



International Association for Pattern Recognition Inc

An affiliate member of the International Federation for Information Processing

# NEWSLETTER

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**JULY DEADLINE - 17 MAY 1995**

## FROM THE EDITOR'S DESK

### Hello Everybody!

One of the greatest pleasures of our discipline is that we can see directly the fruits of our research being applied to real problems of everyday life. Coming from an astronomical background (nothing could be more distant than the Big Bang itself) I firmly believe that there is no fundamental research that is really useless or completely irrelevant to every day life. It is all a matter of time-scales! When Boolean Algebra was developed, computers did not

exist and when Walsh developed the functions named after him, he was probably just playing mathematical games unaware of their future applications to image processing. And yet, although Big Bang is the furthest event we can think in this world, it is not a coincidence that it is the closest as well, since it happened at ALL points of space at the same time, ie. it happened here! So, there is a web of interconnections that things that seem irrelevant to everyday life now, may one day be very, very relevant. All I am saying is that we are lucky to work in a discipline that the time-scale between scribbling pages of Algebra on a piece of paper (or tippy-typing it on a computer screen) and the time we see the impact of these equations on every day life is not very large.

Why all this philosophical dribbling now? Because I just came back from an SPIE conference on Machine Vision Applications to Industry. I usually get fascinated at such conferences by the applications people think for their work. This time what got my fancy was an application to automate the "production line mail" - what you and I call "junk mail", ie those types of letters you receive some times, saying that you have "uniquely been chosen to receive the latest amazingly great offer of bla bla that does bla bla". Soon, I am pleased to announce, you will get even more of this stuff, as people develop systems that will automatically inspect the match between the address

on the letter and the address on the envelop so that your letter is not put by a mistake into somebody else's envelope and you are left out of the "unique opportunity of the amazing offer" etc etc.

However, the record for an original application of the wider field of Artificial Intelligence, in my mind, is still held by a paper I read a few years back now in a journal: It was describing the development of an expert system to aid the decisions of aphorisms the Greek Orthodox church had to make! The expert system was meant to make such decisions more consistent. So, you see, even God started to enjoy the benefits of our research! Thus, keep up the good work, you never know where your next invitation to consultancy may come from!

**In the meantime, don't forget our  
CROSSWORD COMPETITION  
First Prize US\$ 70**

Send me a crossword which YOU made with definitions related to IAPR activities! Deadline, 1 May 1995.

*Maria Petrou*

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**NEWS FROM MEMBERS**

**Proceedings - 12th ICPR  
International Conference on Pattern Recognition  
Oct 9-13, 1994, Jerusalem, Israel**

- Vol 1.**  
COMPUTER VISION AND IMAGE PROCESSING
- Vol 2.**  
PATTERN RECOGNITION, NEURAL NETWORKS
- Vol 3.**  
SIGNAL PROCESSING, PARALLEL COMPUTING

**Pre-publication Cost:**

- US\$ 130.00, surface shipping included
- US\$ 150.00, airmail shipping included

The proceedings (3-volume set) can be ordered, as supplies last, using a check or credit-card (Visa, MasterCard, AmEx), by mail, fax, or email, from:  
12th ICPR, c/o International, 10 Rothschild Blvd.,  
65121 Tel Aviv, ISRAEL.  
Tel. +972(3)510-2538, Fax +972(3)660-604  
Email: icpr@math.tau.ac.il

**WELCOME TO THE FIRST  
INDUSTRIAL AFFILIATE  
OF IAPR**

**HITACHI CENTRAL RESEARCH LABORATORY.**  
We hope other companies will follow.

**PLEASE MAKE THE FOLLOWING CHANGES TO  
THE IAPR DIRECTORY ISSUED IN JANUARY:**

(new information in italics)

**Professor J K Aggarwal**

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**Professor Q Shi - Contact address for ROC**

*All details correct in directory*

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Y A J

**(Yet Another Journal!)**

The Institute of Telecommunications, Bydgoszcz, Poland organised and launched a new international journal called Image Processing & Communications, in the spring of 1995. It will be published twice a year.

This journal encompasses image processing in its widest sense, specific areas of interest include: Image Processing, Coding, Analysis and Recognition, Image Manipulation, Communication of Visual Data, Network Architecture for Real-Time Video Transport, Video Coding Algorithms and Technologies for ATM/Packet Network, Protocols for Packet Video and New Visual Services over ATM/Packet Network.

For more information, contact: Prof. Ryszard S. Choras,  
Editor-in-Chief of Image Processing & Communications,  
Institute of Telecommunications, 85-791 Bydgoszcz ul. S.  
Kaliskiego 7 Poland  
Fax: +48 43-83-41 Email: choras@mail.atr.bydgoszcz.pl.

## IAPR'S 32nd MEMBER SOUTH AFRICA

### The Pattern Recognition Association of South Africa

In 1990 a number of people, active in the field of pattern recognition in South Africa, organized a workshop for pattern recognition. For this country with its rather limited activity in areas of technical research and development, this workshop turned out to be quite successful. Pattern recognition seems to be one of the fields which are popular in South Africa.

Since 1990, an annual workshop for pattern recognition has been held at various locations in South Africa. Every time it brought together people from all sectors to share their work in this field. Much of this work was concerned with artificial neural networks. These workshops were conducted on an informal basis, which may be one of the contributing factors to their success so far.

Suggestions to create an informal association to serve the pattern recognition community of South Africa, were often raised. At the fourth workshop these suggestions turned into a request: the organizer of the fifth workshop should go through the process of forming this association and at the same time affiliate with the IAPR.

