



International Association for Pattern Recognition Inc

An affiliate member of the International Federation for Information Processing

NEWSLETTER

Editor

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OCTOBER COPY DEADLINE

15 August 1994

FROM THE EDITOR'S DESK

Dear Everybody,

This is the big moment! The very big moment when the results of our cartoon competition are announced! I was overwhelmed by the response of all....four of you! However, ancient Greeks used to say: "Ουκ εν τω πολλω το ευ" which roughly means "Quality is not found in quantity". I have had enough good entries, to be able to

include one cartoon per issue for the next 3-4 years if necessary! So, here we are. The winner, (by unanimous decision of the panel of judges), is:

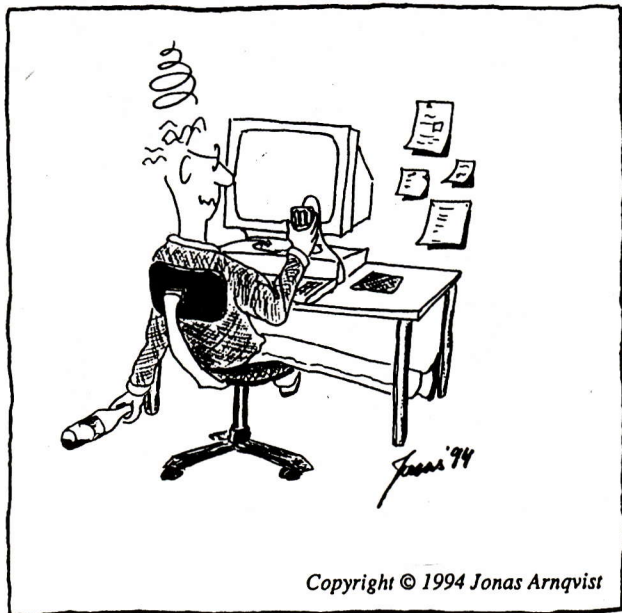
Jonas Arnqvist from FUJITSU, Japan,
who will receive US\$50! His entry is printed on page 2.

Now, some serious business. Many of you, and this time I do not mean only four(!), contact me about changes of address or complaints about delivery of the newsletter. Please note that the responsibility of the distribution of the newsletter resides with the national member organizations which do it in two different ways: some societies send labels or an address disk to the Secretariat which we print and pass to the mailing company. It is the responsibility of these Societies to provide us with regularly updated lists. Countries belonging to this category are Canada, Norway, Slovenia and Sweden. All other countries receive a certain number of newsletters in bulk mail and distribute them themselves to their members. So, please, if you have some complaint about delays etc in the distribution, address it to your local Society. (If recipients of bulk consignments have any problems, they should get in touch with the Secretariat).

In the meantime, those of you with the issue in your hands, and no complaints, enjoy it!

Maria Petrou

FUZZY PICTURES



Copyright © 1994 Jonas Arnqvist

Again confusing theory and applications, Hans experiments with the theory that a blurred image provides better understanding of the global view.

LETTER TO THE EDITOR

Dear Editor

I am writing to draw attention to the problems faced today by scientists in the former USSR. Although we try to solve these problems by ourselves, we also need some help from the world scientific community. We are sure that this help will be beneficial for all sides. For example, joint projects and visiting scientists from the East will bring new ideas and communicate already obtained results, to the western groups. This way, altogether we can save for the collective world, knowledge and results that already have been obtained and avoid wasting time and money on rederiving them.

One possible way of helping us is by waiving the subscription to the main Pattern Recognition journals, or supplying us with past issues. I also invite our western colleagues to be more forthcoming in organizing joint projects with our groups and in inviting our scientists for short or long-term visits at their universities. Finally, we are in great need of financial support to participate in International Conferences. A suggestion is to hold some of these conferences in our countries so that they work out to be cheaper. I am sure that our mutual cooperation will be beneficial for all sides and will serve for a better life on our planet.

Sergei Ablameyko
Republic of Belarus



MEMBERS' CONTRIBUTIONS

This newsletter is intended to be the voice of IAPR and a forum for members to talk to one another. The Editor would like to receive members' contributions and these can be topics which might be of interest to the community: news of members, reports of conferences, book reviews or whatever you feel strongly about.

☪

The cartoon on the left was submitted to our competition by Jonas Arnqvist of Japan; (see Editorial on page one). Camera ready graphics, preferably larger than intended publication size to ensure good reproduction, are also welcome.

EDUCATION QUESTIONNAIRE Preliminary Report

Gabriella Sanniti di Baja - Chairman

The activity of the Education Committee during the last months has been mainly concerned with the distribution to universities and polytechnics of a questionnaire requesting, besides general questions about the institution, more specific information on education in PR, CV, and IP. The questionnaire was originally created by Tim Ellis (Information Engineering Centre, London) for the British Machine Vision Association and Society for Pattern Recognition (BMVA). It was given to the IAPR-EC members for distribution to institutions in their respective countries and, where possible, in a wider area (except for Britain where Adrian Clark rather than Josef Kittler organised the distribution). The purpose was to derive enough information to produce some significant statistics and to see whether a core syllabus can be identified in the courses offered.

