



International Association for Pattern Recognition, Inc.

An affiliate member of the International Federation for Information Processing

NEWSLETTER

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FROM THE EDITOR'S DESK

Although I now receive regularly announcements of conferences and workshops and calls for papers for dissemination to the IAPR community, the inflow of material about other activities of IAPR Standing Committees, Technical Committees and Ad-Hoc Committees is almost nonexistent. Also, conference reports for publication in the Newsletter arrive very sporadically and in some quarterly periods the submissions are reduced to absolute zero. On such occasions I ponder whether the remaining pages of the issue should be filled with columns upon columns of the titles of papers and reports from Japan. In view of the letter to the Editor which is carried on Page 3 I opted this time for a shorter, 8-page issue of the Newsletter, hoping that the extent of the contributed material in future issues will allow me again to include Reports from Japan without seriously upsetting the balance of the Newsletter.

The Editor

PRESIDENTIAL MESSAGE

For anyone involved in the conduct of IAPR business, the second half of the term between two successive ICPR's is usually a rather busy period. This is especially true of all those concerned with the preparation of the next ICPR and, in particular, the Scientific Program Committee.

In the present instance, the response to the call for papers has been overwhelming: a total of 679 papers from 28 different countries were submitted. I do not have the figures for the previous ICPR's but I have some reasons to believe that this could be a new record in the history of IAPR. These figures do not only speak for themselves, they also bear witness to the vitality of the field and the attractiveness of our organization. I have no doubt that thanks to the dedication of all those involved and in particular our Chinese colleagues, the 9th ICPR will be a great success.

In parallel, some national organizations are carefully preparing proposals to host the 11th ICPR in ... 1992. Remember that, in the meantime, the 10th ICPR will take place in Atlantic City, in 1990. Still others are actively preparing nominations for the King Sun Fu Award. Should you wish to file a proposal, please bear in mind that the deadline is May 01, 1988.

The IAPR Executive Committee had a chance to discuss these and many other items at its latest meeting held on November 19, 1987 at Rutgers University, NJ, USA. Not all items on the agenda were as rosy and gratifying as those mentioned above. For instance, one recurrent source of serious concern was the lack of response from some of our committees. This is not a new problem and it is one that is not specific to IAPR. Still it is one that has to be addressed if we wish IAPR to keep growing and developing harmoniously.

The problem is many-faceted. For instance, at the latest meeting of Technical Committee chairmen held in Paris in 1986, it was noted that the conditions imposed by our Bylaws on the geographical distribution of committee members was more of a hindrance than a help. Accordingly, the IAPR Governing Board was invited — and agreed — to relax those conditions and the positive effects of this decision could be observed in a matter of months afterwards.

Along the same line of thought, the Executive Committee has examined a number of ways of revitalizing some Standing Committees, for instance by proposing a new code of practice that would give more freedom to committee chairmen in selecting the members of their committee.

We have no doubt that this is a long term enterprise but it is our hope that the IAPR community at large, and the next Executive Committee in particular, will benefit from our efforts.

Eventually, I would like to underline that, over the last semester or so, IAPR was well represented on a number of important occasions. In the first place, I have established informal contacts with the International Federation of Classification Societies and I was fortunate enough to be invited to their first International Conference. Moreover, it has been agreed that TC-1 of IAPR would be invited to contribute to the scientific program of their next conference. In the second place, Professor H. Freeman represented IAPR at the latest IFIP General Assembly in Budapest which was one of the most productive sessions in recent years. Last but not least, a number of past and present IAPR officers — including former President J.-C. Simon and myself — participated in the International Workshop on Expert Systems and Pattern Recognition that was organized in Novosibirsk by Professor N. Zagorujko. This was a prime opportunity for strengthening our relationships with our colleagues from USSR.

Pierre A. Devijver

NEWS IN BRIEF

9TH ICPR BEIJING A total of 679 papers have been submitted for presentation at the 9th International Conference on Pattern Recognition to be held in Beijing, China, 17-20 October 1988. Of these 272 papers come from the host country, the Japanese and American contributions share the second place with 92 submissions each and France drummed up impressive 70. Owing to the unexpectedly large number of papers submitted the review process is estimated to take about one month longer than originally scheduled.

K S FU AWARD NOMINATIONS DEADLINE

The closing date for receiving nominations for the King Sun Fu Award is 1 May 1988. For details of this prestigious award established by the IAPR and a copy of the nomination form see IAPR Newsletter vol. 10 no. 2.

LETTERS TO THE EDITOR

Wither the Japanese Reports

Dear Editor,

I am writing to you after receiving the latest copy of the IAPR newsletter because a large fraction of it consisted of a list of the titles of reports from Japan. I would like to ask the question, do they perform any useful function other than filling space in the newsletter? I acknowledge the need to disseminate information about work in geographically disparate regions of the world but would argue that this format and this forum is not the appropriate one. In any year there are hundreds, even thousands, of reports written in each of the IAPRs constituent associations and a list of all their titles would fill the newsletter many times over. Although the titles of many of the reports in the Japanese Reports section are of interest to me, I am hesitant to pursue them as I have no indication of their quality. It is precisely for this reason that the refereed journal has evolved and I feel that this is where Japanese authors should submit their contributions. I would like to see more topical, general interest reports from the newsletters correspondents. In the case of Japan this might take the form of reports on the results of the advanced research programs which were initiated in the early 1980's. Another useful feature might be a section which would keep people informed of commercial products which are available in the pattern recognition field. I hope that these suggestions are constructive and would be interested to hear whether others strongly disagree with me.

John Illingworth

BOOKSHELF

Processor Arrays: Architecture and Applications

Terry Fountain, Academic Press, 1987

Terry Fountain's timely work surveys the early history of array processor design including the SOLOMON, ILLIAC and CLIP programs and describes in detail modern systems such as CLIP-7, WARP and PASM. Although there is a chapter on systolic systems, the discussion is almost exclusively restricted to the engineering details of SIMD type systems. Programming is usually described only at the level of assembly language.

Chapter 1 outlines the principles of operation of array processors, and gives examples of primitive operations and higher level applications of arrays. Chapter 2 is a historical survey covering SOLOMON, ILLIAC

III and IV and CLIP 1-3. Chapter 3 describes so-called second generation systems, specifically the ICL DAP, CLIP-4 and the Goodyear Massively Parallel Processor. Some interesting tables provide a comparative review of the systems which shows that for arithmetic operations the performance of CLIP-4, DAP and MPP are roughly 1:20:100, but for binary neighbourhood operations the ratio is 1:2:6.

Chapter 4 contains detailed information on some VLSI chips for array processors such as the NCR GAPP and the GEC GRID as well as more conventional devices such as the TMS32010 and the Transputer. In Chapter 5 the Carnegie Mellon systolic projects are described and the GEC/RSRE bit serial systolic devices. Fountain notes that the term systolic is being used to describe more general processors such as WARP that might just as easily be termed pipeline processors.

The provision of local autonomy within arrays is detailed in Chapter 6. CLIP-7 and the Programmable Systolic Array feature in the same chapter, with a more general discussion on transputers and pyramid architectures. Chapter 7 concerns some mathematical applications of array processors and Chapter 8 looks ahead to future developments.

In summary, an extremely interesting book with plenty of practical detail. As might be expected given the author's background, the CLIP machines feature prominently but overall the survey is wide ranging and the 66 references provide a good starting point for the reader wishing to explore the subject in more depth.

Adrian Johnstone

Royal Holloway and Bedford New College

Pattern Recognition and Image Processing

*Fred Aminzadeh, Geophysical Press,
London, 1987, ISBN 0-946631-20-4*

This book is volume 20 in the Handbook of Geophysical Exploration Series concerned with seismic exploration. The main purpose of the book as indicated by the editor is "to familiarize explorationists with the diverse and mostly under-utilized pattern recognition (PR) and image processing (IP) methods and their many applications in the oil industry". And the primary focus is "the application of PR and IP in the analysis and interpretation of seismic data". The book has indeed met these objectives very well and it is in fact the first such book with a fairly complete collection of recent research papers on PR and IP in exploration seismology.

The book consists of six chapters. It starts with a lucid overview of applications of PR and IP techniques

in oil exploration by the editor which is followed with an overview of IP and PR techniques by R G Gonzalez. Chapter 3 with 3 papers on image processing applications examines the Hough transform, thinning and linking algorithms in seismic images, and 2-D coherence processing of VSP (vertical seismic profile) data, as well as covariance analysis, or Karhunen-Loève coding of 2-D seismic data. Chapter 4 with 7 papers on pattern recognition applications presents well over three dozen seismic indicators (features, attributes) for effective seismic discrimination and interpretation of subsurface stratigraphic seismic data, a comparison of various classification rules in statistical seismic recognition, syntactic methods for recognizing bright spots, applications of pattern recognition to reservoir geophysics, interactive seismic analysis using trace attributes, and the application of clustering in exploration seismology. This chapter, as the key element of the book, has the best collection of pattern recognition papers in oil exploration.

Chapter 5 with 3 papers is concerned with artificial intelligence and expert systems in seismic data analysis. This is very new and promising area though very little concrete progress has been made to date. Chapter 6 contains 3 papers on fuzzy sets and non-seismic applications. The paper by P Bois is an excellent example of using fuzzy set theory in seismic prospecting. Two other papers by C M Griffiths deal with fuzzy based strata recognition and classification using automated exogenous pigeonholing.

In summary the book provides an excellent collection of research papers on pattern recognition and image processing in oil exploration which are quite readable to pattern recognition researchers without exploration seismology background. It is thus highly recommended to readers of IAPR Newsletter.

C H Chen

Southeastern Massachusetts University

Image Segmentation and Uncertainty

Roland Wilson and Michael Spann, Research Studies Press, Letchworth 1988 and J Wiley & Sons, Chichester, 1988, ISBN 0 471 91826 1

This book is part of the series of books on advanced topics on pattern recognition and image processing. As such it does not constitute an easy read. It is very much like a long original research paper which stems from the authors' research effort during the past six years.

The first chapter states what the problem of segmentation is and discusses briefly the various types of

approaches to solving it. It also summarizes very briefly, I would say too briefly, the necessary mathematical background; maybe a few more explanations and some examples would not have gone amiss here.

The second chapter is the development of a formal theory on segmentation. The principle of uncertainty in image segmentation is rigorously explained in terms of properties of the symbolic representation of an image. A way then is presented to get around it by representing the image with a quad tree and utilising information from one level of the tree to the next. This takes advantage of the fact that the structure of the tree reflects the uncertainty in the image: the closer to the root node you are the easier it is to find out "what you see"; the further away from the root node you are the easier it is to find out "where the object you see is". It would have been useful if the authors had tried to answer certain critics of the relevance of the principle of uncertainty to edge finding (e.g. Boie & Cox); however, no such attempt has been made.

Chapter three deals with the implementation of the ideas discussed in the previous chapter for the gray level segmentation of various images. In particular, the algorithm of local centroid clustering is discussed and its adaptation to cope with realistic images with overlapping class distributions. Once an image has been classified, information from the higher resolution levels of the quad tree is utilised until the boundary of each region is accurately determined. The technique is compared with other existing methods of image classification and shown to be superior. It is successfully applied to various images, including a natural scene. Again, some parts of this and the previous chapter are rather difficult to follow particularly since the occasional printing error makes it hard to see how one equation follows from the one before in places.

The fourth chapter is again a theoretical one concerned with ways of quantitatively describing texture as an alternative feature to the gray level values to be used for the segmentation of images. The properties of the finite prolate spheroidal sequences are briefly discussed as functions which compromise the uncertainty between the spatial and the frequency representation of a signal. The coefficients of the expansion of a small patch of the image in terms of these functions for a certain frequency band are the "features" the authors use to describe the image. A method of tessellation of the frequency domain is developed and efficient ways of calculating the "features" which correspond to the different frequency bands are discussed. Conceptually this chapter is the most difficult of the book to follow and it would have helped if the authors had put some more explanations in,

instead of occasionally referring the reader to published research papers for more details. One expects from a textbook that it will elucidate the material published in more condensed form in papers.

Having established a way of selecting features, the fifth chapter expands and adopts the algorithms developed in the third chapter so that multifeature images can be handled and segmented. The method is applied and tested to a number of images consisting of mixed textures. Some limitations of the method are discussed.

The final chapter is a critical review of the whole work within the more general framework of problems related to machine vision and perception.

In summary, it is a very interesting book for the specialist. Maybe an extra fifty pages or so with more explanations and examples would have made it a nice read for the non-specialist too.

Maria Petrou

CALLS FOR PAPERS

IAPR INTERNATIONAL WORKSHOP ON STRUCTURAL AND SYNTACTIC PATTERN RECOGNITION

Nancy, France - September 12-14, 1988

Program

The aim of the workshop is to bring together people involved in structural and syntactic pattern recognition and its application to the classification and interpretation of 1D to 4D signals (speech, image, motion images, etc.). The emphasis will also be on hybrid methods, mixing the structural approach with statistical or knowledge based pattern recognition.

Deadlines

March 15, 1988	Full paper (3 copies)
June 15, 1988	Authors notified
August 30, 1988	Camera-ready manuscripts

Paper Submission and Further Information

Roger Mohr
CRIN-INRIA Lorraine
Campus Scientifique
BP 239
54506 Vandœuvre Cedex
France

IAPR WORKSHOP ON COMPUTER VISION

Tokyo, Japan - October 12-14, 1988

Program

This international workshop on Computer Vision is sponsored by IAPR Technical Committees TC6 and TC8. The workshop will be held at Nihon Daigaku Kaikan, Tokyo just before the 9th ICPR. The discussion at the workshop will concentrate on two themes: *Special Hardware and Industrial Applications*. In particular it will include the following topics:

- High speed image processors
- VLSI for image processing
- Image understanding workstations
- PC-based low cost image analysis systems
- Special purpose pattern recognition machines
- Intelligent sensor
- Software environments for special hardware
- Visual inspection
- Robot vision
- Engineering automation for documents and line drawings
- New imaging techniques
- 3-D information usage
- AI vision techniques in practical applications

Deadlines

May 15, 1988	Abstract (400 words, 4 copies)
July 1, 1988	Authors notified
August 31, 1988	Camera-ready manuscripts

Paper Submission and Further Information

Mikio Takagi
Institute of Industrial Science
University of Tokyo
7-22-1, Roppongi Minato-ku
Tokyo 106
Japan

IEEE 2ND INTERNATIONAL CONFERENCE ON COMPUTER VISION

Tarpon Springs, Florida, USA - December 5-8, 1988

Program

ICCV is the second international conference sponsored by the IEEE Computer Society which is devoted solely to computer vision. The program will consist of high quality contributed papers on all aspects of computer vision. All papers will be refereed by members of the Program Committee. To avoid conflicts, it is not planned to hold parallel sessions. Two hours each day will be devoted to Poster Papers.

Deadlines

May 15, 1988	Full paper (4 copies)
July 15, 1988	Authors notified
Sept 1, 1988	Camera-ready manuscripts

Paper Submission and Further Information

Ruzena Bajcsy
University of Pennsylvania
Department of Computer Science
and Information Science
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Philadelphia
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USA

INTERNATIONAL WORKSHOP ON INDUSTRIAL APPLICATIONS OF MACHINE INTELLIGENCE AND VISION

Roppongi, Tokyo, Japan - April 10-12, 1989

Program

The workshop which is co-sponsored by IEEE Industrial Electronics Society and Institute of Industrial Science, University of Tokyo is organised in cooperation with IAPR TC8. The purpose of the workshop is to stimulate international exchange and discussions on the two key technologies, AI and Vision, for building tomorrow's industrial systems and society. As seen in the title of the workshop, the emphasis is on advanced AI and Vision technologies applicable to industrial problems. Topics of interest include:

- Foundations for AI and vision systems
- AI technologies
- Vision technologies
- Hardware architectures for AI and vision systems
- Advanced environments for AI and vision systems

Deadlines

Nov 21, 1988	Summary (800 words, 4 copies)
Dec 20, 1988	Authors notified
Feb 10, 1989	Camera-ready manuscripts

Paper Submission and Further Information

Prof Mitsuru Ishizuka
(General Chair of MIV-89)
Institute of Industrial Science
University of Tokyo
7-22-1, Roppongi, Minato-ku
Tokyo 106
Japan

6th SCANDINAVIAN CONFERENCE ON IMAGE ANALYSIS

University of Oulu, Finland - June 19-22, 1989

Program

The 6SCIA is organised by the Pattern Recognition Society of Finland and co-sponsored by IAPR. The programme will include invited and contributed papers in the areas of:

- computer vision
- image processing
- pattern recognition
- perception
- parallel algorithms and architectures
- applications

Deadlines

Dec 1, 1988	Summary (1000 words, 4 copies)
Jan 31, 1989	Authors notified
March 31, 1989	Camera-ready manuscripts

Paper Submission and Further Information

Prof Matti Pietikäinen
6SCIA Program Chairman
Dept Electrical Engineering
University of Oulu
SF-90570 Oulu
Finland

TUTORIALS

STATISTICAL PATTERN RECOGNITION: Introduction

*University of Surrey, Guildford,
England- September 17-21, 1988*

The course sponsored by the IAPR Technical Committee TC1 will discuss fundamental methods of statistical pattern recognition. Several example classes will be aimed at familiarizing the participants with the material presented. The course will include seminars on application of pattern recognition methods to specific problems in which a step by step description of the design of practical pattern recognition systems will be outlined.

The topics covered will include *elements of statistical decision theory, nonparametric pattern classification, learning machines, probability density function estimation, classification error probability estimation, feature selection, feature extraction and cluster analysis.*

Course textbook: P A Devijver and J Kittler, *Pattern Recognition: A statistical approach*, Prentice/Hall, Englewood Cliffs, NJ, 1982.

Course lecturers: Dr P A Devijver and Dr J Kittler

For further information and registration form write to:

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and Electrical Engineering
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STATISTICAL PATTERN RECOGNITION: Advanced Topics

*University of Surrey, Guildford,
England- September 17-21, 1988*

The course will feature a number of advance topics in statistical pattern recognition. In particular, it will focus on the use of contextual information in decision making with the emphasis on Markov models.

The methodology will be illustrated on applications in speech recognition, image restoration, image segmentation, computer vision and character recognition.

The topics covered will include: *role of context, Markov chain, Markov mesh and Markov random field models of apriori world knowledge, Gibbs distributions, hidden Markov models, elements of compound decision theory, Baum's algorithm, Derin's algorithm, Viterbi algorithm, labelling in hidden Markov meshes and random fields, discrete relaxation, probabilistic relaxation, learning contextual relationships, learning Markov models.*

Course lecturers: Dr P.A.Devijver and Dr J.Kittler

For further information and registration form write to:

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and Electrical Engineering
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CALENDAR OF EVENTS

<i>Date</i>	<i>Event</i>	<i>Location</i>	<i>Sponsor/Information</i>
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
April 4-8, 1988	Optics, Electro-Optics and Sensors	Orlando, Florida, USA	SPIE, PO Box 10, Bellingham, WA 98227-0010, USA
April 24-29, 1988	IEEE International Conference on Robotics and Automation	Franklin Plaza Hotel, Philadelphia, PA, USA	The Computer Society of the IEEE, 1730 Massachusetts Avenue, N.W., Washington, DC 20036-1903, USA
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
August 14-17, 1988	Detroit, USA	3rd International Conference on CAD/CAM: Robotics and Factories of the Future	For information on the session on Computer Vision for Industrial Automation contact: Prof J G Postaire, Centre d'Automatique, Université des Sciences et Technique de Lille Flandres-Artois, 59655 Villeneuve d'Ascq Cédex, France
August 14-19, 1988	Optical and Optoelectronic Applied Science and Engineering	San Diego, California, USA	SPIE, PO Box 10, Bellingham, WA 98227-0010, USA
August 31- Sept 2, 1988	Alvey Vision Conference	University of Manchester, United Kingdom	AVC88, c/o Helen Jenkins, Rutherford Appleton Laboratory, Chilton, Didcot, OX11 0QX, United Kingdom
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
Sept 12-14, 1988	IAPR International Workshop on Structural and Syntactic Pattern Recognition	Nancy, France	Roger Mohr, CRIN-INRIA Lorraine, Campus Scientifique, BP 239, 54506 Vandœuvre Cedex, France
September 19-23, 1988	Optical Science and Engineering	Hamburg, West Germany	SPIE, PO Box 10, Bellingham, WA 98227-0010, USA
Sept 27-29, 1988	10ty DAGM-Symposium Mustererkennung	University of Zürich, Switzerland	Prof P Stucki, Universität Zürich, Institute für Informatik, Winterthurerstrasse 190, CH-8097 Zürich, Switzerland
October 4-5, 1988	SGAICO Annual Conference on Artificial Intelligence in Manufacturing, Assembly and Robotics	University of Berne, Switzerland	Prof H Bunke, Universität Bern, Institut für Informatik und Angewandte Mathematik, Länggass-Strasse 51, CH-3012 Bern, Switzerland
October 12-14, 1988	IAPR Workshop on Computer Vision	Tokyo, Japan	Mikio Takagi, Institute of Industrial Science, University of Tokyo, 7-22-1 Roppongi Minato-ku, Tokyo 106, Japan
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
November 6-11, 1988	Visual Communications and Image Processing III	Cambridge, Massachusetts, USA	SPIE, PO Box 10, Bellingham, WA 98227-0010, USA
December 5-8, 1988	IEEE 2nd International Conference on Computer Vision	Tarpon Springs, Florida, USA	ICCV 88, c/o Computer Society of the IEEE, 1730 Massachusetts Avenue, N.W., Washington, DC 20036-1903, USA
January 11-13, 1989	2nd International Workshop on Artificial Intelligence in Economics and Management	Singapore	Mrs Vicky Toh, Institute of Systems Science, National University of Singapore, Kent Ridge, Singapore 0511, Republic of Singapore
April 10-12, 1989	International Workshop on Industrial Applications of Machine Intelligence and Vision (MIV-89)	Roppongi, Tokyo, Japan	Prof Mitsuru Ishizuka (General Chair of MIV-89), Institute of Industrial Science, University of Tokyo, 7-22-1, Roppongi, Minato-ku, Tokyo 106, Japan
June 19-22, 1989	The 6th Scandinavian Conference on Image Analysis	University of Oulu, Finland	Prof Matti Pietikäinen, 6SCIA Chairman, Dept Electrical Engineering, University of Oulu, SF-90570 Oulu, Finland