RTD projects in field of signal/image processing and pattern recognition and overlapping areas. UAsIPPR organises international and regional conferences and publishes their proceedings. For participation in the labor of the Association the members are invited on a voluntary basis, common creative, professional and business interests, mutual respects and collaboration.

The main goal is to develop Theory and Applications of Signal/Image Processing and Pattern Recognition in Ukraine and by this way to contribute towards improvements in the quality of life.

- Methodological Problems of Pattern Recognition;
- Theoretical Basis of Signal and Image Processing and Recognition;
- Computer and Discrete Geometry Problems;
- Training and Selftraining Problems in Pattern Recognition;
- Automatic Recognition, Understanding and Synthesis of Speech Signals;
- Natural Language and Speech Resources and Technologies;
- Technical Diagnostics of Objects and Machines on its Signals and Fields;
- Printed and Hand-Written Texts, Drawing and Graphic Picture Processing and Recognition;
- Photopictures Processing and Recognition;
- Scene Processing, Recognition and Understanding;
- Simulating and Research Systems;
- Processors Architecture for Signal/Image Processing and Recognition;
- Signal/Image Input/Output Tools and Multimedia Systems;
- Signal/Image Filtering, Compression, Reconstruction and Synthesis;
- Audiovisual Data and Knowledge Bases: Retrieval and Summarisation;
- Multimodal Means for Man-Machine Communication;
- Advanced Information Technologies and Systems Based on Signal/Image Processing

SINCE 1992 IN UKRAINE UASIPPR ORGANIZES BIENNIAL All-Ukrainian International Conference on Signal/Image Processing and Pattern Recognition (“UkrObraz”). The last

Fifth Conference was held in 2000. The Proceedings of all these Conferences were published.

There are courses for students on Pattern Recognition and related fields in Universities and Ukrainian scientists publish many papers every year. Ukrainian researchers have contacts with Western research institutes and the journals “Cybernetics and System Analysis” (former “Cybernetics”) and “Problems of Control and Informatics” (former “Automatics”) are translated into English and re-edited in the USA.

The basic UAsIPPR institutions are The Institute of Cybernetics, UNESCO/IIP International Research-Training Centre for Information Technologies and Systems (both Kyjiv), The Institute of Physics and Mechanics of the Academy of Sciences of Ukraine (L’viv) and Kharkiv Technical University of Radioelectronics.

**S**OME WELL-KNOWN TECHNIQUES WERE ORIGINATED AND developed in Ukraine: Generative Model for Dynamic Time Warping in Automatic Speech Recognition; Two-Dimensional Structural Picture Analysis and Recognition; Heuristic Algorithms for Identification, Extrapolation and Prediction; Special Hardware Architectures for Signal/Image Processing.



Since 1992 Prof Dr.Eng.Sc. Taras Vintsiuk (pictured above) has been the UAsIPPR President and IAPR Governing Board representative.

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## SPONSORSHIP of CONFERENCES

**M**ANY CONFERENCE ORGANISERS IN THE PATTERN recognition community have recognised the benefit of IAPR sponsorship of their events and have emailed me as Chair of the Conferences and Meetings Committee to approve support. For the benefit of others who have not yet asked for sponsorship, I thought I should say a few words on the matter.

The vast majority of IAPR sponsorships are at the category A support level. These meetings are completely organized under the umbrella of an autonomous and independent organization. The topics of the meeting are of interest to IAPR members, and IAPR is only involved indirectly in terms of publicity and promotion in its newsletter and on the website. The name of the meeting does not generally refer to IAPR directly. However conference organisers then have the right to use the IAPR logo in publicity as a means of enhancing the technical profile of the event to increase attendance. Note that the IAPR is happy to cosponsor events alongside other technical societies such as the IEEE or national pattern recognition societies.

Meetings sponsored by IAPR are advertised in this newsletter which is now circulated to over 7000 members throughout the world. As well as publicising the call for papers and listing the meeting in the date chart on the back page, the newsletter also carries reports following sponsored meetings so that those who were unable to attend will be kept informed.

