

IAPR



International Association for Pattern Recognition, Inc.

An affiliate member of the International Federation for Information Processing

NEWSLETTER

Editor

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FROM THE EDITORS DESK

With the 8ICPR held in Paris now almost a year behind and the 9ICPR to be held in Beijing only a year away I was getting increasingly concerned about the prolonged silence on these two topics in the last issues of the Newsletter. I am delighted therefore that both of these important IAPR conferences take up some space in the current issue. The detailed report on the 8ICPR compiled by a group from University of Manchester featuring on page 3 is complemented by David Hand's review of the Conference Proceedings included in the Bookshelf section. The Calls for Papers section carries an invitation for contributions to the 9ICPR programme which announces a novel structure for ICPRs in future. Please note the deadline of December 2 for paper submissions. It requires your immediate action!

The Editor

NEWS IN BRIEF

INTERNATIONAL COMPUTER VISION CONFERENCE The 1st International Computer Vision Conference held in London last June was attended by more than 300 people. The conference was organised by the IEEE Computer Society and cosponsored by IAPR. At the conference Prof Azriel Rosenfeld presented David J Heeger of University of Pennsylvania and SRI International the Marr prize for the best paper on computational vision submitted to the conference.

MULTIRESOLUTION IMAGE ANALYSIS A seminar on Multiresolution Image Analysis will be held in Kefar Hamakabia, Israel on September 17, 1987. The meeting is organized by the Information Processing Association of Israel, the IAPR affiliate in Israel.

THE ALVEY VISION CLUB

Computer vision research in the United Kingdom is funded primarily by the Alvey Programme in Information Technology launched in 1983. The Alvey Vision Club was inaugurated in 1985 for the express purpose of providing a focus for Alvey funded work in vision. Membership of the Club is automatic for active workers in vision-related Alvey projects. For other UK researchers actively engaged in vision work but not funded by Alvey, membership is at the discretion of the Alvey Directorate. Membership is of course not possible for non-UK research workers.

The purpose of the Club is to act as a forum for

- the exchange of research experience and results for the mutual benefit of members
- discussion of future research directions
- to act as a point of contact for research workers who are not members.

In order to be effective in discharging its responsibilities, the Club promotes various activities. These include running an annual technical conference, workshops, and an information facility.

The annual conference is the main activity in which the Club is involved. The first conference took place in September 1985 at Sussex University with 120 delegates hearing 40 papers over a period of two and half days. An evening session on the Poplog environment inspired lively debate and resulted in more Alvey funding to support further development. The second conference was held at Bristol University in September 1986 and attracted 140 delegates. The conference programme consisted of 8 paper sessions over 3 days and included two

invited talks from Shimon Ullman of the Weizmann Institute of Science, Israel and Don Geman of the University of Massachusetts, Amherst. An evening discussion session entitled "The Future" in which certain aspects of Eureka, Esprit and IT86 were considered was well attended.

The major technical sessions covered: The 2.5D sketch; Object models, matching and geometry; Image descriptions and segmentation; Applications; Hardware; Motion; Associative networks. Selected papers from AVC86 have been published in a special May87 issue of Image and Vision Computing.

AVC87 will be held at Cambridge in September and will focus on the work of Alvey Consortia, although there will also be individual papers and two invited speakers. The evening discussion session will be on the subject of exploitation and will include a speaker from the Electronics and Applications Division of the Department of Trade and Industry.

M B Brown
Vision Club Chairman

CONFERENCE REPORTS

IAPR Workshop on Errors and Failures in Vision Systems

London, UK- 12 June 1987

The Robotics and Automation Subcommittee of IAPR TC8 (Applications in Industry) held an international workshop on Errors and Failures in Vision Systems as an adjunct to the 1st International Conference on Computer Vision. The objective of the workshop was to focus the attention of the academic vision research community on the full range of problems which are preventing or hindering the successful application of vision research in industry.

Richard A Young and Steve Holland, General Motors Research Laboratories, organised the workshop and Michael Brady, Oxford University served as the discussant. The plan of the workshop was fully supported by the IAPR executives who also approved a partial funding for this event.

The workshop was attended by 30 participants from Europe, USA, Australia and Japan. Michael Brady will be presenting a paper based on the discussions at the workshop at the International Conference on Pattern Recognition in Beijing to be held in October 1988.

ICPR Thoughts From Home

Despite having spent nine years working in Image Analysis my first opportunity to attend a meeting of the ICPR was last October when I went, along with six other colleagues to the Paris meeting. Our group covered a wide range of experience ranging from "old hands" like myself to recent recruits with little previous experience in the field. None of us were particularly experienced in speech recognition or character recognition. Consequently we focused our attention on those sessions most closely related to our main area of interest and were able to cover this and some other sessions quite thoroughly. This report is an attempt to summarise our various impressions and reflections on the conference. It is an amalgam of personal views and does not claim to be representative.

The conference was preceded by a series of tutorials on Text recognition, Statistical pattern recognition, Speech recognition and Artificial intelligence which ran in parallel. Several members of our group chose to attend the Statistical pattern recognition tutorial which proved to be a most valuable preparation for the more technical papers on statistical pattern recognition which followed. It was not especially inspiring but it was valuable both to those of our group with little experience of image analysis and also to the "long service" members. The topics covered were Bayesian classification, feature extraction, cluster analysis, error estimation and Markovian models of contextual information. There was also an interesting case study of the use of statistical pattern recognition in the Hematrak automated differential white blood cell counter. The introductions to each topic were very clear. The description of Markovian models was especially lucid. Considerable attention was also given to an account of feature extraction methods. The colourful informal explanations given were also particularly helpful and it is a shame that these were not reproduced in the tutorial notes as this is the sort of coverage not normally given by text-books.