Up to now, I have received the replies collected by C. Arcelli (Italy), A. Camphilo (Portugal), P.C.K.Kwok (Canada), N.Petkov (The Netherlands), H.Samet (USA) and P.Zamperoni (Germany). The replies collected by K. Abe (Japan) have still to be processed at his place, i.e., translated into English. The collection of the British replies will be completed by June and the results will be discussed at the BMVA workshop on educational aspects of CV and PR at the BMVA/IAPR workshop on Teaching Machine Vision, taking place at the University of Essex on July 13 1994. The current collection counts more than 100 forms, but is certainly only a very partial picture of the state of the art as it concerns courses in PR, CV and IP. In fact, the collection refers to courses given only in

continued on page 4

NEWS OF MEMBERS

Herbert Freeman has retired from active service in IAPR

It is very difficult to write something on Herbert Freeman without going through the history of IAPR! He was there, at the conception of the IAPR idea, as a founder member, and he is still here now that IAPR has grown to be one of the largest organizations of its kind, as an ordinary member, having served in many of its posts, including the post of President (1978-80).



IAPR was conceived in 1972 in the "Pattern Information Processing" conference at Airlie House in Warrington, VA and a standing committee was set up to promote the idea. From that time and until 1976 Herbert Freeman served as Joint Vice Chairman (with C K Chow) of the "Standing Conference Committee for the International Joint Conference on Pattern Recognition", as it was called, and helped organize three such conferences until the committee was officially replaced by the formal organization of IAPR in 1976. K S Fu was elected the first Chairman of the new organization and H Freeman its first treasurer, a position which he held for four terms, until 1988. As IAPR's Treasurer, in 1985, following the death of K S Fu, he arranged the setting up of the K S Fu award and conducted the fund raising for a permanent financial backing for the award. But before that point was reached, IAPR needed a lot of devoted care in its infancy!

Back in 1976, Herbert Freeman played an active role in preparing the IAPR Constitution and Bylaws with C Verhagen, on the model of the Constitution and Bylaws of IEEE Computer Society and IFIP (International Federation

for Information Processing). He actually became Chairman of the Constitution and Bylaws committee in 1976 and remained in that position until 1986. He also handled the incorporation of IAPR as an educational scientific organization under the laws of the state of New York and arranged for the recognition of IAPR as a tax exempt organization and as an organization recognized to receive tax exempt gifts and donations. With his suggestion IAPR became a member of IFIP, where he had been active since 1962. Herbert Freeman served as the IAPR delegate to the Federation from the beginning until 1988.

As Chairman of IEEE Computer Society's Technical Committee on Machine Intelligence and Pattern Analysis, he lobbied the Computer Society to become the USA representative to IAPR and in collaboration with K S Fu arranged a new Computer Society Transactions that came to be known as PAMI. He was one of the four IEEE Computer Society's governing board members to IAPR and held that position longer than anybody else, for 14 continuous years until 1992.

Herbert Freeman served several times on the organising committee of ICPR and proudly claims that he has attended every single ICPR! Now he has retired from active service, we are all grateful for his major contributions and wish him many more happy ICPR participations!

ICPR 1998 CALL FOR PROPOSALS

The Executive Committee of IAPR is soliciting proposals for the venue of the 14th International Conference on Pattern Recognition in 1998.

Previous and upcoming ICPR venues:

- 1990 Atlantic City, NJ USA
- 1992 The Hague Netherlands
- 1994 Jerusalem Israel
- 1996 Vienna Austria

For details on the information content of proposals, please contact the IAPR Conferences and Meetings chairman:

Professor Walter Kropatsch
Institut für Automation 183/2
Dept for Pattern Recognition & Image Processing
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Education Committee report continued from page 2

some of the IAPR countries and, in some cases, only a small fraction of the questionnaires that have been distributed have come back, or only a few questionnaires have been distributed. For instance, the collection includes only three questionnaires from the USA, so that the current picture reflects essentially the European trend and the results derived so far are likely to be modified, once more questionnaires from the USA and those from Japan and other Asian countries are available.

I summarize here some average results derived from the responses. In particular, I report on the received answers concerning the used software packages and hardware platforms, the hours spent on a number of sub-topics and the most commonly used course texts.

In most of the cases in-house-done and public domain software packages are used. The public domain package having the highest score is Khoros. Other packages are used, but each of them only in a minority. Hardware platforms more commonly employed are SUN (Sparcstations), PC (386 and 486) and HP (7000, 9000).

The sub-topics to which the largest number of hours are devoted are Mathematical Foundations and Feature Extraction and Measurements (the following sub-topics were listed in the questionnaire: Human Visual System, Mathematical Foundations, Sensors and Data Acquisition, Image Coding, Image Restoration, Image Enhancement, Image Segmentation, Morphological Operations, Feature Extraction and Measurements, Image and Pattern Classification, 3D Properties of Images, Model-Based Image Interpretation, Knowledge Representation and Image Understanding, Vision Systems and Architectures, Applications of Machine Vision, Methodology and Algorithm Evaluation, Image Databases).