**T**HE COST OF CATEGORY A SUPPORT IS US\$100 IF LESS than 100 participants attend and US\$200, if greater. This payment is due after the event has concluded and helps cover the cost of the newsletter and other operational costs of the IAPR. Organisers of IAPR sponsored conferences are also invited, indeed required, to submit a brief report on their event for the newsletter.

As an organiser of several conferences, I know the value of international advertising and technical endorsement. Typically even a small increase in attendance over expectation yields a substantial increase in conference profit. This is because fixed costs such as venue hire and proceedings publication are relatively high and the incremental cost of a few additional participants is quite low. So some unexpected registrations can really add to the bottom line. This is one of the major reasons to advertise through the IAPR. Many IAPR members travel regularly and

often try to find events of interest in countries of interest at suitable times of the year.

Even if only one or two additional delegates attend your event through IAPR sponsorship, it is well worthwhile. Even for pattern recognition events aimed at your national scientific community, a few additional international guests will make these events more successful - both technically and financially. Furthermore, IAPR sponsorship of national events improves the international profile of your country's pattern recognition community while simultaneously enhancing the role of the IAPR as an advocate of the international community.

**T**HERE ARE OTHER LEVELS OF IAPR SPONSORSHIP reserved for core IAPR activities under the auspices of the Technical Committees which sometimes involve a loan or underwriting from the IAPR. These are category B and B/F support levels which are documented on [www.iapr.org](http://www.iapr.org) and mentioned by the ExCo on page 3.

Finally, ICPR is the major conference of the IAPR and is organised under a special set of rules that also appear on the association's website.

In all cases, application for sponsorship is simply a matter of emailing the Chair of the Conferences and Meeting a request for sponsorship with details of your meeting as outlined on <http://www.iapr.org/guidelines.html>. In particular, all requests should contain the following information:

- 1. Subject and title of meeting**
- 2. Date and location**
- 3. Expected number of participants**
- 4. Tentative program**
- 5. Clarification whether the Proceedings will be published before or after the meeting**
- 6. Names of the organizing societies and the scientific committee members.**

I hope to hear from you soon with a request for sponsorship.

*Brian Lovell*  
*Conferences and Meeting Committee Chair*  
[lovell@elec.uq.edu.au](mailto:lovell@elec.uq.edu.au)



# IAPR-TC15 : GRAPH BASED REPRESENTATIONS

## GBR'01 : ISCHIA - MAY 23-25 2001



**T**HE 3RD IAPR- TC-15 WORKSHOP ON GRAPH-BASED Representations took place on the island of Ischia, Italy, May 23-25 2001. They were about 25 participants coming mainly from European countries. Due to the wonderful organization of Mario Vento's team, we had lively discussions in the context of the challenges that have been set at the end of our previous workshop in 1999:

- \* Strategies for matching graphs having large set of nodes
- \* Increasing the "intelligence" of a pixel-based graph
- \* Benchmarking
- \* n-D representations

The workshop has been divided into 5 sessions (22 presentations)

- Graphs & segmentation
- - Graph based representation
- - Graph matching
- - Benchmarking
- - Learning & clustering

and four counter papers. During the meeting of the TC-15 taken in Barcelona in September 2000, we decided to increase the interaction and stimulate the discussion among the people presenting their papers. To this aim, all the sessions excepting the last one, have included, besides "normal" papers, a "counter paper", i.e. a more informal presentation from the reviewer of the papers of a particular section, stressing differences, advantages and effectiveness of the papers presented in the session. After the presentation of the counter paper, an open discussion has been taken concerning the topic of the session.

### Graphs & segmentation

Presentations introduced both theoretical and practical way of segmenting a graph mainly related to images in 2D or 3D as well as for image sequences. Then comes the first counter-paper!! E. Hancock presented a nice analysis of the papers and pointed out the works of the literature that were not mentioned, emphasizing the need for our community to better collaborate for instance with computer vision community. As an example, he presented a probabilistic framework based in

an EM formalism raising the question of the kind of framework we must focus on in pattern recognition and image analysis. This, of course, didn't result in a simple answer but in a very valuable discussion on the properties we are looking for.