The conference itself covered such a broad range of topics that it is difficult to give a systematic appraisal, a fact that was also apparent from the program! It was difficult to identify papers of interest because a topic would often be covered under several different headings. The major technical divisions were Architectures, Speech recognition, Statistical pattern recognition, Knowledge based pattern recognition, Natural vision (i.e. 3-D Vision, Stereovision etc), Text and character recognition, Applications and Computational techniques (such as Texture analysis, Relaxation labelling, Quad trees, Edge detection, Shape analysis, etc). A strong emphasis was given to the traditional aspects

of pattern recognition such as segmentation, feature extraction, texture analysis, statistical modelling and classification. Surprisingly little emphasis was given to knowledge based techniques or to hardware architectures. There were no reports from the numerous groups working on the application of AI techniques in computer vision nor any on the application of transputers! It would seem that these topics are better covered by the more specialised meetings on architectures and on artificial intelligence.

The few papers on special architectures and knowledge based systems were among the most interesting for the more experienced members of our group. Of particular note were the review of Soviet work on the application of knowledge based systems by N G Zagoruiko (unfortunately not published in the proceedings) and a paper on a logic programming language, PSIWAG [1]. A collection of papers in the traditional field of statistical pattern recognition which raised special interest were those from the group at INRIA [2,3]. Interesting papers in other sessions were those describing microcomputer systems [4], a paper on split and merge segmentation [5] and those on edge detection. Regretably the papers on microcomputer systems were more a catalogue of building blocks and failed to address key issues concerning pixel tessellation and the special requirements for efficient software libraries (of which there are few if any that really work). Only a few of the papers presented appeared, to us "old hacks", to be especially innovative. However they provided a good introduction to the field for the less experienced members of the group. One member of our group with less than 12 months experience of intelligent segmentation methods was surprised how few reports there were on similar work. Many papers reported on systems using naive thresholding techniques which clearly limited their performance. The traditional material for these meetings of statistical pattern recognition (classification, clustering, Markovian models, etc) were well covered.

There was also a large poster session with free Cognac. Unfortunately the posters were open for viewing for only a short time in a very crowded room which made it difficult for the participants either to casually peruse posters or to hold detailed discussions with authors (without a severe danger of spilling the free Cognac). The distribution of participants in hotels around the centre of Paris was clearly inevitable but also led to a general lack of opportunity for casual discussions with authors: A participants lounge or similar provision for causal discussion would have helped.

To summarise, the conference was on balance worth attending for all concerned, although it did not alto-

gether meet the high expectations that some of us held for it. But then do any conferences manage that? The problems posed by the size of the meeting and the number of parallel sessions were apparent but they have already been addressed by Michael Duff in a previous newsletter. It did appear that previously well aired issues were re-presented to the exclusion of new topics although clearly conference organisers are limited by the submissions they receive. If the ICPR is to remain primarily a conference on Pattern Recognition (and by the implication of tradition primarily a conference on statistical pattern recognition) then perhaps areas such as knowledge based techniques and special purpose architectures should be omitted or best covered by state-of-the-art reviews from guest speakers.

- [1] Eckstein W and Poppl S J, PSIWAG A language for logic programming in image analysis, p1117.
- [2] Gagalowicz A and Monga O, A new approach for image segmentation, p265.
- [3] Gagalowicz A and Tournier-Lasserre C, Third order model for non- homogeneous natural textures, p409.
- [4] Ramo E G and Salminen J, An experimental study of low cost image workstation architectures, p34.
- [5] Gebrands J J, Backer E and Cheng X S, Multiresolution cluster segmentation using spatial context, p1333.

Rapporteur

David Pycok, Wolfson Image Analysis Unit
Dept. Medical Biophysics, University of Manchester

Attendees

Dr James Graham, Dr Noel Bryson, Dr Yau Jim Yip
Dr Paul Azzopardi, Wolfson Image Analysis Unit

Mr Granville V Moore, Dept. Computer Science
University of Manchester

Mr Barrie Saxon, Automation Services, ICL, Kildagrove

REPORTS FROM JAPAN

This section contains report titles which have been submitted by corresponding editor Prof M Nagao. Most of these reports are in Japanese. For further information regarding access to these reports please contact Prof Nagao directly. His mailing address is as follows:

Prof M Nagao
Faculty of Engineering, Kyoto University,
Sakyo-ku, Kyoto 606, Japan

- Frame-based 3D Vision System with an Object Surface Modeling, *Toshiyuki Hama, Mitsuru Ishizuka*, Institute of Industrial Science, University of Tokyo.
- A Recognition Method of 3D Object using Projected Regular Patterns, *Toshiyuki Yoshitake*, Kokichi Sugihara**, Noboru Sugie**, *Faculty of Engineering, Nagoya University, **Faculty of Engineering, Tokyo University.
- An Algorithm for the Recovery of Structure of a Jointed Object from Orthographically Projected Optical Flow, *Katumi Kato*, Kokichi Sugihara**, Norboru Sugie**, *Faculty of Engineering, Nagoya University, **Faculty of Engineering, Tokyo University.
- Vision System for Navigation by Stereoscopic Method - (1) Construction of Experimental System, *Mutsumi Watanabe, Kazunori Onoguchi and Hiroshi Hoshino*, Research and Development Center, Toshiba, Japan.
- Automated Construction of Border and Mass Pattern Extraction Procedures by Sample-Figure Presentation, *Hiroaki Kubota, Jun-ichi Hasegawa, Jun-ichiro Toriwaki*, Dept. of Information Engineering, Faculty of Engineering, Nagoya University.
- Hybrid System for both Figure and Image Data, *Takuya Yamahira*, Yoshichika Koyama** and Yutaka Kasahara**, NEC Corp. C&C Systems Research Labs., **NEC Scientific Information Systems Development, Ltd.
- Pipe-lined Algorithm for Labeling Connected Regions at Video Rate, (CV 43-1), *Toshiyuki Gotoh*, Yoshiyuki Ohta*, Masumi Yoshida* and Yoshiaki Shirai***, * Fujitsu Laboratories Ltd and ** Electro Technical Laboratory
- A Prototype of DIA-Expert System (1) - Design Concept and Characteristics, (CV 43-2), *Hideyuki Tamura*, Katsuhiko Sakaue**, Fumio Kubo*** and Hiroaki Sato**, * Cannon Inc. Research Centre, ** Electrotechnical Lab and ***Stanley Electric Co. Ltd
- A Prototype of DIA-Expert System (2) - Image-Processing Techniques for Particle Analysis and Systematization of Knowledge about them, (CV 43-3), *Fumio Kubo*, Katsuhiko Sakaue** and Hideyuki Tamura****, *Stanley Electric Co. Ltd, ** Electrotechnical Lab. and ***Canon Research Center
- Combination of Image Processing Operators, (CV 43-4), *Takashi Matsuyama, Naoki Murayama and Takayasu Ito*, Department of Information Engineering, Tohoku University
- Recognition System for Sign Language Motion Image, (CV 44-1), *Shinichi Tamura and Shingo Kawasaki*, Department of Information & Computer Sciences, Osaka University
- Three Dimensional Object Recognition Based on Edge Matching and Generalised Hough Transform, (CV 44-2), *Ryuichi Tamano, Yoshinobu Sato and Shinichi Tamura*, Department of Information & Computer Sciences, Osaka University
- Range Image Acquisition by Rainbow Range Finder, (CV 44-3), *Johji Tajima*, C&C Information Technology Research Laboratories
- Texture Analysis of Meteorological Image by Fractal Dimension and Lower Order Statistics, (CV 44-4) *Hiroshi Nakayama, Mitsuo Sone and Mikio Takagi*, Institute of Industrial Science, University of Tokyo

- Automatic & Interactive Correction of Auto-Digitized Drawings and Maps, (CV 44-5), *Yutaka Ohsawa, Yasuhiro Takishima and Masao Sakauchi*, Institute of Industrial Science, University of Tokyo
- Camera Rotation Invariance of Image Characteristics, (CV 45-1), *Ken-ichi Kanatani*, Department of Computer Science, Gunma University
- Measurement of 3-D Direction and Distance of Line Segments by Spherical Mapping, (CV 45-2), *Yasushi Inamoto, Susumu Kawakami, Takashi Uchiyama, Yusuke Yasukawa and Toshihiko Morita*, Fujitsu Limited
- Determination of Three-Dimensional Structure from Image Sequences given by Horizontal and Vertical Moving Camera, (CV 45-3), *Masanobu Yamamoto*, Automatic Control Division, Electrotechnical Laboratory
- A Fundamental Shape Detection System Using Flexible Shape Description, (CV 45-4), *Morito Shiohara*, Hitoshi Ogawa** and Tadahiro Kitahashi**, *Institute of Scientific & Industrial Research, Osaka University and **Department of Information & Computer Sciences, Osaka University
- How to Solve Jigsaw Puzzle with Image Processing of the Puzzle Pieces, (CV 45-5), *Jun'ichi Lijima, Hideki Iwanishi and Hiroshi Sugiyama*, Department of Computer Science, University of Electro-Communications
- A Model Estimation of Gray-Level Image using Pulse Density Modulation (II), (PRU 86-59), *Junji Kawasaki* and Taizo Iijima***, *Kanazawa Technical College and **Tokyo Industrial University
- Operator Equations Related to the Restoration Problem, (PRU 86-60), *Hidemitsu Ogawa*, Tokyo Institute of Technology
- High-precision 3-D Shaded Display of the Brain Obtained from CT and Angiographical Images, (PRU 86-61), *Noburi Niki*, Hiroyuki Kuriyama*, Yoshizo Takahashi*, Shyuji Horie** and Keizou Matsumoto***, *Faculty of Engineering, Tokushima University and **School of Medicine, Tokushima University
- On the Measurement and Processing of Jomon Pottery Images by the Contour Information, (PRU 86-62), *Ryuzo Takiyama, Yuji Ishida and Hiroto Shingai*, Dyushu Institute of Design
- Transparent Object Extraction from Regular Textured Backgrounds by Using Binary Parallel Operations, (PRU 86-63), *Hiromitsu Yamada* and Tony Kasvand***, *Electrotechnical Laboratory and **National Research Council of Canada
- Recognition Preprocessing Method in Optical Kanji Character Reader for Japanese Documents, (PRU 86-64), *Sueharu Miyahara and Naoki Nakajima*, Electrical Communication Laboratories, NTT
- Coordinate Rotation Invariance of Image Characteristics for 3D Shape and Motion Recovery, (PRU 86-65), *Ken-ichi Kanatani*, Department of Computer Science, Gunma University
- Recovery of Nonrigid Curvilinear Object using the Optical Flow, (PRU 86-66), *Akira Kawamura*, Noboru Sugie* and Kokichi Sugihara***, *Faculty of Engineering, Nagoya University, **Faculty of Engineering, University of Tokyo
- A Rule-based Model for Visual Geometrical Illusions, (PRU 86-67), *Kazunori Seki*, Noboru Sugie* and Kokichi Sugihara***, *Faculty of Engineering, Nagoya University and **Faculty of Engineering, University of Tokyo
- An Algorithm for Generating Subjective Contours, (PRU 86-68), *Nazuhisa Ando and Noboru Sugie*, Faculty of Engineering, Nagoya University
- A Mathematical Theory of Recognizing Patterns (Part VII. Realization and Analysis of Similarity-Measure Function), (PRU 86-69), *Shoichi Suzuki*, Department of Information System, School of Information, Bunkyo University
- Classification of B-spline Transforms and Computational Complexity, (PRU 86-70), *Iwao Sekita, Kazuo Toraiichi and Ryoichi Mori*, University of Tsukuba
- Several Properties of Partial Projection Filter, (PRU 86-71), *Hidemitsu Ogawa and Shoji Hara*, Tokyo Institute of Technology
- An Experiment for Detecting Objects covered with Darkly-coloured Glass, (PRU 86-72), *Tetsuta Ishii and Takuki Watanabe*, Nihon University
- Development of Picture Processing Technology and its Application to Automatic Surface Flaw Detection for Steel Strips, (PRU 86-73), *H Aizawa, Y Sawada and Y Morioka*, Mizushima Works
- 3-D Shape Reconstruction from Multiple Images and its Application, (PRU 86-74), *Junta Doi* and Tetsuo Miyake***, *Faculty of Agriculture, University of Tokyo, **R&D Division, Asahi Glass Co. Ltd
- A Round-Robin Architecture for Relaxation Operations, (PRU 86-75), *Masaru Kamada*, Kazuo Toraiichi**, Kazuhiko Yamamoto***, Hiromitsu Yamada*** and Ryoichi Mori***, *Doctoral Program in Engineering, University of Tsukuba, **Institute of Information Sciences & Electronics, University of Tsukuba and ***Electrotechnical Laboratory, MITI
- Recognition by Means of Hierarchical Discriminant Analysis and a Character Recognition System on the Personal Computer PC-OCR, (PRU 86-76), *Hiroyuki Kami, Hiroshi Okamoto, Tsutomu Temma and Ko Asai*, C&C Information Technology Research Laboratories, NEC Corporation
- Concept and Development Process of the Handscript Word-processor, (PRU 86-77), *Tetsuo Tomimoto, Hiroshi Ohta and Takuya Sugita*, Wireless Research Laboratory
- The Technological Establishment on Pattern Recognition Applied to a Wrist Watch and its Commercialization, (PRU 86-78), *Hiroyuki Suetaka*, Casio Computer Co. Ltd
- An Optical Character Recognition System for Industrial Applications (TOSEYE-1000), (PRU 86-79), *Yoshikatsu Nakamura, Masato Suda and Takeshi Hayashi*, Toshiba Corporation
- Report on CVPR'86, (PRU 86-80), *Takeshi Shakunaga*, Minoru Ito*, Shigeki Ishikawa**, Masatoshi Kameyama***, Jun Tsukumo*** and Kenji Suzuki+*, *NTT, **IBM Japan, ***Mitsubishi Electric, ****NEC and +Hitachi
- Analysis of Facial Images by Using Knowledge and Model, (PRU 86-81), *Noboru Babaguchi, Satoshi Yamauchi and Tsunehiro Aibara*, Faculty of Engineering, Ehime University
- Extracting Polyhedral Structure of Buildings by Stereopsis, (PRU 86-82), *Minoru Maruyama and Shigeru Abe*, Central Research Laboratory, Mitsubishi Electric Group

- 3D Configuration Recovery Using Perspective Angletransform, (PRU 86-83), *Takeshi Shakunaga and Hiroshi Kaneko*, Electrical Communications Laboratories, NTT
- Correspondence Search of Trinocular Stereo Using Dynamic Programming, (PRU 86-84), *Takehiko Yamamoto, Yuichi Ohta and Katsuo Ikeda*, Inst of Information Sciences and Electronics, University of Tsukuba
- A Method for Recognition of Compound Polyhedra in a Scene Based on Clique Detection, (PRU 86-85), *Yasushi Kanazawa*, Tadahiro Kitahasi**, * Toyohashi University of Technology and **The Institute of Industrial and Scientific Research, Osaka University*
- Construction of the Octree Approximating a Three-Dimensional Object by using Multiple Views, (PRU 86-86), *Hiroshi Noborio, Shozo Fukuda and Sugura Arimoto*, Department of Mechanical Engineering, Osaka University
- Algorithms for a B-REP of an Image as its Intermediate Description, (PRU 86-87), *Fumiaki Tomita* and Hironobu Takahashi**, *Electrotechnical Laboratory and **Tsukuba Res. Cen. SANYO Ltd*
- Scene Description based on Matching B-REPs of Stereo Images, (PRU 86-88), *Hironobu Takahashi* and Fumiaki Tomita**, *Tsukuba Res. Cen. SANYO Ltd and ** Electrotechnical Laboratory*
- Fair Copy Reproducing System for Hand-Sketched Diagrams, (PRU 86-89), *Michihiko Minoh*, Kouji Matsui*, Toshiyuki Sakai* and Yu-ichi Yoshida**, *Faculty of Engineering, Kyoto University, **CADIX Inc.*
- Model-based Matching by Using Feature-Integrated Cells, (PRU 86-90), *Mutuo Sano, Shinichi Meguro and Akira Ishii*, NTT Electrical Communications Laboratories
- A Method of Extracting 3D Distance Information of Object Using Point Source Illumination, (PRU 86-91), *Yuji Iwahori, Hiroyuki Kamei, Shoichiro Yamaguchi and Noriharu Hiratsuka*, Faculty of Engineering, Tokyo Institute of Technology
- Extended Photometric Stereo Method for an Object with Unknown Reflectance Property, (PRU 86-92), *Noriharu Hiratsuka, Yuji Iwahori, Hiroyuki Kamei and Shoichiro Yamaguchi*, Faculty of Engineering, Tokyo Institute of Technology
- Representation of Objects Hindered by Intervening Obstacles, (PRU 86-93), *Yoshihiko Nomura and Hiroshi Naruse*, NTT Electrical Communications Laboratories
- A Vehicle License Number Recognition System Using Image Processing, (PRU 86-94), *Tadaaki Mishima*, Morio Kanasaki**, Masao Takatoo***, Masato Suzuki****, Yoshiki Kobayashi*, Hideo Oota** and Toshiro Shibata***, *Hitachi Ltd, ** Hitachi Research Laboratory, ***Omika Works and ****Systems Engineering Division*
- A Pseudo-Closed Region Extraction Method from Roughly Handwritten Line-Drawings for Structure Description, (PRU 86-95), *Hui Shieh, Yasuo Arika and Toshiyuki Sakai*, Faculty of Engineering, Kyoto University
- Fast Computation of Binary Picture Matching by Column Division Multiplexing Method, (PRU 86-96) *Mitsuru Shiono*, Okayama University of Science
- A Structural Analysis for Generalised Waveform, (PRU 86-97), *Makoto Sato and Toshikazu Wada*, Tokyo Institute of Technology
- An Approach to Associative Memory Using Multiple-Match Situation, (PRU 86-98), *Koji Nishikawa, Kenji Matsushita and Eiji Shimizu*, Faculty of Engineering, Osaka City University
- Image Description by Polynomial, (PRU 86-99), *Atsushi Imiya, Shinzou Kodeda, Toshihiro Nakamura and Shigeharu Araki*, Department of Electrical & Computer Engineerig, Kanazawa University
- On an Image Processing Technique for Fingerprint Identification, (PRU 86-100), *Fujio Kodama, Taiho Kanaoka and Shingo Tomita*, Yamaguchi University
- An Approach to Extracting Surface Orientations of an Object with Irregular Patterns, (PRU 86-101), *Seiichiro Ohtake, Masahiko Iwane and Shuntetsu Matsumoto*, Toyota Technological Institute
- An Approach to 3D Object Inference Using Optical Flow, (PRU 86-102), *Kouichi Taniguchi and Eiji Shimizu*, Faculty of Engineering, Osaka City University
- Image Reconstruction of Rotatory Moving Object from Projections and its Application to Plasma Diagnosis, (PRU 86-103), *Atsushi Imiya and Yoshiyuki Nakayama*, Department of Electrical & Computer Engineering, Kanazawa University
- Rotation-Invariant Contour DP Matching Method for 3D Object Recognition, (PRU 86-104), *Hiromitsu Yamada*, Michel Hospital** and Tony Kasvand**, * Electrotechnical Laboratory and **National Research Council of Canada*
- 3D Object Recognition by Clustering Local Hypotheses, (PRU 86-105), *Yoshinobu Sato, Ryuichi Tamano ad Shinichi Tamura*, Faculty of Engineering Science, Osaka University
- Study of an Image Processing Expert System, (PRU 86-106), *Kiyotaka Inada and Shuki Matsumoto*, Sumi tomo Metal Industries Ltd
- Sketch from Chest X-Ray and Development of Intelligent Retrieval System by Figure Description, (PRU 86-107), *Nori-take Okada, Junichi Hasegawa and Jun-ichiro Toriwaki*, Nagoya University
- Automated Extraction of Abnormal Lesions with Radial Pleat-Like Pattern from Double Contrast X-Ray Images of Stomach, (PRU 86-108), *Taketoshi Tsutsui, Jun-ichi Hasegawa and Jun-ichiro Toriwaki*, Nagoya University
- Study of 3D Display Method for Medical Images using Density Projections, (PRU 86-109), *Mitsuhide Kimura*, Shigeki Yokoi*, Jun-ichiro Toriwaki* and Michimasa Matsuo**, *Dept of Information Engineering, Nagoya University and **School of Medicine, Nagoya City University*
- Border Ray-Tracing Algorithm, (PRU 86-110), *Akihiko Hashimoto, Kenji Mase and Taka-aki Akimoto*, NTT Electrical Communications Laboratories
- Hierarchical Line-Drawing Method Described by the Chain-Code Based on Fractal Theory, (PRU 86-111), *Masakazu Satoh and Hideyoshi Tominaga*, School of Science and Engineering, WASEDA University
- Coding Scheme with Combined Region Based on Intensity-Gradient, (PRU 86-112), *Hiroshi Nakamura, Hirohisa Jozawa and Hideyoshi Tominaga*, School of Science and Engineering, WASEDA University

- A Comparison of Various Entropy Coding Methods for MC/DCT Hybrid Coding, (PRU 86-113), *Mutsumi Ohta and Toshio Koga*, NEC Corp. C&C Information Technology Res. Labs.
- An Image Encoding Method Using Adaptive Vector Quantization, (PRU 86-114), *Kazutoshi Usui and Hideki Imai*, Division of Electrical & Computer Engineering, Yokohama National University
- A Method to Analyze Format of a Document Image, (PRU 86-115), *Masaya Tanaka, Takeo Nishi and Hideyoshi Tominaga*, School of Science and Engineering, Waseda University
- Remote Glance Operation Over Image Coded Documents using Abbreviated Pictures, (PRU 86-116), *Toru Takeda*, NTT Electrical Communications Laboratories
- Automatic Recognition of Document Architecture Element - Extracting the Graphical Structure of Roads from Road Map Image, (PRU 86-117), *Wataru Kameyama, Hideyoshi Tominaga*, School of Science & Engineering, Waseda University
- Recognition of Scene Images and Retrieval of them Using the Attributive Features of the Objects - In Case of a Mountain in the Scene Image as an Example, (PRU 86-118), *Hiroshi Okazaki, Michihiko Minoh and Toshiyuki Sakai*, Faculty of Engineering, Kyoto University
- The Reduction Method, (PRU 86-119), *Kunio Takahashi, Hiroshi Amanuma, Hayato Takefushi and Yoshihiro Adachi*, Kanagawa University

BOOKSHELF

Digital Image Processing

R C Gonzalez and P Wintz, Addison-Wesley Publishing Company, Reading MA, 1987, ISBN 0-201-11026-1

This is a new, extensively revised edition of a text which was first published 10 years ago. The book is an excellent introduction to many aspects of image processing. The first 6 chapters follow the same line of development as the first edition but often contain new material or material presented within a more recent theoretical framework.

The first chapter introduces some of the history of the subject and contains a description of the elements of a digital image processing system, while Chapter 2 discusses some fundamental material such as the mechanics of the human visual system, the basics of sampling and quantisation, definitions of connectivity and distance measurement in the digital domain and the basic maths of imaging geometry.

Image transforms play a prominent role throughout the book and they are explained in Chapter 3. Their computation and their properties are presented in a

clear way with good use of diagrams to aid in understanding the mathematical development. Most of this chapter is devoted to the Fourier Transform but it also includes other related separable transforms such as the Walsh, Hadamard and Discrete Cosine Transforms as well as the statistically based Hotelling transform and the parameter extracting Hough Transform.

In Chapter 4 image enhancement techniques are considered. The authors are careful to distinguish between spatial and frequency domain techniques and develop the ideas of histogram modification, image sharpening and image smoothing. They include a section illustrating how spatial masks can be generated from frequency domain specifications and they end this chapter with a short section devoted to the basics of pseudo-colour processing.

Image restoration is the topic of Chapter 5. After considering simple models of image degradations they introduce a unified algebraic formalism and discuss the properties of circulant and block circulant matrices that form the basis for the solution of these problems. Constrained and unconstrained restoration are treated including inverse and Wiener filtering. Implementations which use spatial domain masks are illustrated.

Data compression and coding is an important topic in many image processing applications and this is dealt with in detail in Chapter 6. The general elements of a coding system are presented and information preserving methods are considered before going on to coding schemes which produce data reduction but lead to some quantifiable reconstruction error. The chapter is concluded by illustrating how the Hotelling transform can be used as a feature extraction technique.

The last two chapters are total rewrites and expansion of material relating to techniques for image segmentation and image representation. Spatial mask operators for point, edge and line detection are discussed and a short section on edge linking is followed by consideration of image thresholding, region growing techniques and the use of motion in segmentation. The final chapter on representation explains chain coding, polygonal approximation of shapes, skeletonisation and boundary descriptors such as simple shape numbers, Fourier descriptors and moments. The description of regions by topology, texture or moments is followed by discussion of how the degree of similarity of two descriptions can be measured. The main body of the book is closed by considering the use of grammars and languages as relational descriptions of image entities.

Most chapters of the book end with a useful discussion of relevant references for further reading and a

set of about a dozen problems. As in the first edition there are two appendices. One contains a suite of Fortran subroutines for the display, by overprinting, of a 64×64 32 gray level image on a lineprinter while the second appendix consists of a set of coded test images which can be typed into a computer. The idea is that these enable the interested reader to try out some of the methods detailed in the book. However, I was discouraged from this by the tedium of typing the coded images into my PC. Hopefully by the time of their third edition the authors can offer us this data via a more acceptable standard computer medium.

The authors do not profess to cover all aspects of image processing. For example they do not consider directly 3D scene analysis and there is no attempt to consider the higher levels of visual processing. As with most books its strengths reflect the background and interests of its authors. In this case I believe these are primarily traditional signal processing and pattern recognition approaches. Little attention is paid to more contemporary computer vision approaches even in those sections where it might have been appropriate i.e. in discussing edge detection there is no mention of zero crossing detection in multiscale DOG filters. However, the material which it does cover is well structured, well motivated and presented using interesting examples.

Production standards are very good and the hardback Addison-Wesley Student edition is a good buy at £25.95. I would certainly consider this book as an excellent text for a course on image processing although I would complement it by a text which offered a computer science/artificial intelligence approach to the subject. The first edition of this book was influential in kindling my own first serious interests in image processing and I am sure that this new edition will be of equal appeal to others coming from a similar physics/maths/engineering background.

John Illingworth

Intelligent Autonomous Systems

L O Hertzberger and F C A Groen Eds., North Holland, Amsterdam, 1987, ISBN 0444701680

As the title suggests, the scope of this substantial volume (some 760 pages) goes beyond the field of pattern recognition and computer vision. It contains papers presented at the conference on Intelligent Autonomous Systems held in Amsterdam in December 1986 the aims of which were to bring together specialists from all the areas of science and engineering that impinge on this important multidisciplinary subject. We thus find in this

edited volume not only contributions in sensor development and in algorithms and architectures for sensory data processing (in particular vision) but also topics such as environment modelling, planning, decision support, robot control, monitoring, and system integration.

The material of the book, more than 80 papers, is divided into sections of invited, refereed, poster and late papers which the reader will not find particularly helpful when searching for articles on topics of his interest. On the positive side, however, the volume provides a compendium of researchers and research activities in this challenging problem area and the collection of invited papers which have a more tutorial flavour enables even a newcomer to steer safely and systematically through this vast well of information on intelligent autonomous system research.

Josef Kittler

Proceedings of the 8th International Conference on Pattern Recognition

North Holland, Amsterdam, 1986, ISBN 0-444-70158-3

More than 500 papers were submitted to this conference, each was reviewed by three people, and 225 short papers and 138 posters were accepted, along with 11 invited papers. This means that this volume has over 350 articles: it weighs over five pounds (the limit of my kitchen scales) and is six centimeters thick.

Reviewing a tome of this magnitude presents something of a problem. I freely admit to not having read every word and it seems invidious to pick on just some of the papers and judge the entire volume on the basis of their quality. Although the papers all deal with some aspect of pattern recognition, this now represents a rather large and diverse field. It is certainly true to say that there will almost certainly be something of interest here to anyone working in pattern recognition or allied fields. The most relevant question is, of course, simply 'is this a useful collection?'. The answer must be yes, it is a very up to date overview of the state of the art, illustrating the important areas in current pattern recognition research.

One criticism is the lack of an index. This makes it difficult to find one's way into the volume. The contents list gives all the titles, but with over 350 of them this is also of limited value. Admittedly they are divided into subgroups by session, but sometimes papers do not lie clearly within any one category, or span two or more categories, so that this is not an ideal solution. These subcategories are listed below so as to give some indication of the contents of the volume.

The papers were produced in camera ready form, which means that there is the usual variability in quality of appearance. In general, however, the quality is good and any slight loss is an acceptable sacrifice in view of the commendable speed with which the publishers have produced this volume.

Session titles:

Visual inspection
Specialised architectures
Speech recognition
Data classification and clustering
Image understanding
3-D vision
Inference and learning
Pattern recognition algorithms
Mobile robots
Knowledge based pattern recognition
Relaxation
Signal processing
Image segmentation
Fundamental aspects of pattern recognition
Low level image processing
Motion
Quadrees
Feature selection and pattern analysis
Optical character recognition
Edge detection
Texture
Shape
Office automation
Biomedical applications
Object segmentation and recognition
Stereovision
Applications
Handwritten character recognition
Image and vision
Image coding
Character vision
Object and image analysis
Image analysis
Image sequences and tracking
Character and text processing
Remote sensing
Computational geometry
Pyramids
Posters

David Hand

CALLS FOR PAPERS

9th INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION

Beijing, China- October 17-20, 1988

Program

The conference is sponsored by the International Association for Pattern Recognition and organized by the Chinese Association for Automation. The meeting

is the major international event in the fields of pattern recognition, computer vision and image processing. The conference program will be organized into four major tracks as follows:

1. Computer vision
2. Pattern recognition systems and applications
3. Image, speech and signal processing
4. Algorithms and architectures for pattern recognition

Papers related to any of the following topics and describing work not previously published are invited for submission:

- Computer vision and image understanding
- Robot and machine vision
- Image segmentation and edge detection
- Shape and texture analysis
- Optic flow and stereo vision
- Knowledge based pattern recognition systems
- Feature selection and pattern classification
- Motion representation and analysis
- Modelling of human perception
- Image data structures and image coding
- Speech and signal processing
- Character recognition and text processing
- Parallel algorithms and architectures
- Biomedical applications
- Industrial applications
- Remote sensing and other applications

Deadlines

Dec 2, 1987	Full papers (4 copies)
April 5, 1988	Authors notified
May 31, 1988	Camera-ready manuscripts

Paper Submission

Submitted papers must be typewritten in English and double spaced. The first page should contain the paper title, the names and addresses of the authors and an abstract of from 70 to 100 words. Four copies of complete drafts of submitted papers should be sent to Program Chairman at the following address:

Prof Herbert Freeman
9ICPR Program Chairman
CAIP Center, Bush Campus
Rutgers University
New Brunswick
NJ 08903
USA

Further Information

For further information about any aspect of the conference including post-conference tours please contact

9ICPR Secretariat
Chinese Association for Automation
P.O.Box 2728
Beijing
China
Tel.: Beijing 284294
Telex.: 20035 CAST CN ATTN

PATTERN RECOGNITION IN PRACTICE III

Amsterdam, The Netherlands- May 18-20, 1988

Program

The conference will aim at stimulating interaction between experts in the field of Pattern Recognition and scientists from various areas in which pattern recognition techniques are applied. The proposed topics include:

- Acquisition of knowledge from large data bases
- Classification of populations
- Use of AI techniques in pattern recognition
- Use of context
- Combining evidence from multiple sources

Deadlines

Nov 1, 1987	Abstract
Jan 15, 1988	Authors notified
May 1, 1988	Camera-ready manuscripts

Paper Submission and Further Information

Prof E S Gelsema
Dept Medical Informatics
Erasmus University
P.O.Box 1738
3000 DR Rotterdam
The Netherlands

IEEE CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION

Ann Arbor, Michigan, USA- June 5-9, 1988

Program

The conference is organised by the IEEE Computer Society. The program will consist of submitted and invited papers on the following topics:

- Image processing

- 3-D representation and recognition
- Motion
- Stereo
- Visual navigation
- Shape from shading and texture
- Vision systems
- Vision architectures
- Pattern recognition
- Applications of computer vision
- Knowledge-based vision

Submitted papers may be long or short. Long papers (8 proceedings pages) are intended for complete high quality work. Short papers (6 proceedings pages) are for continuing work with partial results, and for ideas that can be presented concisely.

Deadlines

Nov 11, 1987	Full papers (4 copies)
Jan 7, 1988	Authors notified
Feb 29, 1988	Camera-ready manuscripts

Paper Submission

Prof L S Davis
Center for Automation Research
University of Maryland
College Park
MD 20742
USA

VISION INTERFACE 88

Edmonton, Alberta, Canada- June 6-8, 1988

Program

Vision Interface 88 is the 2nd Canadian Conference devoted to pattern recognition and picture processing. It is the newest regularly scheduled conference in Canada sponsored by the Canadian Image Processing and Pattern Recognition Society. The conference will be held in conjunction with Artificial Intelligence 88 and Graphics Interface 88. Papers describing original work in any of the following areas are invited:

- Model based vision systems
- Knowledge representation for vision
- Models of human perception
- Image understanding and object recognition
- Computational geometry
- Image processing
- Feature selection and pattern analysis
- Motion representation and analysis
- Speech recognition and synthesis
- Texture and segmentation

- 3-D Vision
- Special purpose architectures
- Applications

Deadlines

Oct 31, 1987	Full papers (4 copies)
Feb 1, 1988	Authors notified
March 28, 1988	Camera-ready manuscripts

Paper Submission

T Kasvand and A Krzyzak, Co-Chairmen
 Vision Interface 88
 Department of Computer Science
 Concordia University
 1455 De Maisonneuve Blvd. West
 Montreal, Quebec
 Canada H3G 1M8

2nd INTERNATIONAL CONFERENCE ON VECTOR AND PARALLEL COMPUTING

Tromso, Norway- June 6-10, 1988

Program

The conference is devoted to issues in applied research and development in supercomputing. The conference themes will include:

- Pattern recognition
- Image processing and computer vision
- Seismic processing
- Artificial intelligence

Deadlines

Dec 11, 1987	Paper abstract
Feb 12, 1988	Authors notified

Paper Submission and Further Information

Berit Hilt
 Bergen Scientific Centre, IBM
 Allegaten 36
 5007 Bergen
 Norway

4th EUROPEAN SIGNAL PROCESSING CONFERENCE

Grenoble, France- September 5-8, 1988

Program

The conference is organized by the European Association for Signal Processing. The aim of EUSIPCO-88 is to cover all aspects of signal processing theory and practice. Sessions will include tutorial and review papers and contributed papers on new results and applications. Areas of interest include:

- Theory of signals and systems
- Mono and multidimensional processing
- Signal interpretation
- Applications
- Hardware and software

Deadlines

Sept 30, 1987	Two-page abstracts (4 copies)
Jan 15, 1988	Authors notified
March 15, 1988	Camera-ready manuscripts

Paper Submission and Further Information

EUSIPCO-88 Conference Secretariat
 CEPHAG-ENSIEG
 BP 46
 38402 St Martin d'Heres Cedex
 France

CALENDAR OF EVENTS

<i>Date</i>	<i>Event</i>	<i>Location</i>	<i>Sponsor/Information</i>
Sept 23-25, 1987	4th International Conference in Image Analysis and Processing	Cefalu, Sicily, Italy	Prof Vito di Gesu, Dipartimento di Matematica e Applicazioni, Universita di Palermo, 90123 Palermo, Italy
Sept 29 - Oct 2, 1987	International Symposium on Data Analysis and Informatics	Versailles, France	INRIA, Service des Relations Exterieures, Bureau des Colloques, Domaine de Voluceau, Bp 105, 78153 Le Chesnay Cedex, France
Oct 25-30, 1987	Visual Communications and Image Processing II	Cambridge, Massachusetts, USA	SPIE, P.O.Box 10, Bellingham, WA 98227-0010, USA
Oct 26-30, 1987	International Workshop on Expert Systems and Pattern Recognition	Novosibirsk, USSR	ESPR Secretariat, Institute of Mathematics, Novosibirsk-90, 63090, USSR

Nov 1-6, 1987	SPIE Symposium on Advances in Intelligent Robotics Systems	Cambridge, Massachusetts, USA	SPIE, P.O.Box 10, Bellingham, WA 98227-0010, USA
Nov 18-20, 1987	AFCET Sixieme Congres Reconnaissance des Formes et Intelligence Artificielle	Antibes, France	AFCET, 156 boulevard Pereire, 75017 Paris, France
Nov 30 - Dec 2, 1987	IEEE Workshop on Computer Vision	Fontainebleau Hilton, Miami Beach, Florida, USA	Narendra Ahuja, Coordinated Science Laboratory, University of Illinois, 1101 W. Springfield Avenue, Urbana, Illinois 61801, USA
Dec 16-18, 1987	International Symposium on Electronic Devices, Circuits and Systems	Kharagpur, India	Prof N B Chakrabarti, Dept. of Electronics and Electrical Communications Engineering, Indian Institute of Technology, Kharagpur 721302 WB, India
Jan 12-15, 1988	Parallel Processing for Computer Vision and Display	Leeds, United Kingdom	Dr P M Dew, Dept Computer Studies, University of Leeds, Leeds LS2 9JT, UK
Jan 31 - Feb 5, 1988	SPIE Conference on Medical Imaging	Newport Beach, California, USA	SPIE, P.O.Box 10, Bellingham, WA 98227-0010, USA
Feb 2-4, 1988	7th International Conference on Robot Vision and Sensory Controls	Zurich, Switzerland	IFS (Conferences) Ltd., 35-39 High Street, Kempston, Bedford MK42 7BT, England
March 28-30, 1988	BPRA 4th International Conference on Pattern Recognition	Queens College, Cambridge, England	Dr J Kittler, Dept Electronic and Electrical Engineering, University of Surrey, Guildford GU2 5XH, England
May 18-20, 1988	Pattern Recognition in Practice III	Amsterdam, The Netherlands	Prof E S Gelsema, Dept Medical Informatics, Erasmus University, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands
June 5-9, 1988	IEEE Computer Society Conference on Computer Vision and Pattern Recognition	University of Michigan, Ann Arbor, Michigan, USA	CVPR88, c/o The Computer Society, 1730 Massachusetts Ave., N.W., Washington, DC 20036-1903, USA
June 6-10, 1988	Vision Interface 88	Edmonton Convention Centre, Edmonton, Alberta, Canada	Wayne A Davis, General Chairman Conference 88, Department of Computing Science, 615 General Services Building, University of Alberta, Edmonton, Alberta, Canada T6G 2H1
June 6-10, 1988	2nd International Conference on Vector and Parallel Computing Issues in Applied Research and Development	Tromso, Norway	Berit Hilt, Bergen Scientific Centre, IBM, Allegaten 36, 5007 Bergen, Norway
June 20-27, 1988	3rd International Workshop on Data Analysis in Astronomy	Erice, Italy	M C Maccarone, IFCAI/CNR, Via Mariano Stabile 172, 90139 Palermo, Italy
Sept 5-8, 1988	4th European Signal Processing Conference	Grenoble, France	Eusipco-88 Conference Secretariat, Cephag-ENSIEG, BP46, 38402 St Martin d'Heres cedex, France
Sept 5-8, 1988	1st International Conference on Visual Search	University of Durham, UK	David Brogan, FIC VS, Department of Psychology, University of Durham, Science Laboratories, South Road, Durham DH1 3LE, UK
October 17-20, 1988	IAPR 9th International Conference on Pattern Recognition	Beijing, China	9ICPR Secretariat, Chinese Association of Automation, P.O.Box 2728, Beijing, China