Finally, the most commonly used textbooks are: Haralick, R.M. and Shapiro, L.G., "Computer and Robot Vision", Addison Wesley, 1992 (2 vol.); Gonzalez, R.C., Woods, R.E., "Digital Image Processing", Addison-Wesley, 1992; Horn, B.K.P., "Robot Vision", MIT Press, 1986; Ballard, D. and Brown, C., "Computer Vision", Prentice Hall, 1982; Jain, A.K., "Fundamentals of Digital Image Processing", Prentice Hall, 1989; Gonzalez, R. and Wintz, P., "Digital Image Processing", Addison-Wesley, 1987; Rosenfeld, A. and Kak, A., "Digital Picture Processing", Academic Press, 2nd Ed., 1982 (2 vol.); Schalkoff, R.J., "Digital Image Processing and Computer Vision", John Wiley & Sons, 1989; Duda, R. and Hart, P., "Pattern Classification and Scene Analysis", Wiley, 1972; Pratt, W., "Digital Image Processing", John Wiley & Sons, 1990; Zamperoni, P., "Metodi dell'elaborazione digitale di immagini", Masson, 1991 (or, in the German version, "Methoden der digitalen Bildsignalverarbeitung", Vieweg, 1989). It is interesting to note that besides more recent books, the quite old "classic" (Duda and Hart, 1972) is still intensively used.

The Chinese Image Processing and Pattern Recognition Society of Taiwan *Professor Jhing-Fa Wang, Chairman*



With the proliferation of computerization, image processing (IP) and pattern recognition (PR) became very important issues in automation. In this decade, the research and development population for IP and PR has been rapidly increasing in Taiwan. It was therefore urgently required to organize a forum for researchers and developers to cooperate, exchange thoughts and share knowledge and the CIPPR was initiated on 28 November 1990 in Hsinchu. The principal goals of CIPPR are:

- To enhance the research techniques, methodologies, systems, software and hardware of IP and PR
- To bring academic research results to practical applications and developments
- To provide cooperation channels between researchers and developers in Taiwan and other international professionals
- To coordinate international cooperation with other related academic institutes and societies.

CIPPR currently has 432 individual members and 23 institute members and regular activities include:

- Annual workshop on Computer Vision, Graphics and Image Processing (CVGIP)
- Annual workshop on Optical Character Recognition (OCR)
- Quarterly publication of Journal of Image and Recognition
- Quarterly publication of CIPPR Newsletter
- 3-4 times a year meeting of the Board and Directors
- Once a year a meeting for all members

In addition, CIPPR recently hosted several interest group meetings of OCR for inter-cooperation between industrial development companies and academic research institutes, a workshop on the application and development of geographical information systems and a workshop on multimedia computing systems. In December 1994 it will host the Workshop on Frontiers of Handwriting Recognition sponsored by IAPR TCs 10 & 11. Future plans include the publication of an international journal.

PEIPA

The Pilot European Image Processing Archive

A COMMON PRACTICAL PROBLEM IN pattern recognition, and particularly in those areas that are concerned with processing image data, is that of reproducing other researchers' results: either the data are difficult to obtain, or one must implement their techniques in order to make a comparison with one's own. The vast majority of researchers are, of course, quite happy to provide copies of software and data upon request, but servicing large numbers of such requests quickly becomes tedious and time-consuming. It is thus attractive to contemplate the idea of an archive, to which people may up-load their software or data for dissemination to other researchers. Indeed, with a central repository for storing software and data, time is saved in both distributing one's own material and acquiring that of others. Most important, the easy availability of such software encourages comparisons with existing techniques on accepted datasets.

You may be pleasantly surprised to learn that an archive of precisely this type, PEIPA, has been running on a pilot basis for about eighteen months. It is physically located at the University of Essex in the UK and connected to the outside world by a (shared) 2Mbit/sec link. The host machine is a Sun Sparcstation ELC, kindly provided by the British Machine Vision Association for this purpose, and uses disk space from a number of research grants and contracts. Additional disk space will soon be in place, funded by DG III of the European Commission.

The archive is operated by the author, and is associated with Technical Committee 5 (Benchmarking and Software) of IAPR. It aims to provide a convenient mechanism for exchanging software relevant to all areas of pattern recognition and image processing, and to make available datasets for testing and evaluating algorithms - the benchmarking of techniques rather than systems.

What's in the Archive? Every item in the archive is available free of charge for research use. The principal contents of the archive are software tools, mostly for processing image data (though see below). These include popular packages such as:

- Khoros, a visualization package with signal- and image-processing facilities, originally from the University of New Mexico
- LaboImage, from the Vision group at the University of Geneva
- pbmplus and netpbm for inter-converting between image formats
- a collection of Hough transform programs
- neural network and genetic algorithm software
- image synthesis tools
- implementations of codecs for the JPEG, MPEG, and H.261 standards.

It is a matter of policy that source code be normally available for software packages. The vast majority of software is written in C and runs on Unix-based workstations. Software for other platforms, such as PC and Macintosh, is welcomed. The archive also provides support information, such as descriptions of popular image file formats, back-issues of the VisionList and Pixel mailing lists, and electronic literature surveys and bibliographies, the latter stored in BibTeX format. The area of the archive that is growing most quickly is that devoted to datasets. The existing entries include laser rangefinder data, calibrated stereo and motion sequences. A large database of face images will be made available as soon as disk space limitations permit.

Areas of the archive that are comparatively new include a European distribution point for documents associated with the 'Image Understanding Environment', a DARPA-originated, but now international, programme for developing a common vision environment, technical reports and summaries of the activities of research groups.

Accessing the Archive: You may access the archive electronically by anonymous FTP, or using the Internet gopher, or via the World-Wide Web (WWW).

Anonymous FTP: FTP to host `peipa.essex.ac.uk`, log in as 'anonymous' and give your email address as the password. The archive is in directory 'ipa'.

Internet Gopher: Direct gopher to host `peipa.essex.ac.uk` and select the 'peipa' menu item.