### Graph based representation

The second session was dedicated to graph representations with a large panel of graph structures like the topographic graph as an alternative to the shock trees, topological map (i.e. combinatorial map) for 3D segmented images, ... these mainly related to the Nd representation challenge. The second counter-paper focused on this disparity and, in relation with the previous one, L. Brun, as did E. Hancock, pointed out these works regarding the today state of the art. The discussion concluded on the need of formal links between all the framework (such as median graph and shock trees) as it has already been done between combinatorial map and dual graphs. The point is thus to get a typology between these representations and their properties in order to better choose a representation for a given application. For instance, one of the differences between the graph based representations is the choice of the information which are explicitly encoded versus those which are implicitly encoded.

### Graph matching

This session was composed of four papers showing the two current approaches of graph matching, called symbolic and numeric approaches. All the papers set new improvements and/or formalisms on a theoretical point of view. This shows that the community is making great effort in both the development of theoretic tools and applying the frameworks on real cases as shown in the previous sessions. The counter-paper emphasized once more the need of links between these approaches. For the symbolic approach, the current need is clearly on a methodological level in order to help an user to set up, for his application, the appropriate list of constraints that will be use, in different way regarding the proposed algorithms, to prune the set of possible paths in the association graph. On the other hand, the numerical approach opens a large domain of possibilities by embedding the graph



matching problem in other frameworks like optimisation. The discussion focused on the need to better explore the relations with the statistical domain as a next step further the research on mean or median graphs. The experience of speech recognition in the past has been quoted as an example of such positive transfer from one domain to another.

### **Benchmarking**

The benchmarking session started with the presentation of the data base developed by the group of Dipartimento di Informatica e Sistemistica of the University of Napoli. This data base is made of 72800 couples of isomorphic (or sub-isomorphic) artificially generated graphs and allows the user of graph matching techniques to compare the performance of both isomorphism and sub-graph isomorphism algorithms. The database contains graphs of size ranging from few nodes up to 1000 nodes, and belonging to five different categories: randomly connected graphs, regular meshes in 2D, 3D and 4D, irregular meshes, bounded valence graphs and irregular bounded valence graphs. The whole database of graphs together with the software for generating other graphs, and the implementation of four exact isomorphism algorithms, make the tool very valuable for our community. It is now available on a cdrom and at the following url: <http://amalfi.dis.unina.it/graph>.

The same team already performed a first performance comparison of five algorithms for graph isomorphism. An alternative is the database built by the neural nets community using the Plex grammar, presented in the same session. The discussion following the counter-paper emphasized the need of a pattern recognition view of the benchmarking (i.e. we have most of the time more information than the only graph) in particular when graph matching is related to visual similarity. Ideally, we should end up with a complex typology which would help application related researches to select the right algorithm.

### **Learning & clustering**

As pointed out in the graph matching counter-paper discussion, graph domain has a lot to learn from other frameworks reuse. In that sense, as we now have the basic tools for computation of distances between graphs, mean of a set of graphs, we have to go further toward actual clustering algorithms for a set of graphs. In that sense, this session proposed algorithms inspired by feature clustering techniques. As an alternative, presentations proposed a learning based approach for visual information retrieval in a large data base using intermediate graph-based representations of images. Another alternative, showing the richness of the works developed by our community, is the probabilistic framework which is widely used by the computer vision community.

The last session of the workshop set up the future activities of the TC 15. First, we have to use the database of graphs and try:

- to extend it in different directions : small graphs with not many constraints, application related graphs and algorithms for graph matching

- to propose normalized algorithm to go from natural or artificial images
- to address the maximum common sub-graph problem.