The fifth South African Workshop on Pattern Recognition was held at the end of November last year. The Pattern Recognition Association of South Africa (PRASA) has been formed and is now affiliated with the IAPR.

Just as with the workshops, the organization of PRASA is straight and simple. The aim is to keep the amount of administration which is required to a minimum. In this way PRASA can be organized by the members of the community themselves. It would hopefully never require full time staff, thereby keeping the required funds at a minimum.

Apart from the obvious benefits associated with its affiliation with the IAPR, PRASA also wants to serve its community by making optimal use of the facilities provided through the Internet. Among these, the setting up of a list server and anonymous ftp sites for training sets and software archives, are envisaged. This should enhance communication among the members and provide them with the data and software required in their research. I personally trust that the interaction between PRASA and the international pattern recognition community, through the IAPR, will be a long standing and fruitful process.

*F S Roux, PRASA*

## IAPR JOURNAL SUBSCRIPTIONS

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### 1. MACHINE VISION AND APPLICATIONS

This note is to clarify to members that they can subscribe to the newly-sponsored journal, Machine Vision and Applications individually or in bulk, through their affiliate IAPR Member Society. The subscription rate is US\$ 49.00 per year.

**Individuals** can subscribe directly by writing to: Subscriptions Department, Springer-Verlag GmbH & Co. KG, Postfach 10 52 80, D-69042 Heidelberg, Germany. Shipping to individual members incurs an additional charge of US\$ 35.00 for postage and handling.

**Member Societies** can arrange a bulk subscription for their members (from the above address) in which case, the basic subscription price of US\$ 49.00 includes the bulk shipping to a designated distribution point.

Member Societies will be announcing to their membership their bulk subscription procedures in due course.

(Unfortunately, the deadline for placing subscription orders for the current 1995 volume of MVA was March 31, which may be just a little too late for this year. However, next year is always around the corner, so keep an eye open!).

### 2. PATTERN RECOGNITION LETTERS

Subscription rates to Pattern Recognition Letters have been substantially reduced for 1995 to IAPR members societies, individuals and affiliates. The rates are Dfl. 504 for individual mailings, Dfl 285 for bulk mailing.

For further information contact: Elsevier Science BV, PO Box 103, 1000 AC Amsterdam, The Netherlands.

### PROFESSOR CHANG TONG IAPR Governing Board Member 1982-1990

We were sad to learn of the death of Professor Chang.

Born in Henan province, China, he received his Master's degree at MIT and PhD at Harvard; in 1947 he returned to work and teach at Tsinghua University, Beijing where he remained until his death.

Professor Chang advocated close cooperation in research worldwide and attended many international meetings enthusiastically; in so doing, he established close ties with many renowned colleagues, including K S Fu, and pushed forward association between the Chinese scientific community with learned circles all over the globe.

He actively initiated and advised research into pattern recognition in China and made a great contribution to the development of this discipline.

*Professor Qingyun Shi  
Beijing, People's Republic of China*

## KING SUN FU AWARD

An Appeal  
by  
PROFESSOR JOSEF KITTLER  
PRESIDENT IAPR

The K S Fu Award Scheme was set up by IAPR in 1986 in memory of King Sun Fu, one of the founders of the Association. Every two years a recipient is selected for this prestigious award by the K S Fu Award committee from nominations made or endorsed by members of the IAPR Governing Board. A cash prize associated with the Award is funded from a special fund established back in 1986 by a generous donation from the King Sun Fu family and from a contribution made by IAPR.

As a result of the recent decline in interest rates, the real value of the K S Fu Award has been eroded. The editorial of Maria Petrou, "Dear Everybody", in the last issue of the newsletter brought this to our attention.

A reader, who wishes to remain anonymous, has offered to match any donation made to the K S Fu Award Fund between now and 15 November 1995, up to a cumulative limit of US\$ 2,000.

Triggered by this generous offer the Executive Committee has decided to launch an appeal for contributions to the Fund. In asking you for a gift I would ask you to reflect on the role IAPR has played in your professional life.

IAPR has fostered many scientific activities which I should like to think benefited your own scientific and career development in one way or another. By contributing to restore the real value of the K S Fu Award Fund you will help to maintain the prestige of the Award in particular, and to enhance the image of IAPR in general.

Please send your donations to:

Dr Josef Bigun  
Treasurer IAPR  
Swiss Federal Institute of Technology  
EPFL, DE-LTS  
CH-1015 Lausanne  
Switzerland.

When considering how much to contribute, you may like to note that in some countries gifts of this kind are tax deductible.

All contributions will be greatly appreciated and will be personally acknowledged.

*Josef Kittler*  
*February 1995*

## Report from Technical Committee 5 Benchmarking and Software

This Technical Committee is concerned with the vital step of turning a technique from a promising idea into a practical system. Benchmarking has traditionally been thought of as measuring and comparing the performance of a technique on a range of hardware platforms. However, the term encompasses the comparison of pattern recognition techniques, a task that is becoming increasingly important among both researchers and practitioners. Moreover, software is playing a more and more significant part in the development of complete pattern recognition systems, a result of them being applied to problems with real-world constraints.

### The aims of the Technical Committee are:

- to compare the performance of pattern recognition techniques on different hardware platforms, including serial, parallel and special-purpose
- to compare the effectiveness of pattern recognition techniques by means of objective measures utilizing agreed test data
- to improve access to software implementations of standard techniques
- to promote the sharing of novel pattern recognition techniques and the development of more robust methods

To this end, TC5 has been involved in the setting up of an electronic archive to make available relevant pattern recognition software and test data.

