



International Association for Pattern Recognition, Inc.

An affiliate member of the International Federation for Information Processing

NEWSLETTER

EDITOR

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EDITORIAL COMMENTS

We are on the threshold of a new and exciting thrust in digital image processing. It is quite possible that this will lead to interesting solutions to old difficulties, but it will without doubt also generate many novel research problems. What I am referring to are the current efforts by a still relatively small number of laboratories which are developing comparatively inexpensive array processors specifically for image processing. Advances in integrated circuit technology have made it possible to perform cellular logic in parallel at speeds which considerably accelerate low level image processing computations. At the same time this technology is also being

used to develop special purpose feature extraction processors. The integration of these with conventional sequential computers, or perhaps even with new architectures for sequential machines, will, in my opinion, change the character of picture processing by computer.

It is true that this work on parallel machines had its origins many years ago in the 1950's. It is also true that during the 60's attempts at constructing such machines were not very successful. However, slow progress has been made in the 70's, probably with more cautious goals in mind. All of the portents point to success in the next decade, with the development of image processing computers of considerable power. Maybe it is time for all of us to pull out of the desk drawer those totally impractical and time-consuming algorithms we have stored away and prepare for the new age.

Martin D. Levine

IAPR NEWS

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U.S.A.
- Secretary : Prof.dr.ir. C.J.D.M. Verhagen
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Delft University of Technology
Lorentzweg 1, 2628 CJ Delft
The Netherlands
Telephone: 015 - 785390

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Princeton, N.J. 08540
U.S.A.

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Institut für Nachrichtentechnik
Tech. Universität München
8-München 2, Arcisstr. 21
W-Germany
Telephone: 089-8383

NITPIC

..... There are signs that Artificial Intelligence may once again become respectable in Britain, although perhaps in a different form Marc Eisenstadt has recently been appointed editor of the AISB Quarterly. The Society for the Study of Artificial Intelligence and Simulation of Behaviour was founded in 1964 and acts as a focal point for news of Artificial Intelligence Research and Experiments in the simulation of behaviour. Membership is about 600, in Europe, drawn from both the Universities and from Industry Ernst Triendl of the Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V. in Oberpfaffenhofen in West Germany is the editor of a local Newsletter published by the Deutsche Arbeitsgemeinschaft für Mustererkennung entitled, "Rundbrief Mustererkennung" Morton Nadler is looking for a translator to English of the monograph "Polynomklassifikatoren für die Zeichenerkennung" [Polynomial Classifiers for Pattern Recognition] by Jürgen Schürman (Oldenbourg, Verlag, 1977). If a suitable translation can be obtained, the book would be published in the forthcoming series "Advanced Applications in Pattern Recognition" by Plenum Publishing Corp. The work would be suitable for a bilingual graduate student in pattern recognition, preferably with English as the mother tongue. Candidates please contact Morton Nadler, 17, Les Huppès, 78170 La-Celle-St-Cloud, France directly

CONFERENCE REPORTS

ENGINEERING RADIOLOGY JOINT CONFERENCES NEWPORT BEACH, CALIFORNIA, JUNE 1979

The IEEE Conference on Computer-Aided Analysis of Radiological Images (CAARI) was held jointly with the Sixth Conference on Computer Applica-

tions in Radiology of the American College of Radiology (ACR) at Newport Beach, CA, June 20-21, 1979. It was sponsored by the Machine Intelligence and Pattern Analysis Technical Committee of the IEEE Computer Society. Professor Jack Sklansky of the University of California at Irvine served as the general chairman, Professor Kendall Preston, Jr. as the program chairman, and Dr. Judith M.S. Prewitt of NIH as the treasurer and also the organizer of the joint ACR-IEEE plenary meeting on computer technology and radiology which was conducted on June 20.

The ACR Conference on Computer Applications in Radiology was chaired by Dr. James L. Lehr of the University of Chicago and began on June 18. The first day was devoted to a panel discussion on current radiology information systems and the second to current applications in radiology.

