Newsletter of the
BRITISH MACHINE VISION ASSOCIATION
AND SOCIETY FOR PATTERN RECOGNITION.
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EDITORS NOTE

The first major conference of the BMVA is now fast approaching. The BMVA committee refereed over 100 contributions and have selected 60 or so papers and posters for inclusion in the proceedings and presentation at the conference. Arrangements are well advanced in Oxford and the deadline for early conference registration and its consequent discount has now passed. However places are still available to BMVA members at the remarkably low price of £190 (£210 for non-members). Further registration details can be obtained from Dr R.W. Series, RSRE, St Andrews Road, Malvern, Worcs WR14 3PS. It all promises to be one of the years star events!

This issue of BMVA News is accompanied by a complimentary copy of Image Processing magazine. This magazine covers many of the industrial and commercial facets of image processing which are maybe less often addressed within the academic community. It can be obtained on a regular basis direct from Reed Business Publishers by completing the reader reply card at the back of the magazine.

ROBOT OLYMPICS

The First International Robot Olympics is being organised and hosted by the Turing Institute on the 27th and 28th September 1990. The event is part of Glasgow's European city of culture programme and is being held in the sports complex at the University of Strathclyde. Primary sponsorship for the event has come from the NatWest bank, the Scottish Development Agency and the IEEE. Robots from the United States, Japan, Canada, Europe and the Soviet Union will be arriving in Glasgow for the event which will be initiated with the carrying of the Olympic flame. At 9.00am on the 27th September, Trolleyman (a two wheeled balancing robot rather like a golf trolley) will carry the Olympic torch through the streets of Glasgow to the sports complex at the University of Strathclyde. This will be followed by a robot parade and a press conference. In the afternoon, the robot "athletes" will be on display in parallel with a masterclass seminar titled "The future of intelligent robots". This masterclass will include talks by leading specialists from around the world focusing on current problems with advanced robots. One of the speakers, Professor Ruzena Bajcsy from the University of Pennsylvania, will be concentrating on problems associated with active vision. Here, it will be argued that one of the primary bottlenecks for producing new generations of robots concerns the issue of generating useful perceptions from sensors.

On the Friday, the main events will start at 10.00am. Each robot will be given time to show their capabilities. More importantly, prior to the event, the organisers will look at the details of the contestants and whenever commonly claimed capabilities are found, competitions will be devised. We expect that there will be junior events, competition races (two legs, four legs, wheels and tracks), collision avoidance tasks, wall climbing competitions, speech communication skills and swimming events (in the University pool).

In addition to all event winners and runners up getting Olympic medals, there will be an overall Olympic champion. The champion will be selected by a team of judges. The criteria that they use will be devised and scored on the basis of three issues:

(i) The quality of the hardware (engineering and electronics).

(ii) The sophistication of the behaviour.

(iii) Novelty.

There will also be prizes for devices or pieces of technology which show good commercial potential, young competitor awards and design awards. The event will finish at around 5.00pm on the Friday.

It is expected that the Robot Olympics will be held every two years alternating between Glasgow and other sites around the world.

Peter Mowforth, The Turing Institute.
email: boffin@uk.ac.turing

JFIT VISION PROGRAMME

The Joint Framework for Information Technology (JFIT) is the SERC/DTI initiative which followed the Alvey programme in mid 1988. Within the new R&D framework collaborative projects in computer vision fall within the remit of the Information Engineering Advanced Technology Programme (IEATP) administered by the DTI's Information Technology Division in Kingsgate House, London.

To date there have been two rounds of submissions for collaborative projects within the new programme, in addition to the normal SERC academic only proposals. Three fully collaborative and one "uncled" project have been approved from the first two calls for proposals, with the two first call projects fully underway and the second call proposal to reach the starting line shortly. From the first call, project 1660 is in the medical imaging domain and is aimed at the investigation and development of novel techniques for interpretation and display of 3D images derived from a variety of imaging sources. On the industrial side the consortium contains Active Memory Technology (AMT) and the British Technology Group, with the academic partners drawn from Manchester University, Aberdeen University, Queen Mary and Westfield College and the London Hospital Medical College. Also from the first call, project 1551 targets the manufacturing sector with the development of active 3D sensors for object recognition, location and inspection. The consortium in this case consists of British Aerospace, YARD and the National Engineering Laboratory on the industrial side, with academic input from the Universities of Surrey, Edinburgh and Heriot-Watt.