We next refined our list of challenges for the next two years:

- **benchmarking** still remains as a crucial point for the forthcoming year using our database but also with database already developed in related communities.

- **(nD) representations** : We surely need to develop new representations able to take into account the diversity of data space we deal with in pattern recognition but we must also develop a better understanding of formal links between these representations (for instance between the shock tree and the medial axis) as has already been done for the combinatorial map framework and the dual graphs.

- **new formalizations and tools** : we must open the windows and look at other domains (especially the statistical domain). We must also open the door to let some of them come in as tutorials during our next workshop. Professor E. Hancock proposed to organize the fourth workshop of TC15 in 2003 in York (maybe in conjunction with the computer vision workshop). As all the members appreciated the counter-paper experiment, it will be maintained for our next workshop.

Finally, the term of the current chairman of the TC 15, J.-M. Jolion, will end next year. Due to his experience in the field and his large investment in our TC, our community will propose Prof. Mario Vento to the IAPR as the new chairman of TC15.



*Relaxation*

As a conclusion, we must say that the work of our TC continued during the Capri workshop on visual form by intensive exchanges with a larger community of pattern recognition, image analysis and computer vision. For instance, the invited lecture of Prof. J. Kittler on matching algorithms for the recognition of objects in cluttered background clearly showed to this community the advantages of graph matching approach over alignment or geometric hashing. The invited lecture of Prof. H. Bunke also shown the main directions our community is currently working on.

Let us continue these exchanges during the next SPR & SSPR workshop next year where a session on graph based approach will be proposed

*Jean-Michel JOLION  
IAPR TC15 chair 1998-2002*



## FOURTH INTERNATIONAL WORKSHOP ON VISUAL FORM (IWVF-4) 28-30 MAY 2001 CAPRI, ITALY



THE FACT THAT "VISUAL FORM" IS ONE OF THOSE TERMS that defies definition did not deter the participating members of the computer vision and pattern recognition community from enjoying the Fourth International Workshop on Visual Form held once again in Capri, Italy in May 2001. Although the workshop has traditionally been held every three years, this time four years had passed since the last one and many of the attendees were wondering if there would still be one more workshop. Fortunately, their calls did not go unheeded.

The workshop was once again organized by Carlo Arcelli, Luigi P Cordella, and Gabriella Sanniti di Baja with no detail too small to merit their attention. It was sponsored by their respective institutions, the Department of Computer Science and Systems of the University of Naples Federico II and the Institute of Cybernetics of the National Research Council of Italy in Arco Felice (near Naples), and, of course, by the IAPR. About 110 researchers from nineteen different countries (Australia, Austria, Canada, Denmark, France, Germany, Greece, Israel, Italy, Japan, Korea, Kuwait, New Zealand, Spain, Sweden, Switzerland, The Netherlands, UK, USA) participated in this workshop. This represented an 18 percent increase over the number attending the last workshop. As evidence of the attractiveness of the workshop, there were a number of participants with no paper or poster contribution.

The three days format of the workshop closely resembled that of the successful last three: there were four sessions each day consisting of two to three paper sessions and one poster session. All but one of the paper sessions were anchored by an invited lecture by a leading person in the field. This year the invited speakers were, in the order of making the presentation, Shimon Ullman, Donald D. Hoffman, Josef Kittler, Freddy Bruckstein, Terry Caelli, Horst Bunke, and Sven Dickinson. The conference concluded with a panel

session titled "State of the Art and Prospects of Research on Shape and the Dawn of the Third Millennium" with the invited speakers serving as panelists.

Of the 117 submitted papers, 67 were accepted, 19 as oral presentations and 48 as posters, although only 45 of the accepted posters were actually presented. At this years workshop, for the first time, the actual proceedings which were published by Springer, were distributed on the first day to the participants. An address list containing contact information (including e-mail addresses) for all of the participants, including the workshop organizers, was distributed to the participants. In addition, some of the authors were asked to prepare extended versions of their contributions for possible publication in *Pattern Recognition Letters*.