The Joint plenary meeting on Computer Technology and Radiology on June 20 consisted of two sessions. There were six papers in the morning session on Emerging Software and Hardware Technologies. The afternoon session was focused upon the cost and benefit in radiological imaging.

Twenty-four papers were presented in four sessions on the last day of the conference, covering Radiology and Thermography, Computed Tomography, Display Techniques in Nuclear Medicine, and Ultrasound.

During the conference, four evening workshops were held with topics covering Radiology, Ultrasound, Nuclear Medicine, and Computerized Tomography; a guided tour to the Image Processing Laboratory of the University of California at Irvine was also conducted.

The proceedings of the joint conference was published in August 1979 by the IEEE Computer Society. To order a copy, write to Mr. True Seaborne, IEEE Computer Society, 5855 Naples Plaza, Suite #301, Long Beach, CA 90803.

BRITISH PATTERN RECOGNITION ASSOCIATION 1980 CONFERENCE ON PATTERN RECOGNITION

The imposing academic atmosphere of the University of Oxford in England was the site of the recently held Conference on Pattern Recognition, sponsored by the British Pattern Recognition Association. Over two hundred people, mostly from Britain, but a substantial number from other countries, attended. The accommodations and dining hall at Keble College were in keeping with the genteel atmosphere expected at this institution and lent an air of congeniality to the proceedings.

About 90 papers were presented, with most putting a heavy emphasis on applications. Sessions were held on medical applications, line drawing processing, statistical methods, scene analysis, theoretical pattern recognition, shape analysis and object location, syntactic methods, microscopic image processing, acoustic signal processing, low level image processing, hardware systems, and character recognition.

**BRITISH PATTERN RECOGNITION ASSOCIATION
1980 CONFERENCE ON PATTERN RECOGNITION (CONT'D)**

Copies of the published abstracts may be obtained from the secretary of the BPRA, Dr. M.J.B. Duff, Dept. of Physics and Astronomy, University College, London, WC1 6BT, Britain.

**MEETINGS AND PROGRAMS TASK FORCE SUBCOMMITTEE ON
BIOMEDICAL PATTERN RECOGNITION AND IMAGE
PROCESSING IEEE COMPUTER SOCIETY**

This report covers the work of the above-named task force during the interval 1977-1979. The task force arranged sessions at three major conferences. These conferences were the 1977 and 1978 IEEE Conferences on Pattern Recognition and Image Processing. At both of these conferences speakers were invited to survey the state-of-the-art in image processing and pattern recognition in fields of radiology, nuclear medicine, and histopathology. Their papers appeared in the conference proceedings and form interesting and helpful contributions to the biomedical image processing and pattern recognition literature.

In 1979 a joint conference was arranged with the International Academy of Cytology (University of Chicago) which was the 1979 International Conference on Pattern Recognition of Cell Images. This meeting was attended by approximately 100 research workers from Japan and Europe, as well as the United States. The papers presented at the conference were collected for publication in 2 journals: Analytical and Quantitative Cytology and the Journal of Pattern Recognition. The first issue of Volume 2 of Analytical and Quantitative Cytology will contain a lead article which was first presented at this 1979 conference entitled, "Automation of the Analysis of Cell Images", which reviews the entire field of cell image analysis from 1950 through 1980. This article was written by the Task Force chairman. Furthermore, approximately 10 papers presented at the 1979 conference have now been reviewed and approved for inclusion in a special issue concerning pattern recognition of cell images which will be published in 1980 in the Journal of Pattern Recognition.

CONFERENCES AND WORKSHOPS

**CANADIAN SOCIETY FOR COMPUTATIONAL STUDIES IN
INTELLIGENCE/SOCIETE CANADIENNE POUR ETUDES
D'INTELLIGENCE PAR ORDINATEUR**

In cooperation with:

Canadian Man-Computer Communications Society
Canadian Image Processing and Pattern
Recognition Society

14,15,16 May 1980, in Victoria, B.C.