The single collaborative project approved within the second call for proposals involves Bolt Beranek and Newman (BBN), Turing Institute and Strathclyde University. The focus of the work is the design of an intelligent robot system capable of dynamic interaction with its environment using a variety of active vision modes.

There will be a further opportunity to apply for funds to support collaborative R&D in computer vision, with a third call for proposals expected in September. The strategy document is currently in preparation and it seems likely that on this occasion the theme will be a more generic signal and pattern processing one, encompassing specific technologies such as speech and vision within its remit.

J. D. Todd, National Engineering Lab.
IED Vision Coordinator

IPTACC

There will be an open meeting and seminar of the Image Processing Transputer Applications Community Club in R22 Lecture Theatre at Rutherford Appleton Laboratory on Tuesday 2^{nd} of October. The meeting begins at 10:30 a.m. with the morning devoted to an open meeting and the afternoon comprising a seminar session from eminent invited speakers. Fuller details will appear in the August and September editions of the Transputer Initiative Mailshot. The IPTACC was set up in June 1989 by the Transputer Initiative and membership is free. So far they have compiled a directory of image processing hardware, of specialist image processing software and are currently interested in obtaining demonstration and/or educational software. There is no charge for the RAL seminar and a courtesy bus will be provided at Didcot rail station to meet participants disembarking from the principal London trains. However to ensure that adequate facilities are available ie bus seats, coffee etc pre-registration is necessary. Participants are therefore asked to contact Mrs J Gore at the Rutherford Appleton Laboratory, e-mail: jmg1@uk.ac.rl.inf(Note: jmg(ONE)@....).

Terry Mawby
IPTACC Secretary

FUTURE BMVA MEETINGS

A BMVA meeting entitled "Machine and Natural Vision" will be held in London on 24th October 1990. The main object of the meeting is to review recent findings in the Psychology and Physiology of Natural Vision for the benefit of researchers in Machine Vision. The meeting is intended to be the first of an occasional series of BMVA meetings to encourage a dialogue between the Machine and Natural Vision research communities. The provisional programme includes:

- Dr. John Robson (Cambridge Univ) - Low-level Visual Neurons.
- Prof Mike Morgan (Edinburgh Univ) - Features in Human Vision.
- Dr Dave Perratt (St Andrew's Univ)- Mechanisms of Object Recognition
- Dr. Brian Rogers (Oxford Univ) - Perception and Representations of 3D surfaces

Exact details of time and place will be circulated shortly.

G. Sullivan, University of Reading
email: G.D.Sullivan@uk.ac.reading

MARKOV MODELS

This half day meeting was held on 22-May-1990 at the DTI in London. The meeting commenced with a talk by Dr P.A.Devijver from ENST Brest entitled "Hidden Markov Mesh Models in Image Processing". He commenced the talk with a description of the properties of a third order Markov Model and then went on and illustrated in considerable detail how an effective algorithm could be developed using Markov Models for the processing of images. This was then extended to illustrate how the algorithm could be applied to the processing of sequences of images.

The second talk was given by Prof K.Mardia from Leeds on the restoration of image sequences using a Markov Random Field. The use of both Bayesean and iterative methods were described, the Iterative Conditional Mode was the approach which was finally chosen as the most suitable in this case, results were given using 64x64 and 32x32 images.

After tea the third talk of the afternoon was given by Sarah Bell from the NERC unit for Thematic Information Systems (NUTIS) at Reading University. This talk concerned an interesting connection between Markov Models and Fractals and commenced with an initial and useful review of both topics. The questions concerning when is a Markov Random Field a fractal? and what types of fractals can be generated by Markov Random Fields? were dealt with together with approaches for obtaining the statistical properties.