ASIDE FROM THE EXCELLENT TECHNICAL PROGRAM, WE would be remiss if we failed to acknowledge the excellent social program that was organized for the participants and traveling companions. In particular, just after the registration, a welcome party was organized in the park adjacent to the Palazzo dei Congressi, where the workshop was held. The first full day was followed by a beach party in Marina Piccola.

The second full day was followed by a Gala Dinner which was held in the "Capri Moon" restaurant. The social highlight, as usual, took place in the final night, in the form of a Neapolitan farewell party where the participants were entertained by a local tarantella band. Many of the band members were familiar to some of the participants. All in all, a good time was held by all, and all participants tried to impress upon the organizers to stay the course and hold the workshop again in three years time. We are all eagerly waiting for the good news.



# FORTHCOMING IAPR SPONSORED MEETINGS

## VI INTERNATIONAL SYMPOSIUM ON MATHEMATICAL MORPHOLOGY and its Applications to Image and Signal Processing 3-5 April 2002, Sydney, Australia

This symposium is the sixth in a series of international workshops devoted to the area of mathematical morphology and its applications in image and signal processing. The scientific program will include invited talks and contributed papers. The size of the workshop will be limited in order to enable interaction between the participants.

While morphological images/signal processing remains the core topic, presentations on related areas will be welcome. Topics of specific interest include, but are not limited to

- PDE methods
- Discrete geometry for image analysis
- Probabilistic methods
- 3D image analysis
- Scale space

**Submission:** Prospective authors are invited to submit five copies of a full paper devoted to any topic in the area of mathematical morphology to the following address:

### ISMM 2002

c/o Hugues Talbot  
CSIRO Mathematical and Information Sciences  
Locked Bag 17, North Ryde NSW 1670 Australia

Alternatively, email submissions will also be accepted. Manuscripts should be in PostScript or PDF format, possibly compressed (gzip preferred), and emailed to:  
**ismm2002@cmis.CSIRO.AU**

Manuscripts should include a separate title page, containing the names and the addresses of the authors (including e-mail address, phone and fax number), an abstract of up to 200 words, and keywords.

Acceptance of papers is based on appropriateness of the topic and on quality, novelty, and clarity of exposition. Each paper will be reviewed by at least two members of the Program Committee using a blind procedure, and their reviews will be returned to the author.

Accepted papers will appear in the proceedings volume published by Kluwer in their Computational Imaging and Vision series. This volume will be available at the beginning of the workshop. The final paper has to be prepared using the LaTeX typesetting system using the style file provided by the organizers (see conference web site), and should be limited to 8 pages including artwork and references.

**Submission deadline:** 15/10/2001  
**Camera ready copy:** 15/12/2001

## 15TH INTERNATIONAL CONFERENCE ON VISION INTERFACE VI'2002 May 27-29, 2002, Calgary, Canada

Vision Interface is a single track conference consisting of high quality, previously unpublished papers, presented either orally or as a poster. Contributions are sought on any aspect of computer vision, image processing or pattern recognition, including but not restricted to the following topics:

- Image Segmentation, Texture, Illumination
- Shape, Surface geometry
- Calibration and Rectification
- Motion and Video Analysis, Optical Flow
- Stereo Vision, Depth, 3D Scene Analysis
- Active and Real-time Vision
- Object, Event, and Scene Recognition
- Face and Gesture Recognition
- Document Processing and Handwriting Recognition
- Learning and Classification Methods in Vision
- Biological and Psychological aspects of Vision
- Neural Networks for Vision and Image Understanding
- Computer Vision for HCI and Computer Graphics
- Image databases and Multi-Media Applications
- Biomedical and Robotics Applications

The conference provides an excellent environment for interdisciplinary interaction as well as for networking of students and scientists in computer vision and image understanding. In addition to regular sessions, there will also be invited sessions. Two awards: for the best paper and for the best student paper, will be presented.