Sessions on the following topics have been scheduled: Expert Systems; Man-Computer Communications; Deduction and Synthesis; Image Analysis; Semantic Nets; Natural Language Processing; Com-

puter Graphics Tutorial; Computer Vision; Speech Analysis and Synthesis; Games, Problems and Search; Computer Film Festival. Address all correspondence to:

CSCSI/SCEIO Conference
Department of Computing Science
University of Alberta
Edmonton, Alberta
T6G 2H1

GERMAN PATTERN RECOGNITION SYMPOSIUM

The 3rd Symposium of the German chapter of IAPR, DAGM (Deutsche Arbeitsgemeinschaft für Mustererkennung (German Association for Pattern Recognition) will be held in Essen, 28-30 May, 1980, together with the 81st meeting of the German Society (DGAO). As usual the proceedings will be pre-published as "Informatik Fachbericht" (lecture note series) by Spinger. For information contact: H.-J. Preuß, c/o E. Leitz, Wetzlar GmbH., Post Office box 2020, D-6330 Wetzlar, Germany.

AISB-80

AISB-80, the fourth conference to be organized by the Society for the Study of Artificial Intelligence and Simulation of Behaviour, will be held in Amsterdam, July 2nd to July 5th, 1980. Papers concerning all aspects of Artificial Intelligence will be considered, including (but not limited to) the topics listed below. In addition to the accepted papers, invited speakers are scheduled. Final versions of accepted papers will appear in the conference proceedings.

TOPICS (AND PROGRAMME COMMITTEE MEMBERS):

Natural Language Understanding,	Karen Spark-Jones (Cambridge)
Automatic Deduction,	Joerg Seikmann (Karlsruhe)
AI Methods and Problem Solving,	Bob Wielinga (Amsterdam)
Automatic Programming and Languages for AI,	Steven Hardy (Sussex)
Vision and Image Understanding,	Mike Brady (Essex)
Psychological Models,	Richard Young (Cambridge)

Questions about the conference should be addressed to:

Dr. Bob Wielinga
Psychology Laboratory
Weerperlein 8
Amsterdam, Netherlands
Telephone: Amsterdam (020)
525-3107

CONFERENCES AND WORKSHOPS (CONT'D)

INTERNATIONAL SOCIETY FOR PHOTOGRAMMETRY

ISP Hamburg, 1980
14th International Congress
July 13-25, 1980

Topics for presentation include:

Registration and correlation of imagery
Merging of data files
Standardization in formatting of digital tapes
Classification
Texture analysis
Line following
Filtering
Pre-processing
Shape recognition

SIGGRAPH '80

Seventh Annual Conference on Computer Graphics and Interactive Techniques, sponsored by the Association for Computing Machinery Special Interest Group on Computer Graphics. July 14-18, 1980 Seattle, Washington. A full week of intensive exposure to the capabilities of computer-generated visual display and interaction.

SIGGRAPH '80
P.O. Box 88203
Seattle, Washington 98188
(206) 453-0599

IFIP CONGRESS 80

IFIP Congress 80, the 8th World Computer Congress, is the next in a series of triennial meetings sponsored by the International Federation for Information Processing (IFIP). Representing the information processing interests of its 39 member countries, IFIP has held congresses in Paris, Munich, New York, Edinburgh, Ljubljana, Stockholm and Toronto. These have been major occasions for the world-wide exchange of information among developers and users of information processing techniques and technology.

The 8th World Computer Congress and Exhibition will be held at two locations: starting in Tokyo (Japan) from 6th-9th October, and continuing in Melbourne (Australia) from 14th-17th October 1980. The program will contain three types of sessions:

Invited Papers, relating to broad areas of information processing.

Submitted Papers, reporting on significant current developments in information processing.

Panel Discussions, exploring the present state of the art and current trends and involving audience participation.