### The archive may be accessed by three routes:

1. Anonymous FTP to site [peipa.essex.ac.uk](http://peipa.essex.ac.uk) in and below directory ipa
2. Gopher to site [peipa.essex.ac.uk](http://peipa.essex.ac.uk).
3. World-Wide Web via the URL  
<http://peipa.essex.ac.uk/index.html>

The archive currently contains largely software directed towards image processing and analysis, but the intention is to extend it to all areas of pattern recognition and to include test data, information on forthcoming conferences, and reference material. The development of this archive is being coordinated with other initiatives such as ECVNet in Europe and the Vision-List archive in the United States. Indeed, any archive is only as good as its contributions, so you are warmly encouraged to contribute your own software etc, thereby making it available to the pattern recognition community as a whole.

If you are interested in the activities of IAPR's TC5, please contact: Dr Adrian F Clark, Dept Electronic Systems Engineering, University of Essex, Wivenhoe Park Colchester CO4 3SQ, United Kingdom  
Tel: +44 1206 872432 Fax: +44 1206 872900  
Email: [alien@essex.ac.uk](mailto:alien@essex.ac.uk)

## THE IMAGE UNDERSTANDING ENVIRONMENT

Jeff Hunter WIAU Manchester University UK

**M**ANY OF YOU WILL BE FAMILIAR WITH THE BENEFITS to be gained from the use of a locally shared library of software to support your computer vision research. There is however a cost: a local library can be expensive in terms of manpower to maintain and externally developed algorithms must be re-coded before they can be used.

The Image Understanding Environment (IUE) is a US initiative to try to address these difficulties. A stated goal of IUE is to provide a software infrastructure which will enhance research productivity through the availability of a well documented, modular, standard object oriented interface for the development and sharing of Image Understanding (IU) software.

Funding for the IUE project was announced by the US agency ARPA in 1991. The initial design of the IUE has been carried out by a technical committee chaired by Joe Mundy of GE and consisting of 10 sites representing a cross section of the US computer vision community. In late 1993 Amerinex Artificial Intelligence was chosen as the prime contractor for the development of the IUE.

The IUE is being implemented in C++ and currently contains over 575 classes which can be subdivided into a number of sections. The base classes dictate the behaviour of many of the entities in the IUE and provide the abstract mathematical foundation which the design committee felt an IU environment should have. Also included in the base class section are the concrete computational and mathematical entities which are required for the implementation of most software. Examples of the base classes include sets, relations, functions, arrays, lists, maps, matrices, vectors units and dimensions. Researchers frequently create and manipulate spatial geometries within their programs and a large number of classes in the spatial object hierarchy exist to support this requirement. Concrete classes from this hierarchy cater for the creation of objects representing, for example, points, lines, curves, circles, ellipses, spheres and irregular volumes. Not surprisingly, the IUE supports images of a variety of different data types including scalar, complex, RGB, structure and sequence. The IUE also supports some complex image structures

which are commonly required in IU research i.e. collections, pyramids, stereo pairs and mosaics. Further sections of the IUE include hierarchies which provide support for image features, coordinate systems, coordinate transforms, sensors, spatial indexing, topology and tasks.

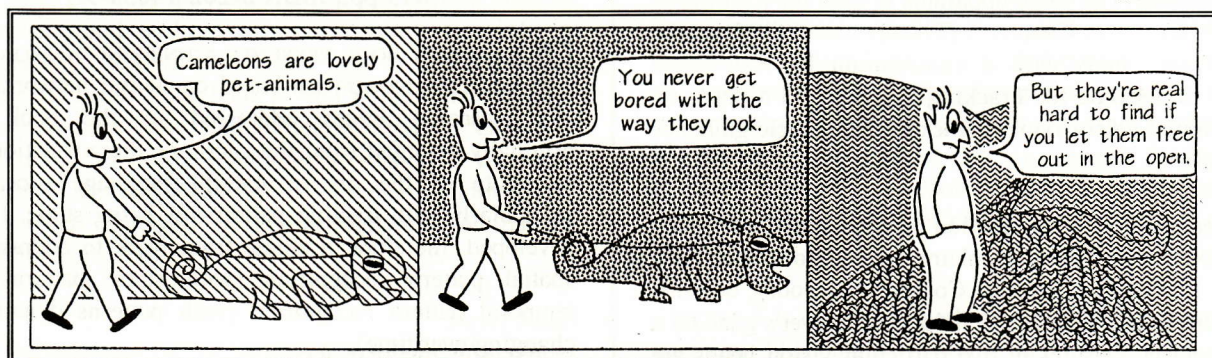
Apart from the rich set of IU abstractions which the IUE provides, the IUE will also include facilities for object display and interaction, a script and visual programming interface and support for the exchange of IU data via a mechanism called data exchange. Data exchange libraries to support the generation of IUE compatible data by non IUE systems are already available.

For more detailed information on all these aspects of the IUE and a description of programming with the IUE refer to the paper "A Stellar Application of the IUE: Solar Feature Extraction". This paper is available in postscript form via anonymous ftp from:

[ftp.aai.com:/pub/iue/doc/reports/IUW94.ps.Z](ftp://aai.com:/pub/iue/doc/reports/IUW94.ps.Z)

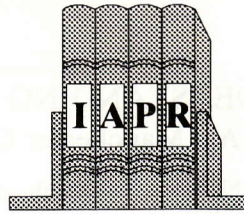
The first general release of the IUE called IUE-Core will be available in the public domain at the end of 1995. During 1996 the IUE team will put effort into the development of a wide selection of IU algorithms based upon the the IUE-Core. These libraries will be released into the public domain at the end of 1996.