World-Wide Web: The URL of the main page concerning the archive is `http://peipa.essex.ac.uk/index.html`. This page also contains pointers to other information of interest on the Web. The numeric address of `peipa.essex.ac.uk` is 155.245.115.161.

How You Can Help? An archive is only as good as its contents. The archive currently concentrates on the processing of image data, since that is the author's research field. It is hoped to expand the archive by incorporating software intended for other data types or for general pattern recognition, and to make available other types of data (e.g., speech). If you would like to contribute to the archive, or would be interested in coordinating a particular subject area, please contact the author:

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Pattern Recognition in the Former USSR Past, Present and Future



THIS ARTICLE IS NOT INTENDED TO BE AN overview of research activity in the countries of the former Soviet Union (fSU) it is more a historical review of the development of research in these countries in recent years and a way of highlighting the problems faced by their scientists today.

In the past there were many research organisations, institutes and groups working in the pattern recognition field. It is not possible to give an exact number and I can only say that in the small Republic of Belarus alone, (10 million people), there were about 30 groups; Russia and Ukraine had more and larger groups and the number of scientists were counted in thousands. It was a big and strong army of researchers. Every year this scientific community organised many different events, amongst which the most well known conferences were those on mathematical methods of PR (6 in the series), systems of image processing (4), processing of graphical information (4) and pattern recognition and image analysis (2). Also many local conferences, exhibitions and workshops were held annually. In the fSU, there were many different scientific councils (academic, industrial, and others), working in the field and it was a strong and powerful scientific structure. The Soviet society joined IAPR in 1988 and under its umbrella united more than 1000 researchers. Later, due to financial problems and political instability in the country, it stopped paying its annual fee and its membership lapsed in 1992.

The situation in science took a turn for the worse. In comparison with 4-5 years ago, the number of researchers in the fSU has been reduced approximately by a factor of two and this process of reduction has not finished yet. The hardest situation is in applied science where many research organisations of different ministries have no money and because of this they cannot produce a competitive product. The situation is a little better for the educational institutes and the Academies of Sciences because they receive governmental support. However, the Academies in the small new republics have financial problems related to the big reductions in military spending. It is no secret that Soviet science, particularly in the field of PR, received a lot of money from the armed forces and the reduction in defence spending made a large army of researchers redundant. Civil industrial enterprises cannot, and do not want to, give money for research; they prefer to use their funds for routine needs. The money which organisations now receive only covers scientists' salaries and it is not easy to buy modern equipment. Another problem has been the transition to new computers, (from

Soviet EC and CM to western PC, SUN etc); this has now largely been solved, but due to certain restrictions (COCOM and financial), modern equipment has been coming very slowly. Financial difficulties have led to the reduction of the number of scientific events held in the CIS countries and only the most well known conferences continue and their attendance is constantly dropping. Attendance at international conferences in other countries became practically impossible due to the absence of hard currency and incredibly high exchange rates. (The current exchange rate between roubles and hard currency means that the average monthly salary in the CIS countries is between US\$ 30-70). The prestige of science and the salaries of scientists are constantly decreased so that many young and prospective researchers leave and move into business.

Another obstacle that prevents us demonstrating our results to the world scientific community is language. Once, to reach top positions in the USSR, it was not strictly necessary to have many published papers in international journals or to be internationally recognized. Scientists therefore did not try to produce papers. Now they have realised the importance of international publications, but fluency in communication and writing in English does not come overnight, particularly to the older generation.

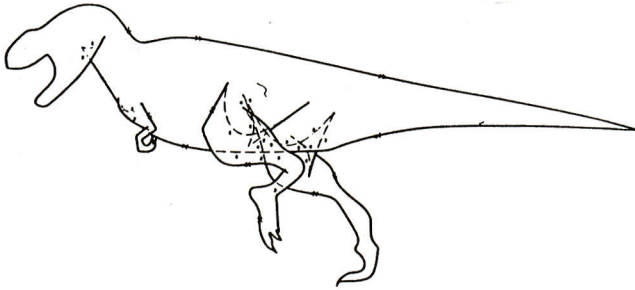
In spite of all these negative features, individual governments *do* support science and a core of real scientists has survived and continued to work; after the first shock in 1992, the situation has now become more stable. We have started to write and submit our results in English to international conferences and journals and the first international conferences have begun to be held in Russia, Ukraine and Belarus. The success of the CAIP'93, (report published in April) conference organised by Dmitri Chetverikov in Budapest last September, [sponsored by IAPR and EEC], brought together scientists from the west and from the former eastern block countries, and shows the way forward for the new republics. The first joint west-east projects funded by EC, NATO and national foundations have started to develop and systems and software produced by our researchers have begun to appear on the world market.

Thus, we can look forward to the future and hope that there will be no more disruption in our republics so that the research in the fSU will eventually gain the position it deserves in the international community.

Sergei Ablameyko
President Belarusian Association

ECCV'94 STOCKHOLM 3-6 May 1994

YOU READ THE BOOK! YOU SAW THE film! You know how difficult the dinosaur husbandry is! But do not worry! We are developing Vision Systems now appropriate even for that! L R Williams, from the NEC Research Institute in Princeton, presented an interesting talk in the recent ECCV on the topological reconstruction of a smooth manifold solid from its occluding contours. He used as an example the sketch of a Tiranosaurus Rex reproduced here for the benefit of the Jurassic Park fans!