**Submission:** Papers are welcomed in either French or English language and must be submitted electronically through the conference website. Submissions in French should be accompanied by an abstract in English. The size of the papers is limited to six (6) double-column pages (Extra pages are \$100 each). All papers will be thoroughly reviewed by the Program Committee. The accepted papers will be published in the conference proceedings, the hardcopy of which will be distributed at the conference. The proceedings will also be made available on-line at the CIPPRS and VI websites on May 1, 2002

### Submit to:

Dr D O Gorodnichy  
Computational Video Group, Institute of Information  
Technology, National Research Council, Montreal Road  
M50, Ottawa, Canada K1A 0R6

**Fax:** +1 613 952 0215

**Email:** dimitry.gorodnichy@nrc.ca

**WWW:** <http://www.visioninterface.org/vi2002>

**Submission deadline:** 01/12/2001  
**Camera ready copy:** 01/04/2002





## FORTHCOMING IAPR CONFERENCES WORKSHOPS AND EVENTS

Please always check updated information on: <http://www.iapr.org>

2002	EVENT	LOCATION	DEADLINES	CONTACT
3-5 April DGCJ2002	10th Discrete Geometry for Computer Imagery	Bordeaux France	Abstract Final Manuscript 14/09/2001 14/12/2001	Fax: +33 5 56 84 66 69 <a href="mailto:dgcj2002@labri.fr">dgcj2002@labri.fr</a> <a href="http://www.labri.fr/dgcj2002/">http://www.labri.fr/dgcj2002/</a>
3-5 April ISM2002	VI International Symposium on Mathematical Morphology	Sydney Australia	Abstract Final Manuscript 15/10/2001 15/12/2001	Fax: +61 2 9325 3200 Mark.Berman@cmis.CSIRO.au <a href="http://www.cmis.csiro.au/ism2002">http://www.cmis.csiro.au/ism2002</a>
22-26 April CGIV2002	First European Conference on Color in Graphics, Image and Vision	Poitiers France	Abstract Final Manuscript 03/09/2001 10/12/2001	Fax: +39 02 7064 3292 <a href="mailto:centauraga@fim.mi.cnr.it">centauraga@fim.mi.cnr.it</a> <a href="http://www.fim.mi.cnr.it/">http://www.fim.mi.cnr.it/</a> , Staff/Schettini
27-29 May VI2002	15th International Conference on Vision Interface	Calgary Canada	Abstract Final Manuscript 01/12/2001 01/04/2002	Fax: +1 613 952 0215 <a href="mailto:dmitry.gorodnichy@nrc.ca">dmitry.gorodnichy@nrc.ca</a> <a href="http://www.visioninterface.org/vi2002">http://www.visioninterface.org/vi2002</a>
6-9 Aug SSPR2002/S PR2002	Joint Int Workshop on Syntactical & Structural Pattern Recognition & Statistical Pattern Recognition	Ontario Canada	Abstract Final Manuscript 10/01/2002 01/04/2002	Fax: +61 2 9385 3974 <a href="mailto:amin@cse.unsw.edu.au">amin@cse.unsw.edu.au</a> <a href="http://www.ph.tn.tudelft.nl/Organisation/sspr2002/">http://www.ph.tn.tudelft.nl/Organisation/sspr2002/</a>
11-15 Aug 16/ICPR	16th International Conference on Pattern Recognition	Quebec City, Canada	Abstract Final Manuscript 01/12/2001 15/04/2002	<a href="mailto:icpr2002@gel.ulaval.ca">icpr2002@gel.ulaval.ca</a> <a href="http://www/icpr2002.gel.ulaval.ca">http://www/icpr2002.gel.ulaval.ca</a>
16 Aug PRRS	2 <sup>nd</sup> International Workshop on Pattern Recognition in Remote Sensing	Niagara Falls Canada	Abstract Final Manuscript 15/03/2002 10/06/2002	Fax: +44 1483 3413 <a href="mailto:petrou@ee.surrey.ac.uk">petrou@ee.surrey.ac.uk</a>

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