The IUE is a major project and it is recognised by the US technical committee and implementation team that there are aspects of the environment which are incomplete and where further effort is required. To this end they are actively encouraging IU researchers in other countries to become involved with the ongoing IUE design and development. It is clear that by doing so researchers will have the opportunity to influence the IUE content to match their requirements and to create an IUE which they will be able to benefit from. We at Manchester have already explored the possibilities for IUE adoption with a number of other UK computer vision research groups and hope to act as a coordinating site for UK IUE interest. If you would like to be kept informed of developments on the IUE then send an e-mail message to [jeff@wiau.mb.man.ac.uk](mailto:jeff@wiau.mb.man.ac.uk) and we will add you to the list of interested parties.



Texture Analysis Challenges  
Stefan Livens, Antwerp, Belgium

BOOK



REVIEWS

### Active Vision

Edited by Andrew Blake and Alan Yuille  
(MIT Press, ISBN 0-262-02351-2)

**T**HIS BOOK IS ONE OF THE FIRST, IF NOT THE FIRST, to introduce the newly emerging paradigm of Active Vision to a wider audience. At this point many readers, especially outside the machine vision community, might have asked themselves "But what is Active Vision?" The new approach is based on the premise that the observer may be able to understand the environment more effectively if the visual sensor interacts with it analysing data purposefully to satisfy specific goals. A strategy of this type requires appropriate machinery, a controllable sensor and computer systems capable of real time operation, as well as understanding of areas such as control theory, recursive statistical filtering and dynamic modelling. These topics are introduced in the form of eighteen papers.

The selected papers are organised into four sections: Tracking, Control of Vision Heads, Geometric and Task Planning and Architecture and Applications. The first section gives a comprehensive overview of real-time tracking techniques. The seven chapters of this section represent the core of the book. The importance of tracking for active vision system is best appreciated from the fact that all but two of the papers in the remaining sections report experiments that include tracking! The presentation of tracking techniques starts with a description of a Kalman snake (Terzopoulos and Szeliski) - an elastic contour controlled by the nature of its internal stiffness, and the dynamics and attraction to external features. The deformable template of Chapter 2 (Yuille and Hallinan) provides an example of a model-based technique. The compact B-spline representation of the dynamic contour (Curwen and Blake) enables video-rate performance. Fast tracking (50Hz) of a rigid model in real images is impressively demonstrated in Chapter 4 (Harris). The machinery of the Extended Kalman Filter is employed to maintain the correspondence between the 3D model and image features. The same apparatus is used for tracking of non-rigid objects in Chapter 5 (Terzopoulos and Metaxas). The section ends with a contribution by Rao (Data Association Method for Tracking System) and a paper on application of colour region tracking for vehicle guidance (Crisman).

The three chapters of the section on the Control of Vision Heads explore different problems related to controllable sensors. In the first, Brown, Coombs and Soong describe how to use visual feedback to hold the observer's gaze on a moving object. Designs of two particular vision heads are

described in detail in papers by Clark and Ferrier, and Murrey, Du, McLauchlan, Reid, Sharkey and Brady.

Four experimental systems are presented in the Geometric and Task Planning section. Blake, Zisserman and Chipolla describe a system capable of building a free-space model and incrementally plan the robot motion. In the following chapter, Cipolla and Blake present a reliable method for extracting information about relative motion between an observer and the scene based on tracking a B-spline snake. Chapter 13 (Prescott and Mayhew) demonstrates the use of AI techniques and Neural Networks to learn how to avoid obstacles.

The final section, Architectures and Application, consists of three papers on applications and a description of a parallel architecture for stereo matching and object recognition (Rybol, Pollard, Brown and Meyhew). The book ends with a description of perhaps the most exciting of active vision systems - Dickmanns' system capable of driving a car at speeds up to 100 kilometers per hour!

There is no easy way to establish quality and usefulness of a book. However, checking its library record gives a clue. Since our vision group acquired a copy of Active Vision, being continuously on loan and overdue, the book became our librarian's headache. Not only did it prove to be 'a passable simulation of a textbook' (quoting the authors), but the level of technical detail in most sections make it useful as a reference book too. I can certainly recommend it - the dog-eared state our library copy is in speaks for itself.

*George Matas*  
*University of Surrey, UK*



### Neural Networks for Pattern Recognition by Nigrin, Albert

A Bradford Book, The MIT Press, 1993  
413 pp., ISBN 0-262-14054-3.

**T**HIS NEW BOOK PRESENTS A UNIFYING APPROACH TO pattern recognition based on neural networks. The research issues addressed in the book have originally emerged from the author's dissatisfaction with the state of the art in natural language processing, particularly with treating patterns as being static. He has developed, therefore, a single framework to address both spatial pattern recognition (with static patterns) and temporal pattern recognition (with patterns dynamically changing over time).

The book is organized into eight chapters. In Chapter 1 a general introduction to the topic is provided, so that the book can be read even by novices in the field of neural nets. Also the properties which the neural nets should possess to meet the stated goals are generally discussed.

The general mechanisms used in neural networks are introduced in Chapter 2. After presenting the basic building blocks of neural networks issues of how to combine these blocks and incorporate them into different networks are discussed. Also, two major networks are described in this chapter, namely the ART networks and the masking field, by means of which such properties as context sensitive recognition and simultaneous classification of patterns can be achieved. Following all this introductory material, the author begins with the presentation of the Self-Organizing Neural Network called SONNET. This unique architecture on which the book is focused, is designed to work in real time, though at present only a simplified version has been completed.