In general, it seems that Vision has now graduated! There was almost nothing on edge detection. The approach now is segmentation-identification in one go. A lot of snake staff, slimy, sneaky, thin and fat ones, more commonly known as deformable models (!). Active Vision, model based approaches and Invariance were the main themes. The flavour of the month seems to be Kalman filtering. I have not done any strict statistics, but I can confidently report that the term was mentioned more times than there were papers in the conference!

One of the novel ideas of the conference came from the Conference Chairman Jan-Olof Eklundh, inspired by Emperor Louis-Napoleon who established the Salon de Refusés in 1863 to accommodate the artists who had been rejected by the Salon de Paris, Jan-Olof introduced the idea to the Vision Community. Every day there was a special session where participants whose papers had been rejected had the chance to present their work! Very few people took up the opportunity but this idea will probably catch on in the future, just like the poster session idea did a few years back. And who knows, it may produce the Manet of Vision! After all, Manet did not make it to the Salon de Paris that year, but he did make it to the Salon de Refusés!

Apart from that, ECCV 94 was an uneventful, well organised conference where the papers ranged from crap to excellent. But as somebody pointed out, what makes a good conference is not the lack of crappy papers, but the inclusion of several good ones, and there were several of those! There was an excellent session on shading and

colour where all papers were very good but two left a more lasting impression on me: The first one was the work by Wolf and Angelopoulou from the John Hopkins University, USA, on 3D stereo using photometric ratios. Apparently, if the same scene is photographed twice by the same camera under different illuminations and the ratio of the two images is taken, this ratio is invariant to camera characteristics, surface albedo and viewpoint. This result was exploited in developing a shape from stereo methodology with impressive results. The method presented is particularly suited to smooth featureless surfaces. On the other hand, the work of Oren and Nayar from Columbia University, USA, "Seeing beyond Lambert's law", sought to relate surface roughness to reflectance. A comprehensive model was presented which predicts reflectance from rough diffuse surfaces and some very convincing results were shown.

Another interesting paper came right at the end of the conference and it was introduced by the session co-chair Olivier Faugeras as "a paper that proves a theorem that many of us would like to be wrong, but it is not!" The paper was presented by Åström from Lund University, Sweden, and showed that there is a fundamental difficulty with the projective invariants: Consider four randomly chosen closed curves and a small number ϵ . The theorem proves that you can always deform these four curves to four others which do not differ from the original ones by more than ϵ , and all of which can be transformed via a projective transformation to the same circle!

This is a too depressing thought to close the report on, so I will mention the conference reception and the banquet to cheer us up! The banquet was excellent and took place in a restaurant where we were taken by a boat on a beautiful sunny Stockholm evening with hot air balloons rising in blue skies and floating above tranquil seas.... The conference reception took place in the City Hall with its 18,600,000 gold pebbles on its walls, the very room where the Nobel Prize dinner is held; the reason was simple: it was to give us all the chance to practice for the "great moment" after we shall have solved some major problem of Computer Vision!

Maria Petrou

MEETINGS SPONSORSHIP

The Conferences and Meetings Committee try to ensure that meetings sponsored by IAPR do not clash with each other. To achieve this they ask meeting organisers to seek sponsorship for *every meeting*. There seems to be some misunderstanding: being an IAPR national member, committee chairman or member of a TC does not mean automatic sponsorship; some organisers believe that they only need to seek sponsorship if funds are required; some have thought that a whole series has been sponsored.

With the exception of ICPR, organisers who seek sponsorship are asked to always contact the Chairman, Walter Kropatsch, (krw@prip.tuwien.ac.at).

CONFERENCE ANNOUNCEMENTS

(if not given here, contact address appear on pages 10-11)

Information Theory and Statistics Alexandria Virginia USA 27-29 October 1994

The exchange of ideas between information theorists and statisticians has grown steadily over time, underscoring the deep connections between the two disciplines. The object of this workshop is to nurture this process by providing both communities with a forum for interaction.

(Final paper deadline: 15 June 1994)
Acceptance notification: 15 July 1994

Fourth International Workshop on Frontiers of Handwriting Recognition [IAPR] Taipei Taiwan ROC 7-9 December 1994

The theme of this workshop will address the new techniques for the recognition of handwritten characters. Recent advances and developments in methodologies, systems and hardware will be emphasised; the workshop is sponsored by IAPR Technical Committees 10 and 11.

(Abstract deadline: 31 May 1994)
Final camera ready paper: 30 Sept 1994

1994 International Symposium on Artificial Neural Networks

Tainan Taiwan ROC 15-17 December 1994

Topics: associative memory, electrical neurocomputers, image processing, machine vision, neurocognition, neurodynamics, optical neurocomputers, optimization, robotics, sensation & perception, sensory/motor control systems and many others.

(Full paper submission: 30 June 1994)
Final camera ready paper: 15 Oct 1994

Europe-China Workshop on Geometrical Modelling and Invariants for Computer Vision Xi'an China 27-29 April 1994

Topics: computation of geometrical invariants from images, localization and positioning from geometrical features, shape recognition using geometrical features, modelling from images, curves and surfaces perception, advanced applications.

Submit 4 copies of extended abstract (2000 words)

Abstract submission: 15 Nov 1994
Final camera ready paper: 1 March 1995

1995 IEEE Workshop on Nonlinear Signal & Image Processing Halkidiki Greece 20-22 June 1995

This is the second in a series of international workshops presenting leading edge work in nonlinear digital signal and image processing and computer vision; the first was in Tampere, Finland in 1993.