The final talk of the afternoon was by Dr S.P.Luttrell from RSRE Malvern entitled "A Maximum Entropy approach to sampling function design". The talk covered a number of topics such as various probability models, maximum entropy, recursive maximum entropy, cluster decomposition and relative entropy. His approach was described in terms of structured tree functions of data and the results used to illustrated it was that of the restoration of a sine wave. The talk was concluded by commenting that the approach could be used as a basis of a more sophisticated algorithm or even to obtain optimal neural networks.

To conclude, this meeting provided a very good insight into the uses and some interesting properties of Markov Models for the processing of images. It is hoped that the meeting proved not just suitable for those people involved specifically in the field but for others less experienced as well.

Paul Ducksbury, RSRE

MOTION COMPENSATION

On Monday 8 October 1990 the IEE is holding a Colloquium on "Applications of motion compensation" at Savoy Place, London. Motion estimation and compensation were processes which were originally developed to improve the efficiency of predictive coding for moving images in low bit rate video codecs. Numerous picture sample-based motion estimation algorithms and image sub-block matching techniques have been developed since that time and the applications of motion compensation now extend to many areas including: noise reduction, image de-blurring, television picture standards conversion, image display up-conversion, video telephony compression coding, machine vision and special effects generation. The aim of the colloquium is to show how the fundamental theory of motion compensation has matured into a practical science, covering a wide range of applications. Contributors should submit a 200 word synopsis to Dr D.I. Crawford, RE/Acron, Falcon Business Park, Finchampstead, Berks. RG11 4QQ.

FRACTALS

The IEE is organising a colloquium on "The application of fractal techniques in image processing" at Savoy Place, London on 3 December 1990. Fractals are figures which have the property of scale invariance i.e. their visual appearance is at least approximately independent of the "magnification" at which they are viewed. More abstractly, they may be very complicated in shape but low in information content, and be reconstructed from a relatively simple so-called Iterated Function System code. The object of the colloquium is to review recent and on-going work in this field. Typical areas of interest include: texture modelling, analysis and classification, the use of concepts of fractal dimension in the development of texture databases and image compression using IFS codes. Contributions for papers are invited. Authors should submit a 200 word synopsis to Prof. R.J. Clarke, Dept of Electrical and Electronic Engineering, Heriot-Watt University, 31-35 Grassmarket, Edinburgh EH1 2HT, by 30 August.

SPEECH PROCESSING

The IEE is organising a colloquium on "Techniques for speech processing" to be held on 17 December 1990 at Savoy Place, London. The colloquium will be concerned with digital signal processing techniques for speech, concentrating on basic tasks which are encountered in a range of speech processing problems. Prospective contributors are invited to submit a synopsis of approximately 250 words before 17 August to Dr M.C. Hall, British Telecom Research and Technology, Martlesham Heath, Ipswich IP5 7RE.

NEURAL NETWORKS

A IEE Colloquium on "Neural Networks: design techniques and tools" will be held at Savoy Place on 12 February 1991. One of the difficulties of applying neural network technology to a particular problem is the limited information available to assist design decisions. This colloquium will examine design techniques and aids available to assist the neural network designer, and will contain sufficient introductory material to be useful to first time designers as well as those more experienced. Papers are invited from both academia and industry on the application of neural networks to real design problems; experience, experiences of aids and/or software tools for design, design techniques to aid important implementation decisions such as input pattern coding, network architecture selection etc. Contributors should submit a 200 word synopsis by 24 August to Dr A.D.P. Green, Department of Electronic Systems Engineering, University of Essex, Wivenhoe Park, Colchester, Essex CO4 3SQ.

SITUATIONS VACANT

University of Manchester

Applications are invited for the post of Research Assistant in the Wolfson Image Analysis Unit, Department of Medical Biophysics.