In Chapter 3 a basic model, SONNET1, applicable to purely spatial patterns, is discussed. It is formed by merging the properties of the ART networks with those of the masking field. Some simulations demonstrating the behaviour of the architecture are presented. Further improvement which results in incorporating SONNET1 into a framework that allows it to perform temporal processing by means of segmentation of temporal sequences is discussed in Chapter 4. The chapter presents an original idea how to design networks converting temporal sequences of events into classifiable spatial patterns. In the following chapter the discussion on classifying temporal patterns continues by presenting the idea of building a hierarchical architecture. It is shown how to cascade multiple homologous layers to create a hierarchy of representations.

Some radically new architectures designed to handle synonyms both for temporal and spatial patterns are presented in Chapter 6. After showing how synonyms can be learned and represented by the considered architectures, the general mechanisms for creating distributed representations are discussed. Chapter 7 treats the problem of both size and translation invariant recognition of objects. Finally, Chapter 8 evaluates the results and properties achieved by the new architectures derived from SONNET1, provides an indication of the current state of the network and outlines areas for future research. A comprehensive list of references and a subject index conclude the book. The book is well written and does not need any previous knowledge of neural networks. Owing to the originality of the new architectures and the clarity of exposition it should prove a source of valuable information for everybody engaged in neural networks or pattern recognition research.

*Pavel Pudil*  
Czech Academy of Sciences

## Morphological Image Operators

by Henk J.A.M. Heijmans

Published by Academic Press, 1994

(509pages, ISBN 0-12-01599-5)

**T**HIS BOOK PRESENTS A FORMALIZED APPROACH TO mathematical morphology that has been developed over several years. The book is well-written and although not very simple to read (the reader must have a mathematical background), it is an excellent starting point for anyone seriously interested in the development and current state of the mathematical morphology and its applications to the low-level image processing.

The first words of its preface explain very accurately the title and the context of the book. "This book is called "Morphological Image Operators" for the simple reason that it deals with morphological (image) operators". But "what is a Morphological operator?" Any attempt to find a formal definition of a morphological operator, however, would lead inevitably to the following dilemma: either it would be too restrictive, excluding operators that should not be excluded a priori, or it would be too general, leading to a "theory of everything". For those readers who are content with a less formal approach: morphological operators are mappings on spaces of images (complete lattices in this book) which emerge in the context of mathematical morphology.

The well known books of Matheron (1975) and Serra (1982, 1988) discuss a number of mappings on subsets of the Euclidean plane, which are based on set-theoretical operations. Only recently these operations have been extended to arbitrary complete lattices, possibly endowed with some automorphism group.

The reader does not need to have prior familiarity with morphology. The book has a very good and autonomic structure. It has 13 sections and my opinion is that it combines the best aspects of a textbook and a monograph.

In Chapter 1 we can find the "first principles" of mathematical morphology. The basic idea of the book is to look at the mathematical morphology and its applications starting from complete lattices and Chapter 2 explains several basic concepts of the theory of complete lattices. Next chapter (titled "Operators on Complete Lattices") restricts attention to operators which have additional properties, such as being increasing or distributive over infima". Chapter 4 contains descriptions of operators which are translation invariant. Morphological operations dilations, erosions, openings and closings are discussed in Chapters 5-6. In Chapter 7, the author explains Hit-or-Miss Topology and Semi-Continuity. A separate chapter describes problems of image and operator discretization.

Chapter 9 is connected with convexity, distance and connectivity. This chapter explains why mathematical mor-

phology is considered to be a geometrical approach in image analysis. The main operators treated in this chapter are metric dilations, distance transforms, granulometries, skeletons, and geodesic operators. The following step is Chapter 10. It is an extension from set operators to function operators. This allows to widen our knowledge of morphology for grey-scale images (Chapter 11). Two last chapters of the book are connected with morphological filters. A detailed investigation of algebraic properties of filters, overfilters, inf-overfilters, and strong filters is given. Then the author explains how one can construct morphological filters by iteration of an arbitrary increasing operator. One simple example proves the correctness of the book's title: we usually use a term "median filter", although from the morphological point of view it is not a morphological filter, but it is an operator!

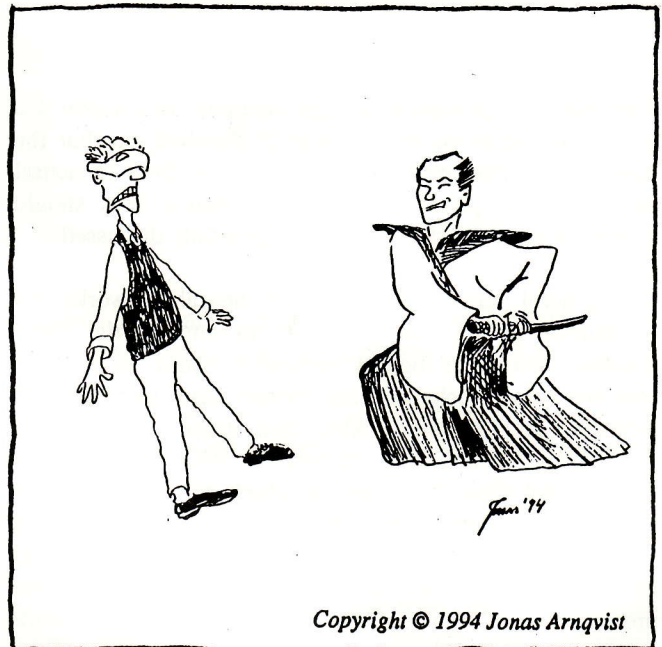
The author tries to illustrate the content of the book by concrete examples and expressive pictures, as much as possible. Every chapter is ended by a subsection titled "Biographical Notes", where author shortly explains some of the concepts referred to in the chapter and directs the reader to the original publications that introduced them. The book contains 170 references, a very useful six page notation index and a comprehensive subject index.