3 copies of extended abstract, not more than 3 pages

Abstract submission: 1 Nov 1994
Final camera ready paper: 1 March 1995

9th Scandinavian Conference on Image Analysis [IAPR] Uppsala Sweden 6-9 June 1995

9SCIA is arranged by the Swedish Society for Automated Image Analysis, sponsored by IAPR, and is being held in the historic city of Uppsala, 70km north of Stockholm.

The conference will offer internationally acclaimed invited speakers and parallel sessions with selected oral presentations and posters. The papers, in English, will cover unpublished theoretical or applied research results and there will be an industrial exhibition. Topics include:

Theory:

- Image processing and analysis
- Pattern recognition and neural nets
- Computer vision
- Image reconstruction
- Image compression

Applications:

- Industrial
- Remote sensing
- Visualization
- Dedicated architectures

Conference Committee:

General Chair: Per-Erik Danielsson, Linköping

Program Chair: Gunilla Borgefors, Uppsala

Local Chair: Ewert Bengtsson, Uppsala

Submission of Papers:

Submit three copies of full papers in English to:

Gunilla Borgefors, 9'SCIA Programme Chair

Lägerhyddvägen 17

S-752 37 Uppsala, Sweden

Queries to 9SCIA:

Fax: +46 18 553447, Email: scia9@cb.uu.se

The cover page must contain:

- Title of paper
- Author(s) name(s) and complete address(es)
- Brief abstract of 150-200 words
- Key words describing main subject (3-5 words)
- Author's opinion on whether paper is most suitable for oral or poster presentation
- Name and address for correspondence

All pages should show the name of the first author and be consecutively numbered. The final length of the accepted papers will be eight book pages.

Paper submission deadline: 24 Oct 1994
Acceptance notification: mid Jan 1995
Final camera ready paper: Feb 1995

**Fifth International Conference on Computer Vision
Cambridge Massachusetts USA
20-23 June 1995**

The programme will include physics based vision, CAD based vision, shape and object representation, medical computer vision, low level processing, integration of modules and cues, motion analysis, object recognition, learning in computer vision, systems and applications, active and real time-vision, stereo, vision-guided robotics, segmentation, grouping, invariants, geometry.

4 copies of complete manuscript, no more than 30 pages.
Full paper deadline 15 Nov 1994

**Fifth International Conference on Image Processing
Edinburgh UK
3-6 July 1995**

Topics to include image communication, image interpretation, image analysis, architecture, applications
Abstracts of approx 1000 words to include 3-4 keywords.

Abstract deadline: 28 Oct 1994
Acceptance notification: Dec 1994
Final camera ready paper: 8 March 1995

**ICDAR '95
Third International Conference on
Document Analysis & Recognition
Montreal Canada 14-16 August 1995**

Topics will include, but are not limited to, document analysis and understanding, character segmentation and recognition, on-line recognition, map & drawing understanding, document image processing, storage and retrieval of document images, hypermedia processing, theoretical and psychological approaches, implementations, applications and systems.

Submit 4 copies of a double-spaced complete paper of not more than 20 pages to:

Professor R Kasturi,
Department of Computer Science & Engineering,
Penn State University,
University Park, PA 16802, USA.
kasturi@cse.psu.edu

First page should contain:

- Title of paper
- Affiliation
- Mailing address
- phone/fax numbers, email address
- Address of the contact author

Second page should include:

- Title of paper
- 200 word abstract
- Keywords

Complete paper submission: 1 Dec 1994
Acceptance notification: 1 March 1995
Final camera ready paper: 1 May 1995

**GRec95
Workshop on Graphics Recognition [IAPR]
Pennsylvania USA
9-11 August 1995**

A single-track, 2 day workshop organised by IAPR Technical Committee 10 will be held before the Third International Conference on Document Analysis and Recognition, (Montreal, Canada, listed previously) and the attendance will be limited to 75 persons. All participants are expected to contribute actively to the workshop either by presenting a full state-of-the-art paper or by an abstract of remarks on a specific topic. In addition to paper presentations there will be a number of panel discussions and working groups and participants are invited to propose topics for these in advance.

Topics will include, but are not limited to:

- Raster-to-vector techniques
- recognition of graphic primitives
- recognition of graphic symbols in charts and diagrams
- interpretation of engineering drawings, logic diagrams, maps, chart etc
- analysis of line drawings, tables, forms etc
- 3-D models from multiple 2-D views
- description of complete systems for interpretation of graphics in scanned documents

Conference Chairs:

Professor R Kasturi
Department of Computer Science & Engineering
Penn State University
University Park,
PA 16802, USA
kasturi@cse.psu.edu

Karl Tombre
INRIA Lorraine & CRIN/CNRS
Batiment LORIA
615 rue de Jardin Botanique BP 101
54602 Villers-les-Nancy Cedex France
tombre@loria.fr

Contact either of the Conference Chairs above for further information.

Submission of papers:

3 copies of abstracts, not more than 2 pages, should be submitted to one of the Conference Chairs; please indicate if you would be willing to present a state-of-the-art paper on this topic if invited to do so by the program committee.