To assist authors a pamphlet entitled INSTRUCTIONS AND AIDS FOR AUTHORS has been prepared and individuals considering submitting a

paper should write for a copy of the pamphlet to:

Program Committee
IFIP Foundation
40, Paulus Potterstraat
1071 DB Amsterdam
The Netherlands

EUSIPCO-80

European Association for Signal Processing

The *European Signal Processing Conference* (EUSIPCO) is a triennial Conference promoted and organized by EURASIP, the European Association for Signal Processing, in cooperation with other scientific and technical organizations. Its aim is to cover all aspects of signal processing theory and practice and to promote the exchange and cross-fertilization of ideas between individuals working in such a multi-disciplinary field.

The first European Signal Processing Conference will be held on the Lausanne Campus of the Swiss Federal Institute of Technology from September 16th to 19th, 1980.

Sessions will include tutorial and review papers, new research results, presentations of applications and technological novelties with possible panel discussions. Poster session will also be set up. Proceedings will be published by North-Holland Publishing Company. English is the official language of the Conference.

This Conference is open to all aspects of signal processing, including:

- * Signal and noise theory
- * Filtering
- * Spectral Analysis
- * Image and 2-D Signal Processing
- * Optical Signal Processing
- * New Signal Processing Technology
- * Special purpose hardware and software developments
- * Radar-Sonar signals and systems
- * Speech processing
- * Applications in communication, biomedicine, pattern recognition, seismology, industrial processes, etc.

Conference Secretariat:

Mrs. C. Stelé
EUSIPCO-80
Dept. of Electrical Engineering
Swiss Federal Institute of Technology
16, Chemin de Bellerive
CH-1007 Lausanne
SWITZERLAND
Tel. (21) 47 26 24
Telex 24478 EPPVD CH.

CONFERENCES AND WORKSHOPS (CONT'D)

5TH INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION

Miami Beach, Florida, December 1-4, 1980. Co-sponsored by IAPR and the IEEE Computer Society.

Topics of Interest

METHODOLOGIES: statistical, structural and syntactic methods, clustering techniques.

PREPROCESSING AND FEATURE EXTRACTION: Image enhancement and restoration, line drawings, waveform analysis, shape and texture analysis.

APPLICATIONS: character recognition, speech recognition, robot vision, medical and biomedical applications, scientific and industrial applications, remote sensing, applications in societal and environmental problems.

IMPLEMENTATIONS: digital systems, special processors, optical techniques, interactive systems, data structures, data bases, innovative computer architectures.

For further information, write to: 5-ICPR, P.O. Box 639, Silver Spring, MD 20901, U.S.A.

6TH INTERNATIONAL JOINT CONFERENCE ON PATTERN RECOGNITION

The 6th IJCPR will be held in Munich, Germany, 19-22 October 1982 at the Technical University.

Chairman: Professor H. Marko
Lehrstuhl für Nachrichtentechnik
Technische Universität München
Arcisstrasse 21
8 München 2

Vice-

Chairman: Professor H.H. Nagel, Hamburg

Finance

Chairman: Dr. S.J. Pöppel, München

Program-

Chairman: Professor H. Niemann, Erlangen

Publications

Chairman: Dr. M. Lang, München

Local

Arrangements : H. Platzler, München

COURSES

EUROPEAN ASSOCIATION FOR SIGNAL PROCESSING

Two one-day courses will be given in conjunction with the EUSIPCO-80 Conference in Lausanne, Switzerland.

PARALLEL PICTURE PROCESSING: by Prof. Goesta H. Granlund and Prof. Björn Kruse, Picture Processing Laboratory, Likoeping University, Linkoeping, Sweden.

Course Outline

- * Parallel and sequential operations
- * Local operations, arithmetic operations, logical operations
- * Segmentation, thresholding, measurements
- * Hardware structures, CLIP4, MPP, PICAP, CYTO-COMPUTER
- * Computing structures, hierarchical structures, feedback systems
- * Software, interactive systems, data structures for image processing
- * Applications, biomedical applications, industrial applications
- * Prospects for the future.