Time and time again there is a discussion of the type: "Is computer vision (or another area) a science or not?". (See, for example, CVGIP: Image Understanding, Vol.53, No.1 and Vol.60, No.2.) My opinion is that this book is one of proofs that image processing is a science and not a set of computer tricks or an accidental set of items from different sciences.

I think this book will be a good reference book for everybody working with morphological operators for image processing. The presentation and discussion of the author's approach is fairly well balanced, and each section is clearly demonstrated by lots of examples. Generally, the presentation is of very high standard. I believe that the author has reached the goal he set himself and this book is going to be a classic for several years to come. I would not hesitate to recommend it to anybody as a graduate text and research reference.

*Valery Starovoitov  
Belarussian Academy of Sciences*

**REMEMBER TO SUBMIT  
YOUR ENTRY TO  
THE CROSSWORD COMPETITION.  
CONTRIBUTIONS SHOULD REACH THE EDITOR  
BY 1 MAY 1995  
!!!  
US\$ 70.00  
TO BE WON**



Copyright © 1994 Jonas Arnqvist

Suddenly not confident that his edge detection gear would pass the committee's rigorous real time test, Brent postponed his demonstration at the Tokyo virtual reality conference.



**IAPR Workshop on  
Machine Vision Applications MVA'94  
Kawasaki, Japan, Dec. 13-15.**

The workshop was attended by 217 people, 159 from Japan and the rest from 23 other countries. The workshop was a great success from both the academic and the organizational aspects. The organizers, in particular Prof. M. Takagi, and Dr. A Maeda - the Workshop Co-Chairs, Dr. M. Ejiri - the Organizing Chair and Prof. S. Ozawa - the Program Chair, deserve all the compliments for this great achievement. I take this opportunity to thank them again and recognize their blessed activity.

The high quality of the Workshop proceedings is a testimony to its quality. Three invited talks were featured: Per-Erik Danielsson of Linkoping Univ., Sweden, talked about 3D cone beam tomography for non-destructive testing. Josef Kittler of Surrey Univ., UK, talked about detection of defects in colour texture surfaces, and Dov Dori of Technion, Israel, (author of this report) talked about the object-process paradigm and its application to machine vision.

Numerous other contributions described research and applications in 3D object recognition and shape analysis, machine vision system architectures, motion and navigation, document processing, maps analysis, and texture analysis, along with many other topics.

The MVA series has already established itself as one of the major events in the machine vision and pattern recognition community and this last workshop has definitely reinforced the international recognition and importance of this workshop series.

*Dov Dori, Israel*



## CONFERENCE ANNOUNCEMENTS

### EUROPTO SERIES

#### 1. BiOS Europe '95 Barcelona Spain 12 - 16 September 1995

The European Biomedical Optics Symposium week featuring lasers and optics in: Medical Applications; Optoelectronics Research and Techniques; Biomedical Systems and Technologies

**Paper submission deadline: 15 March 1995**

*Late submissions may be considered*

**Final camera ready paper: 16 Aug 1995**

(address printed below)

#### 2. Satellite Remote Sensing II Paris France 25 - 29 September 1995

**Paper submission deadline: 27 Feb 1995**

*Late submissions may be considered*

**Final camera ready paper: 20 Aug 1995**

**For complete conference descriptions of both above meetings contact:** Direct Communications GmbH,

Xantener Strasse 22, D-10707 Berlin, Germany.

Tel: +49 30 881 5047 Fax: +49 30 881 5040

Emails: 1. Burger,100140.3211@compuserve.com

2. 100140.3216@compuserve.com(Heckel)

#### Second Asian Conference on Computer Vision Singapore 5 - 8 December 1995 [IAPR]

The theme of ACCV '95 is **Computer Vision for the Twenty First Century**. Original papers are invited in, but not limited to, the following topics:

- Image Processing
- Stereo Vision
- Motion Analysis & Tracking
- Texture Analysis
- Sensor Fusion
- Active Vision
- Physics Based Vision
- Invariant Features
- Segmentation & Grouping
- Feature Extraction
- Learning in Computer Vision
- Pattern Recognition
- Robot & Machine Vision
- Mobile Robots & Navigation
- Remote Sensing
- Medical Imaging
- Real-Time Vision Systems
- Parallel Algorithms
- Applications of Computer Vision
- Virtual Reality

#### **Paper submission:**

3 copies of extended summary (1000-1500 words), in English, should include:

- the author's name (surname underlined)
- address, telephone, fax and email address
- broad classification of the paper.

The length of the final papers in the proceedings will be limited to a maximum of five A4 pages including figures, tables and references.

#### **Submit to:**

Eric Sung, ACCV '95, School of Electrical & Electronic Engineering, Nanyang Technological University, Nanyang Avenue, Singapore 2263

**Paper submission deadline: 30 June 1995**

**Acceptance notification: 31 Aug 1995**

**Final camera ready paper: 15 Oct 1995**

#### Nineth IMDSP Workshop Belize City Belize 3 - 6 March 1996

#### **Topics will include:**

Physics Based Models; Multiresolution models; Models for the Human Vision System; Color Models; Image and Video Quality Metrics, Compressions and Analysis; Image Rendering for Printing and Display; Color, Radar and Medical Imaging. For further information:

Jan Allebach +1 317 494 3535; allebach@ecn.purdue.edu

J Kovacevic +1 908 582 6504; jelena@research.att.com

**Paper submission deadline: 15 Aug 1995**

**Acceptance Notification: 15 Oct 1995**

**Final camera ready paper: 15 Nov 1995**

#### Fourth European Conference on Computer Vision Cambridge United Kingdom 14-18 April 1996

The programme will consist of a single track of the highest quality, previously unpublished, contributed papers delivered either orally or as a poster. Contributions are sought on new research on any aspect of computer vision.