Abstract submission: 31 Dec 1994
Acceptance notification: 15 Mar 1995
Final camera ready paper: 13 May 1995

FORTHCOMING CONFERENCES, WORKSHOPS AND EVENTS

1994	Event	Location	Contact [Sponsor]
8-12 Aug ECAI '94	11th European Conference on Artificial Intelligence	Amsterdam, Netherlands	Dr Tony Cohn, Division of Artificial Intelligence, School of Computer Studies, University of Leeds, LS2 9JT, UK. ecai94@scs.leeds.ac.uk
15-17 Aug ISSM	ISMM Int Conf Distributed Multimedia Systems and Applications	Honolulu, Hawaii	Dr B Furht, Department of Computer Science & Eng., Florida Atlantic University, Boca Raton, Florida 33431, USA. borko@cse.fau.edu
28 Aug-2 Sept IFIP Congress '94	13th World Computer Congress	Hamburg, Germany	IFIP '94 Conference Secretariat, PO Box 30 24 80, D-20308 Hamburg, Germany. Fax: +49 40 35 6923 43
29 Aug-1 Sept ICVS4	Fourth International Conference on Visual Search	Eindhoven, Netherlands	Conference Secretariat, Applied Vision Research Unit, University of Derby, Mickleover, Derby DE3 5GX, UK. avru@derby.ac.uk
9-13 Sept Dalton 94	The John Dalton Conference	Manchester, UK	Dalton '94, UMIST, Manchester, M60 1QD, UK. dalton@umist.ac.uk
13-16 Sept EUSIPCO-94	VII European Signal Processing Conference	Edinburgh, Scotland, UK	Professor C F N Cowan, Dept of Elec & Electrical Eng., University of Technology, Loughborough LE11 3TU, UK. Fax: +44 509 222 830
13-16 Sept BMVC 94	Fifth British Machine Vision Conference	York, UK	Dr E Hancock, Department of Computer Science, University of York, York, YO1 5DD, UK. erh@minster.york.ac.uk
21-23 Sept ICGI94	2nd International Colloquium on Grammatical Inference	Alicante, Spain	Dr J Oncina, Dept Tecnologia Informatica y Computacion, Universidad de Alicante, E-03080 Alicante, Spain. Fax: +34 6 590 3464 [IAPR]
21-23 Sept 16 DAGM	Recognition and Learning	Vienna, Austria	Prof W Kropatsch, Technical University of Vienna, Inst for Automation, Treitlstrasse 3/1832, A-1040 Wien, Austria. dagm@prip.tuwien.ac.at
21-24 Sept AIMSA '94	6th Int Conf on Artificial Intelligence: Methodology, Systems, Applications	Sofia, Bulgaria	Philippe Jorrand, AIMSA '94 Program Chair, Institut IMAG-LIFIA, 46 avenue Félix Viallet, 38000 Grenoble, France. philippe.jorrand@imag.fr
25-28 Sept VCIP '94	Visual Communications & Image Processing '94	Chicago, USA	VCIP '94, SPIE, PO Box 10, Bellingham, WA 98227, USA. rosa@mom.spie.org
26-30 Sept ISSRS	The International Symposium on Satellite and Remote Sensing	Rome, Italy	Satellite Remote Sensing, EUROPTO, c/o Direct Communications GmbH, Xantener strasse 22, D-10707 Berlin, Germany. Compuserve: 100140,3216
3-7 Oct MP'94	2nd International Workshop on Massive Parallelism	Capri, Italy	A Mazzarella, C di Napoli, Istituto di Cibernetica, Via Toiano 6, I-80072 Arco Felice, Napoli ITALY. secyann@cib.na.cnr.it
4-6 Oct SSPR'94	International Workshop on Syntactic and Structural Pattern Recognition	Nahariya, Israel	Ms Nilly Schnap, Faculty of Industrial Engineering and Management Technion, Israel Institute of Technology, Technion City, Haifa 32000 Israel. SSPR94@ie.technion.ac.il [IAPR]
9-13 Oct 12th ICPR	International Conference on Pattern Recognition	Jerusalem, Israel	12th ICPR, c/o International Ltd, 10 Rothschild blvd, 65121 Tel Aviv, Israel. icpr@math.tau.ac.il [IAPR]
13-15 Oct 3rd SDIDR	3rd Symposium on Digital Imaging in Dental Radiology	Noord-wijkerhout, Netherlands	Mrs Yvonne Emmer, Department of Oral Radiology, Academic Centre for Dentistry (ACTA), Louwesweg 1, 1066 EA Amsterdam, The Netherlands. radmail@sara.nl
18-20 Oct DAS94	Document Analysis Systems	Kaiserslautern Germany	Andraes Dengel, German Center for Artificial Intelligence, PO Box 2080, 6750 Kaiserslautern, Germany. DAS94@dfki.uni-kl.de [IAPR]
27-29 Oct ITW'94	1994 IEEE Information Theory Workshop - Theory & Statistics	Virginia, USA	Professor Prakash Narayan, Department of Electrical Engineering, University of Maryland, College Park, Maryland 20742, USA. prakash@eng.umd.edu
8-11 Nov ICARCV'94	Third Int Conference on Automation, Robotics and Computer Vision	Singapore	Assoc. Professor N Sundararajan, ICARCV'94 Conference Secretariat, Institution of Engineers, Singapore, 70 Bukit Tinggi Road, Singapore 1128, Republic of Singapore. ensundara@ntuvax.ntu.ac.sg
11-12 Nov WNRAM	IEEE Computer Society Workshop on Non-rigid & Articulate Motion	Austin, USA	Ms D Paxton, Computer Vision Research Center, University of Texas (ECE Dept), Austin, Texas 78712-1084, USA. dpaxton@emx.cc.utexas.edu

Please inform the Secretariat of any revisions or additions to this information.
66 Weston Park, Thames Ditton, Surrey KT7 0HL, UK Email: 100042.511@compuserve.com

1994	Event	Location	Contact [Sponsor]
13-16 Nov ICIP-94	First IEEE Int Conference on Image Processing	Austin, Texas, USA	Conference Management Services, 3024 Thousand Oaks Drive, Austin, Texas 78746, USA. icip@pine.ece.utexas.edu
14-17 Nov SPICIS '94	Second Singapore International Conference on Intelligent Systems	Singapore	Dr Looi Chee Kit, SPICIS '94, c/o Japan-Singapore AI Centre, 75 Science Park Drive, 01-01-04, Cintech II, Singapore 0511. cheekit@iti.gov.sg
20-25 Nov ISITA '94	International Symposium on Information Theory & Its Applications 1994	Sydney, Australia	The Convention Manager, ISITA '94, AE Conventions Pty Limited, PO Box E181, Queen Victoria Terrace, ACT 2600 AUSTRALIA. Fax: +61 6 273 2012
5-7 Dec WACV	2nd IEEE Workshop on Applications of Comp Vision	Sarasota, Florida, USA	Bruce Flinchbaugh, Texas Instruments MS 238, 13510 N Central Expressway, Dallas, Texas 75243, USA.
7-9 Dec WFHR	4th International Workshop on Frontiers of Handwriting Recognition	Taipei, Taiwan	Professor H-J Lee, Chairman Dept Computer Science & Information Engineering, National Chiao University, 1001 Ta Hsueh Road, Hsin Chu 30050, Taiwan, ROC. hjlee@hjlee.csie.nctu.edu.tw [IAPR]
13-15 Dec MVA'94	IAPR Workshop on Machine Vision Applications	Kawasaki, Japan	Professor M Takagi, Institute of Industrial Sciences, University of Tokyo, 7-22-1 Roppongi, Minato-ku, Tokyo 106 Japan. takagi@tkl.iis.u-tokyo.ac.jp [IAPR]
15-17 Dec ISANN	1994 International Symposium on Artificial Neural Networks	Tainan, Taiwan	Prof P C Chung, Dept Electrical Engineering, National Cheng-Kung University, Tainan, Taiwan, ROC. pcchung@eembox.ncku.edu.tw
1995	1995	1995	1995
27-29 April WGMICV	Europe-China Workshop on Geometrical modelling and Invariants for Comp Vision	Xi'an, China	Prof R Mohr, LIFIA INRIA, 46 Avenue F Viallet, 38031 Grenoble Cedex, France. Mohr@imag.fr
6-9 June SCIA95	9th Scandinavian Conference on Image Analysis	Uppsala, Sweden	9SCIA, Centre for Image Analysis, Lagerhyddsvägen 17, S-752 37 Uppsala, Sweden. scia9@cb.uu.se [IAPR]
20-22 June WNSIP	1995 IEEE Workshop on Nonlinear Signal and Image Processing	Halkidiki, Greece	Professor Ioannis Pitas, Department Electrical & Computer Eng., Aristotle University of Thessaloniki, PO Box 463, 54006 Thessaloniki, Greece. pitas@vergina.eng.auth.gr
20-23 June 5ICCV	Fifth International Conference on Computer Vision	Cambridge, MA, USA	Eric Grimes, Artif. Intell. Lab, 545 Technology Square, Mass. Inst of Tech., Cambridge MA 02139, USA. Fax: +1 617 258 6287
3-6 July IPA95	5th International Conference on Image Processing	Edinburgh, UK	IAP95 Secretariat, IEE Conferences Services, Savoy Place, London WC2 0BL, UK. conference@iee.org.uk
9-11 Aug GRec95	IAPR Workshop on Graphics Recognition	Pennsylvania, USA	Professor R Kasturi, Dept Computer Science & Engineering, Penn State University, University Park, Pennsylvania 16802, USA. kasturi@cse.psu.edu [IAPR]
14-16 Aug ICDAR '95	Third International Conference on Document Analysis and Recognition	Montreal, Canada	Professor R Kasturi, Department of Computer Science & Eng., Pennsylvania State University, 323 Pond Laboratory, University Park, Pennsylvania 16802 USA. kasturi@cse.psu.edu
6-8 Sept CAIP'95	6th International Conference Computer Analysis of Images and Patterns	Prague, Czech Republic	Vaclav Hlavac, Czech Technical University, Faculty of Electrical Engineering, Department of Control Engineering, Karlovo namesti 13, CZ-121 35 Prague 2, Czech Republic. caip95@vision.felk.cvut.cz [IAPR]
13-15 Sept ICIAP '95	8th International Conference on Image Analysis and Processing	San Remo, Italy	Professor Leila De Floriani, ICIAP '95, University of Genova, Viale Benedetto XV 3, I-16132 Genova, Italy. iciap@dibe.unige.it [IAPR]
18-20 Sept CAMP'95	Computer Architectures for Machine Perception	Como, Italy	Alessandra Setti, Dip. di Informatica e Sistemistica, Via Abbiategrasso 209, 27100 Pavia, Italy. ale@ipvvis.unipv.it