DIGITAL FILTERING: by Prof. Vito Cappellini, Florence University, Florence; Dr. Anthony C. Constantinides, Imperial College, London; Dr. Pier L. Emiliani, IROE - C.N.R., Florence

Course Outline:

- * Sampling
- * Discrete-time signals and systems
- * The Discrete Fourier Transform (DFT) and the Fast Fourier Transform (FFT)
- * The z-transform
- * Digital filtering (1-D and 2-D)
- * Design of FIR and IIR digital filters (1-D and 2-D)
- * Software implementation of digital filters
- * Hardware implementation of digital filters
- * Applications of digital filtering to speech, communications, image processing, radar-sonar, biomedicine, remote sensing, earth resource and archaeological prospecting.

GENERAL INFORMATION

Course Location and Date:

Dept. of Electrical Engineering of the Swiss Federal Institute of Technology (Ecole Polytechnique Fédérale) Lausanne, Switzerland

September 15, 1980

Course starts at 9:00 and distribution of course material will start at 8:30.

Course Secretariat:

Mrs. C. Stehlé
EUSIPCO-80
Dept. of Electrical Engineering
Swiss Federal Institute of Technology
16, Ch. de Bellerive
CH-1007 Lausanne
SWITZERLAND
Tel. (021) 47 26 24
Telex 24478 EPFVD CH.

EUROPEAN ASSOCIATION FOR SIGNAL PROCESSING (CONT'D)

Course Fee:		
(for each course)	EURASIP members	non-members
before June 1, 1980	150.-S. Fr.	200.-S. Fr.
after June 1, 1980	200.-S. Fr.	250.-S. Fr.

RESEARCH CENTERS

NATIONAL REMOTE SENSING AGENCY, INDIA

S. Chandrasekhar,
K.R. Rao,
M. Maruthachalam

General purpose software has been developed for:

- i) Extracting specified regions from computer compatible tapes for further analysis.
- ii) Grey scale thematic map generation, histogram equalisation, image enhancement and restoration
- iii) Classification (supervised and unsupervised techniques)
- iv) Geometric correction
- v) Temporal analysis, perspective transformation, and contour maps
- vi) Analysis of 11-channel aircraft data

Three computer systems are available:

- i) A PDP-11/34 computer with 128 k words of memory, two Pertec magnetic tape drives, a GOULD 5100 Printer/Plotter System, a B/W TV monitor, and a Hazeltine terminal. The operating system is RT-11.
- ii) An interactive Multispectral Data Analysis System (M-DAS) consisting of a PDP-11/35 with 32k words of memory, 2 tape drives, disk, moving window display, operator interaction panel, and Optronics film recorder. A facility exists to analyse 11-channel aircraft scanner data and to digitize maps using a data Grid Digitizer.
- iii) A Data Processing System (DPS) for the Landsat ground station is centered around a PDP-11/55 computer with 128 k words of memory, extended arithmetic unit and floating point processor, card reader, DEC writer, A/N terminal, two RK06 disk drives, calcomp 300 MB disk, array processor, Optronics film recorder, and high density tape recording system.

A data bank has been set up which provides a computerized information retrieval system for Landsat products which are procured from NASA or produced in house. Different cartographic products such as maps, aerial films and photographs are all maintained on direct access files and fast search algorithms have been implemented to gain quick access to information required by users.

For further information write to:

S. Chandrasekhar
National Remote Sensing Agency
No. 4, Sardar Patel Road, P.O. Box 1519
Secunderabad - 500 003
Andhra Pradesh, India

BOOKS

ULTRASONIC IMAGING

An International Journal

Editor-in-Chief: Melvin Linzer
National Bureau of Standards, Washington, D.C.

Ultrasonic Imaging, a new international journal, was founded to provide rapid publication for original and exceptional papers concerned with the development and application of ultrasonic techniques. Emphasis is on ultrasonic medical diagnosis, yet many of the papers will be broadly applicable to areas extending beyond this field, such as signal processing and nondestructive evaluation of materials.

Leading researchers in both engineering and clinical ultrasound areas consider theoretical and experimental aspects of advanced methods and instrumentation for imaging, computerized tomography, Doppler measurements, signal processing, pattern recognition, microscopy, and measurements of ultrasonic parameters. Also presented are important developments concerning clinical evaluation of new techniques, tissue parameter measurements, mechanisms of ultrasonic-tissue interactions, transducer technology, calibration and standards and tissue phantoms.