In addition it is planned to hold a small number of specialised workshops on Friday 19 April immediately following the main meeting; anyone interested in organising a workshop should contact the chairman, Professor B Buxton, email: b.buxton@cs.ucl.ac.uk

**Programme and registration information from ECCV'96,**  
42 Devonshire Road, Cambridge CB1 2BL, UK.

**Paper submission deadline: 1 Oct 1995**

**Acceptance notification: 10 Dec 1995**

**Final camera ready deadline: 20 Jan 1996**

## FORTHCOMING CONFERENCES, WORKSHOPS AND EVENTS

1995	Event	Location	Contact [Sponsor]
18-20 April FOM'95	8th Int Conf on 3D Image Processing in Microscopy & 7th Int Conf on Confocal Microscopy	Taipei, Taiwan	Dr P Cheng, Advanced Microscopy & Imaging Lab, Dept Elec & Comp Engineering, State Uni of New York at Buffalo, PO Box 84, Getzville, NY 14968. USA. <a href="mailto:elepcc@corn.eng.buffalo.edu">elepcc@corn.eng.buffalo.edu</a>
27-29 April WGMICV	Europe-China Workshop on Geometrical modelling and Invariants for Computer Vision	Xi'an, China	Prof R Mohr, LIFIA INRIA, 46 Avenue F Viallet, 38031 Grenoble Cedex, France. <a href="mailto:Mohr@imag.fr">Mohr@imag.fr</a>
8-12 May ICASSP-95	1995 IEEE International Conference on Acoustics, Speech and Signal Processing	Detroit, USA	ICASSP-95, Diversified Management Services, PO Box 265, Eaton Rapids, MI 48827-0265, USA.
11-13 May ÖAGM	19th ÖAGM and 1st SDVR Workshop	Maribor, Slovenia	Franc Solina, University of Ljubljana, Faculty of Electrical Eng & Comp Sci, Trzaska 25, 61000 Ljubljana, Slovenia. <a href="mailto:franc@fer.uni-lj.si">franc@fer.uni-lj.si</a> [IAPR]
15-19 May VI'95	Vision Interface'95	Quebec, Canada	Denis Poussart, Department of Electrical Engineering, Laval University, Québec, Québec, Canada G1K 7P4. <a href="mailto:poussart@gel.ulaval.ca">poussart@gel.ulaval.ca</a> [IAPR]
6-9 June 9SCIA	9th Scandinavian Conference on Image Analysis	Uppsala, Sweden	9SCIA, Centre for Image Analysis, Lägerhyddsvägen 17, S-752 37 Uppsala, Sweden. <a href="mailto:scia9@cb.uu.se">scia9@cb.uu.se</a> [IAPR]
18-19 June WPBMCV	IEEE Workshop on Physics-Based Modelling in Computer Vision	Cambridge, MA, USA	Demetri Metaxas, Dept Comp & Information Science, University of Pennsylvania, 200 South 33rd Street, Philadelphia, PA 19104-6389. USA.
19 June WCBC	IEEE Workshop on Context-Based Vision	Cambridge, MA, USA	Tom Strat, SRI International, 333 Ravenswood Avenue, Menlo Park, California 94025, USA.
19 June WSPM	IEEE Workshop on Shape & Pattern Matching	Cambridge, MA, USA	Andrea Califano, IBM TJ Watson Research Center, 30 Saw Mill River Road, Hawthorne, New York 10532, USA. <a href="mailto:acal@watson.ibm.com">acal@watson.ibm.com</a>
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. <a href="mailto:pitas@vergina.eng.auth.gr">pitas@vergina.eng.auth.gr</a>
20-23 June 5-CCV	Fifth International Conference on Computer Vision	Cambridge, MA, USA	Eric Grimson, Artificial Intelligence Lab, 545 Technology Square, MIT, Cambridge, Massachusetts 02139, USA. <a href="mailto:welg@ai.mit.edu">welg@ai.mit.edu</a>
26-28 June DSP 95	International Conference on Digital Signal Processing	Limassol, Cyprus	DSP 95, Department of Computer Science, University of Cyprus, Kallipoleos 75 PO Box 537, Nicosia, Cyprus. Tel: +357 2 360589 Fax: +357 2 360881
3-6 July IPA95	5th International Conference on Image Processing and its applications	Edinburgh, UK	IPA95 Secretariat, IEE Conference Services, Savoy Place, London, WC2R 0BL, UK. <a href="mailto:conference@iee.org.uk">conference@iee.org.uk</a> [IAPR]
9-14 July 40 SPIE	SPIE's 40th Annual Meeting - Mathematical Imaging	San Diego, USA	SPIE, PO Box 10, Bellingham, Washington 98227-0010, USA. Phone: +1 206 676 3290
5-9 Aug IROS'95	IEEE/RSJ International Conference on Intelligent Robots and Systems	Pittsburgh, USA	Patricia Mackiewicz, School of Computer Science, Carnegie-Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213-3891 USA. <a href="mailto:patty@cs.cmu.edu">patty@cs.cmu.edu</a>
7-9 Aug DMSA	Distributed Multimedia Systems and Applications	Stanford, USA	Dr Borko Furht, Department of Computer Science & Eng, Florida Atlantic University, Boca Raton, Florida 33431, USA. <a href="mailto:borko@cse.fau.edu">borko@cse.fau.edu</a>
10-11 Aug GRec95	IAPR Workshop on Graphics Recognition	Pennsylvania USA	Professor R Kasturi, Dept Computer Science & Engineering, Penn State University, University Park, Pennsylvania 16802, USA. <a href="mailto:kasturi@cse.psu.edu">kasturi@cse.psu.edu</a> [IAPR]
10-11 Aug ISATP'95	1995 IEEE International Symposium on Assembly and Task Planning	Pittsburgh, USA	Prof Sukhan Lee, Dept Computer Science, University of Southern California, Los Angeles, California 90089-0781, USA. <a href="mailto:rajeev@cs.uiuc.edu">rajeev@cs.uiuc.edu</a>
14-16 Aug ICDAR '95	Third International Conference on Document Analysis and Recognition	Montreal, Canada	Professor R Kasturi, Dept Computer Science & Engineering, Penn State University, University Park, Pennsylvania 16802, USA. <a href="mailto:kasturi@cse.psu.edu">kasturi@cse.psu.edu</a> [IAPR]

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

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]
11-14 Sept BMVC'95	Sixth British Machine Vision Conference	Birmingham, UK	David Pycock BMVC'95, School of Electronic & Electrical Engineering, The University of Birmingham, Edgbaston, Birmingham B15 2TT UK, . BMVC95@bham.ac.uk
12-16 Sept BiOS Europe'95	European Symposium on BiOS Europe'95	Barcelona, Spain	BiOS Europe'95, c/o Direct Communications GmbH, Xantener Strasse 22, D-10707 Berlin, Germany. burger,100140.3211@compuserve.com
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]
13-15 Sept 17th DAGM	17th DAGM Symposium on Pattern Recognition	Bielefeld, Germany	Prof G Sagerer, University of Bielefeld, Technical Depart Applied Comp Science, PO Box 10 01 31, 33501 Bielefeld, Germany, . dagm@techfak.uni-bielefeld.de
17-22 Sept ISIT'95	IEEE International Symposium on Information Theory	Whistler, Canada	Prof I Blake, Dept Elec Comp Eng, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1. ifblake@claudu.uwaterloo.ca
18-20 Sept CAMP'95	Computer Architectures for Machine Perception	Como, Italy	Alessandra Setti, Dip. di Informatica e Sistemistica, Via Abbiategrosso 209, 27100 Pavia, Italy. ale@ipvvis.unipv.it [IAPR]
19-21 Sept PRIA'95	Third Scientific Conference on Pattern Recognition and Image Analysis	Minsk, Belarus	Professor S Ablameyko, Institute of Engineering Cybernetics, Belarusian Academy of Sciences, Surganov str 6, 220012 Minsk, Belarus. mahaniok%bas10.basnet.minsk.by@demos.su
25-29 Sept SRS-II	European Symposium on Satellite Remote Sensing II	Paris, France	Satellite Remote Sensing II, c/o Direct Communications GmbH, Xantener Strasse 22, D-10707 Berlin, Germany. 100140.3216@compuserve.com(Heckel)
27-30 Sept KARP-95	Second International Symposium on Knowledge Acquisition, Representation and Processing	Alabama, USA	Chuck Karr, US Bureau of Mines, The University of Alabama Campus, PO Box L, Tuscaloosa, Alabama 35486-9777, USA. karr@ai.usbm.gov
9-13 Oct ESSRS II	European Symposium on Satellite Remote Sensing II	Florence, Italy	The Europto Series, Direct Communications GmbH, Att. Ms Susan Jones, Xantener Str 22, 10707 Berlin, FR Germany. (Jones)100140,3214@compuserve.com
22-25 Oct ICIP'95	1995 International Conference on Image Processing	Washington DC, USA	ICIP'95, Conference Management Services, 3024 Thousand Oaks Drive, Austin, Texas 78746, USA. icip95@ieee.org
5-8 Dec ACCV'95	Second Asian Conference on Computer Vision	Singapore	Mr Eric Sung, Research Lab IV, School of Elect & Electronic Eng, Nanyang Technological University, Nanyang Ave, Singapore 2263. accv95@ntu.ac.sg [IAPR]
6-8 Dec DICTA'95	Digital Imaging Computing Techniques and Applications	Brisbane, Australia	Ross Walker, DICTA95, C/-Dept Elect and Comp Engineering, University of Queensland 4072, Australia. dicta95@cssip.elec.uq.oz.au
11-13 Dec ICSC'95	Third International Computer Science Conference - Image Analysis Applications and Computer Graphics	Hong Kong	Professor R T Chin, Department of Computer Science, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong. roland@cs.ust.hk [IAPR]
<b>1996</b>	<b>Event</b>	<b>Location</b>	<b>Contact [Sponsor]</b>
14-18 April ECCV'96	Fourth European Conference on Computer Vision	Cambridge, UK	ECCV'96 Conference Secretariat, 42 Devonshire Road, Cambridge, CB1 2BL, UK. cc@concon.demon.co.uk
20-23 Aug SSPR'96	International Workshop on Structural & Syntactic Pattern Recognition	Leipzig, Germany	Mrs R Vetter, HTWK Leipzig FB Informatik, PSF 66, 04251 Leipzig, Germany. sspr96@informatik.th-leipzig.de
25-30 Aug 13-ICPR	13th International Conference on Pattern Recognition	Vienna, Austria	c/o Austropa Interconvention, A-1043 Vienna, POB 30, Austria. icpr@prip.tuwien.ac.at [IAPR]
2-5 Sept 5 IWFHR	Fifth International Workshop on Frontiers in Handwriting Recognition	Colchester, UK	Prof S Impedovo, Dipartimento di Informatica, Università di Bari, Via Amendola 173, 70126 Bari, Italy. Fax: +80 544 3142