The post has arisen from the award of an SERC grant, Automated Crack Detection using Computer Vision. The project, which is funded under the ACME scheme (Application of Computers to Manufacturing Engineering), is a 2-year industrial collaboration to automate Magnetic Particle Inspection, a process widely used in motor vehicle manufacturing to detect the presence of surface cracks in critical components. The project aims to achieve production performance levels through improved imaging and the use of geometrical and surface models of components to optimise image interrogation and feature classification. Most of the work will be carried out in Manchester using data to be archived on optical disk, with performance trials as necessary at the industrial site (Wolverhampton). The final phase of the project will be to draw up a specification for a production system architecture with the desired inspection and throughput characteristics.

Applicants should hold a doctorate or have equivalent experience in computer vision or relevant discipline, preferably with a background in industrial applications. Experience in the design and implementation of computer systems would be an advantage.

Salary is in the range £10,458 to £16,665, (scale R1A - under review) according to age and experience and the appointment will be for 2 years in the first instance.

Write enclosing CV and the names of two referees to: Dr R N Dixon, Department of Medical Biophysics, Stopford Building, Oxford Rd, Manchester M13 9PT or via e-mail.
Dr R.N. Dixon, Univ. of Manchester
email: rdixon@uk.ac.man.cs

University of Edinburgh

Applications are invited for three researchers to work in the Department of Artificial Intelligence on a European Institute of Technology funded research project entitled "Surface-Based Object Recognition for Industrial Automation" and a SERC funded IED project entitled "Location and Inspection from Range Data". Principal investigators on the projects are Dr. Robert Fisher and Dr. John Hallam.

The projects investigate the use of laser-stripe based range data to identify and locate parts as they pass down a conveyor belt. The vision research to be undertaken includes topics in: surface patch extraction from range data, surface patch clustering, geometric object modeling, model matching, geometric reasoning and parallel image processing. The projects build on substantial existing research.

One researcher will be expected to take a leading role in the scientific direction of the projects (5 research staff total) as well as undertake scientific research. The second researcher will be more involved in software implementation and testing, but will be expected to undertake some original research. The third researcher will be mainly investigating parallel reimplementations of existing serial vision algorithms on transputer-based systems. Applicants for the first two posts should have a PhD (or comparable experience) in an appropriate area, such as computer vision, image processing, computer science or mathematics. Applicants for the third post should have at least a BSc in an appropriate area.

In general, applicants should have experience with the C programming language. Applicants with experience in computer vision, the UNIX operating system, the C++ language or parallel processing on transputer systems will be preferred.

The posts will be for up to two years and will be on appropriate research staff salary scales according to age, experience and qualifications.

Applications should include a curriculum vitae (3 copies) and the names and addresses of two referees, and should be sent to the Personnel Department, University of Edinburgh, 63 South Bridge, Edinburgh, EH1 1LS by August 21, 1990, from whom further particulars can be obtained. In your application letter, please quote reference number 5796, and indicate for which of the posts you are applying.

DIARY

25-27 September 1990 British Machine Vision Association Conference, Oxford.
27-28 September 1990 First International Robot Olympics, Turing Institute, Glasgow.
2 October 1990 Transputer Applications Community Club Open Meeting, Rutherford Appleton Laboratory.
8 October 1990 IEE Colloquium on "Applications of Motion Compensation", London
24 October 1990 BMVA meeting on "Machine and Natural Vision", London
28-30 November 1990 IAPR Workshop on Machine Vision Applications, Tokyo, Japan
3 December 1990 IEE Colloquium on "The application of fractal techniques in image processing", London.
3-7 December 1990 IEEE 3rd International Conference on Computer Vision, Osaka, Japan
17 December 1990 IEE Colloquium on "Techniques for speech processing", London
26-27 December 1990 7th Israeli Conference on Artificial Intelligence and Computer Vision, Tel-Aviv, Israel.
12 February 1990 IEE Colloquium on "Neural Networks: design techniques and tools", London