Ultrasonic Imaging will be published quarterly from author-prepared copy - a format selected to ensure extremely rapid publication of research results. In addition to original full-length papers, the journal will include research notes, comments on papers, book reviews, and occasional review articles.

Academic Press.

THESES, PAPERS & REPORTS

Haralick, Robert M., and Eliot, Gordon L.,
"Increasing Tree Search Efficiency for Constraint Satisfaction Problems", Department of Computer Science, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

ABSTRACT

In this paper we explore the number of tree search operations required to solve binary constraint satisfaction problems. We show analytically and experimentally that the two principles of first trying the places most likely to fail and remembering what has been done to avoid repeating the same mistake twice improve the standard backtracking search. We experimentally show that a lookahead procedure called forward checking (to

THESES, PAPERS & REPORTS (CONT'D)

anticipate the future) which employs the most likely to fail principle performs better than standard backtracking, Ullman's, Waltz's, Mackworth's, and Haralick's discrete relaxation in all cases tested, and better than Gaschnig's backmarking in the larger problems.

Shapiro, Linda G., and Haralick, Robert M., "Structural Descriptions and Inexact Matching", Technical Report #CS97011-R. Department of Computer Science, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

ABSTRACT

In this paper we formally define the structural description of an object and the concepts of exact and inexact matching of two structural descriptions. We discuss the problems associated with a brute-force backtracking tree search for inexact matching and develop several different algorithms to make the tree search more efficient. We develop the formula for the expected number of nodes in the tree for backtracking alone and with a forward checking algorithm. Finally, we present experimental results verifying the theory and showing that forward checking is the most efficient of the algorithms tested.

THESES, PAPERS & REPORTS

ABSTRACT

In this paper we explore the number of nodes in search operations required to solve binary constraint satisfaction problems. We show analytically and experimentally that the principles of first trying the places most likely to fail and remembering what has been done to avoid repeating the same mistake twice improve the standard backtracking search. We experimentally show that a lookahead procedure called forward checking (to

EUROPEAN ASSOCIATION FOR SIGNAL PROCESSING (CONT'D)

(for each course) EURASIP members non-members before June 1, 1980 100-200-2 200-2 200-2 after June 1, 1980 200-2 200-2 200-2

RESEARCH CENTERS

NATIONAL BUREAU OF STANDARDS, INDIA

Research centers and their locations in India, including details on various departments and research areas.

- (i) Expanded specified regions from computer compatible tapes for further analysis.
- (ii) Geometric matching and generation, hierarchical registration, image enhancement and restoration.
- (iii) Classification (supervised and unsupervised) using neural networks.
- (iv) Geometric correction.
- (v) Temporal analysis, perspective transformations, shift, and contour maps.
- (vi) Analysis of 11-channel digital data.

Three computer systems are available: (i) PDP-11/55 computer with 128 K words of memory, two 5.25 inch magnetic tape drives, and a 3000 baud baud rate terminal.

(ii) PDP-11/55 computer with 128 K words of memory, two 5.25 inch magnetic tape drives, and a 3000 baud baud rate terminal. The operating system is RT-11. An interactive data analysis system (DAS) consisting of a PDP-11/55 with 128 K words of memory, 2.5 inch disk, moving window display operator, interactive panel, and graphics line recorder. A facility exists to analyze 11-channel analog scanner data and to digitize maps onto a data grid.

(iii) A PDP-11/55 computer with 128 K words of memory, extended arithmetic unit and floating point processor, 2.5 inch disk, and 3000 baud baud rate terminal. Two 5.25 inch magnetic tape drives, and high capacity tape recording system.

A data bank has been set up which provides a computerized information retrieval system for land-use products which are produced from NASA or processed from different cartographic products such as aerial film and photographs are all maintained on direct access files and last search algorithms have been implemented to gain quick access to information required by users.

For further information write to: