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

This is my first BMVA newsletter. It is written at a time of great upheaval since I am in the process of moving from the SERC Rutherford Appleton Laboratory to York University. The main consequence is that my co-ordinates given above are somewhat sparse and also rather fuzzy. However, by the time of the next newsletter I should be in a more stable configuration. In the meantime please bare with me.

As far as editorial policy is concerned, I propose to make no changes to the fine example set by my predecessor John Illingworth. My main aims are to keep the readership up to date with developments and events in computer vision and pattern recognition, both in the UK and internationally. Since conferences and workshops are the main events at which important developments are reported, I hope to keep you informed of these by way of announcements and reports. For this reason I am keen to receive copy about events however small or specialised.

Well, so much for promisses. The road to hell is, after all, paved with good intentions. I will at least try to get out four newsletters a year.

Travel Bursaries

The BMVA has a limited fund that can be used to make partial contributions towards the cost of presenting a paper at an international conference. The aim is to encourage younger researchers who are developing their reputation.

To apply for an award you should write to the Honorary Secretary, John Illingworth, enclosing a copy of the paper to be presented an making a case for support. Applications will be considered by a review panel appointed by the President of the Association.

Collaborative European Vision Projects.

This meeting was held to give the BMVA membership an opportunity to discover what work was being done within some of the large European collaborative vision projects, with the sample of talks being drawn from both the ESPRIT (European Strategic Programme for Research and Development in Information Technology) and AIM (Advances in Medicine) programmes. It was planned that the meeting would not only present the technical work being undertaken, but would also give the audience a flavour of the benefits of working as part of a trans-European team of researchers.

The timing of the meeting was particulary appropriate because the four ESPRIT II projects (VIDIMUS, VIEWS, VOILA and PANORAMA) had just reached the two-year mark, and had either just been, or were about to go through, a major review. They were therefore expected to be able to demonstrate worthwhile results.

The venue for the meeting, the oak-panelled surroundings of the Institute of Radiology, is worth a brief mention, if only because of its unique sense of history which extended even to the lecture theatre, with its dazzling, analogue overhead projector, and its clinical, tombstone racks of radiogram viewers.

The morning's presentations were from three very different projects.

The first was COVIRA(AIM), which is investigating automatic techniques for diagnosing the presence of brain tumours. After a brief tour through the history of the project, John Knapman presented the main application of vision to this area, which consisted of tailoring existing edge and region-detectors to the specialised imagery being studied. A pilot study had been started to build an advice system that used the detected regions to make an automatic diagnosis, but trials were indicating that it was hard enough to get experts to agree on the same diagnosis let alone a computer.

The next presentation was VIDIMUS, whose aim is to provide sufficient intelligent advice to enable a non-expert inspection system designer to assemble a suitable vision system for his application. The project has so far concentrated on building a set of tools which will allow the user to decompose his inspection task as a hierarchy of vision tasks before interactively designing networks of suitable algorithms to implements those tasks. John Anderson presented some results from experiments to show how CAD information is being used within a prototype inspection system for 3D manufactured parts. The first use is during the location stage where 2D wire-frame projections are supplied to a Lowe-type matching algorithm, but the more novel use is the automatic determination of the best viewing positions for inspecting nominated component features. Both aspects of this inspection system have been incorporated into a working robotic cell, where a Puma robot and an XY-table are used to achieve the different configurations of component and sensor. Rob Bodington then described the Interactive Computing Environment (ICE), a sophisticated graphics-based environment in which the user can interactively design vision systems. Here, with the help of two invisible video monitors, Rob carefully explained all the subtleties of the ICE, indicating how easy it was for the user to build and test image processing systems using the high resolution Graphical User Interface.

The final project in the morning was SKIDS, an ESPRIT I project primarily concentrating on data fusion from a number of sensors including vision, acoustic and range devices. Here, Phil Greenway provided a description of the object recognition software being investigated to interpret low-level image-processed data supplied from four fixed cameras. The main task being tackled was furniture detection in a quasi-factory environment, with the approach again being based on Lowe's algorithms, but with the novel aspect of combining contributory information from a number of independent viewpoints. Some novel ideas on the use of Dempster-Schafer uncertainty intervals to resolve ambiguities bewteen hypothesised viewpoints were proposed, and it will interesting be to see whether this representation still remains appropriate when many competing pieces of evidence are combined.

After an invasion of a homely London pub for a lunchtime waiting for scampi and chips, we returned for an afternoon session promising three projects with some commonality, in both object recognition and motion detection.

The first presentation was on the VOILA project, and, having warmed us up with his silky-tongued Tomorrow's World video, Eric Thirion then returned to the more down-to-earth matter of the software/hardware environment being built at Matra for integrating the impressive range of software being assembled by the consortium. The main thrust of this project is to use a combination of stereo and optical flow techniques to provide continuous 3D information about a complex industrial scene. This will then be used to calculate sensible trajectories for an autonomous robotic vehicle, and the consortium are currently performing experiments with four different robotic platforms. One of the main integration tasks is to provide a suitable HCI together with a sophisticated management system to permit extensive testing of all the different techniques being developed at individual sites. The hardware architecture that has been chosen is based around Matra's own Capitan ring bus system.

Motion cues are also being exploited within the VIEWS project, where the consortium is investigating real-time surveillance. In contrast to VOILA, though, there is a greater emphasis on full scene interpretation and the consortium is relying on 2D image data alone to make predictions about the behaviour of 3D objects. The chosen application is vehicle management, currently comprising vehicle identification and tracking, but with future enhancements to include traffic scheduling. The two chosen demonstrators are ground traffic at an airport, and domestic road traffic, the latter being the one on which the consortium had concentrated during the first phase of the project. Robert Godden's well-paced presentation included a video illustrating a number of different identification and tracking sequences. These were obtained by applying model-matching and motion detection techniques to imagery from a fixed camera overlooking a Bremerhaven roundabout, with the highlight being the metamorphosis of a MCCS employee's Chevette (private Alvey joke !) into an advertising billboard. Like most aspects of German life, roundabout culture appears to be well-organised, allowing, as it does, a number of traffic types, such as cars, bicycles and even trams, to coexist on what, in England, is a daily test of a driver's nerve. German traffic regulations on priorities and no-go zones, however, are of course strictly observed (just like English mini-roundabouts) and therefore the behaviour and position of any vehicle could provide additional help to any automatic traffic monitoring system. Contextual cues of this type are only just beginning to be exploited by the consortium, but they will be indispensable in the airport domain, where the camera position will mean worse resolution imagery and certainly far more occlusion.

We returned to autonomous navigation for the final presentation on the PANORAMA project, whose aim is to construct an autonomously-guided vehicle that can manoeuvre in such unstructured scenarios as rock quarries and snow-covered Finnish forests(!). As we were all relieved to hear from Neil Matthews, vision is not the dominant part of this project, since vehicle position and speed information will be obtained from satellite positioning information, radio beacons, and other external sources. However, it is planned to have an optical flow system aboard to perform obstacle detection, and Neil's talk concentrated on an algorithm for performing matrix bidiagonalisation and its subsequent parallelisation on a transputer array.

In summary, therefore, this meeting provided a very interesting quick look at a number of, mostly large, European vision projects. However, the technical advances aside, some very relevant issues were also raised on the usefulness of collaborations on such a large scale. While

it is apparent that there are many benefits from sharing technology with a set of European partners, the overhead of collaboration, and particularly the growing pressure from the CEC to integrate all the project work into single,large demonstrators, should not be underestimated. The effect of this pressure is that the balance between research and development is clearly shifting towards development, and there is now a danger that collaborative programmes of this type are squeezing out the research initiatives they were set up to foster.
John Anderson
British Aerospace

Mammographic Image Analysis

On the 14th and 15th January, IBM UK Scientific Center at Winchester hosted a Mammographic Image Analysis Workshop. The objective of this workshop was to set up a Special Interest Group on Mammographic Image Analysis. The aims of this society are firstly to keep both medical and image pattern processing researchers informed and in contact. It is also intended that the society will provide a forum for the development of future collaborative projects. The first collaborative project is concerned with creating a large database of mammographic images.

Approximately 15 people from the UK and Europe took part in the workshop and each gave a 30 minutes presentation of their work. These presentations were varied and extremely interesting. The topics covered included: digitisation techniques, image enhancement, feature extraction, expert systems, neural network and classical image processing for diagnosis as well as invasive and non-invasive imaging techniques. There was also a talk on diagnosis standardisation and factors affecting diagnosis from the medical view point. After all the presentations there was a discussion on the issues and problems of creating an image database, image acquisition and image annotation for example using hypertext.

There was also an interesting tour of the IBM UK Scientific Center. The meeting was most enjoyable. IBM were excellent hosts organising very pleasant meals and accommodation. Animated discussion went on after dinner until late in the night.

Anyone interested in supporting this activity, please contact: Dr Sue Astley, Wolfson Image Analysis Unit, Department of Medical Biophysics, University of Manchester, Stopford Building, Oxford Road, Manchester M13 9PT, or email her at: sue@wiau.mb.man.ac.uk.
Margaret Varga
Royal Signals and Radar Establishment, Malvern

NIPS 91

The 5th NIPS inter-disciplinary conference on Neural Information Processing Systems will be held in Denver CO. from 2-5 December 1991, preceded by an afternoon of tutorials and followed by two days of focused workshops at a nearby resort area. Major categories are: Neuroscience; Theory; Implementation and Simulation; Algorithms and Architecture; Cognitive Science and AI; Visual Processing; Speech and Signal Processing; Control, Navigation and Planning; and Applications. Plenary, contributed and poster sessions will be held. There will be no parallel sessions. The full text of presented papers will be published. Original research contributions are solicited, and will be carefully refereed. Authors must submit six copies of both a 1000-word (or less) summary and six copies of a separate single- page 50-100 word abstract clearly stating their results, by May 17, 1991. Summaries are for program committee use only. At the bottom of each abstract page and on the first summary page indicate preference for oral or poster presentation and specify one of the above nine broad categories and, if appropriate, sub-categories (For example: Poster, Applications- Expert Systems; Oral, Implementation-Analog VLSI). Include addresses of all authors at the front of the summary and the abstract and indicate to which author correspondence should be addressed.

Mail Submissions To: Stephen J. Hanson NIPS 91 Submissions Siemens Research Center 755 College Road East Princeton NJ, 08540, USA. Mail For Registration Material To: NIPS 91 Registration Siemens Research Center 755 College Road East Princeton, NJ, 08540, USA.
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RSRE Malvern (Bridle@RSRE.MoD.UK) UK liaison.

CVPR 91, Maui, Hawaii, USA

This conference is due to take place between 3-6 June 1991 at Lahaina on the island of Maui in the state of Hawaii. The main program contains about 100 oral and 50 poster papers. The invited speakers are Professor R Brooks (MIT) -*Small Autonomous Robots*, Professor A Barr (Caltech) - *Teleological Computer Graphics Models* and Dr K Stewart (Woods Hole Oceanographic Institute) - *Remote Sensing Issues for Intelligent Underwater Systems*.

There are four pre-conference tutorials on Task-Based Vision, Architectures for Computer Vision, Psychophysics, and, Computational Geometry. In addition there is also a two-day pre-conference workshop on Directions in Automated CAD-Based Vision, which takes place between 2-3 June.

Details can be obtained from IEEE Computer Society, 1730 Masachusetts Avenue, Washington, DC 20036-1903, USA.

SCIA 91, Aalborg, Denmark

This conference will take place in Aalborg, Denmark between 13-16 August 1991. The list of invited talks is both extensive and impressive. The speakers and titles are J Crowley (INPG, Grenoble) - *Vision and Robotics*, I Biedermann - *Human Vision Understanding*, A Hanson (University of Masachusetts) - *Knowledge Based Vision*, J Koenderinck (Utrecht) - *Scale Space Analysis*, P Besl (General Motors) - *Range Image Analysis*, and

R Haydn (Munich) - *Remote Sensing.* Ruzena Bajcsy (Pennsylvania) will be the after dinner speaker.

Details and registration can be obtained from 7 SCIA Conference Secretariat, Aalborg Tourist Bureau, Oesteree 8, Aalborg, DK 9000.

BMVA Conference

This is our *raison d'etre.* So get out your filofaxes and indelibly mark-in, and then highlight, BMVC 91 for 23, 24, 25 and 26 September. The conference is being hosted by the Turing Institute in Glasgow. The programme will contain regular oral presentations and posters. The invited speakers include Demetri Terzopoulos. It is now too late to submit a paper. Dr Peter Mowforth the Programme Chairman reports a very healthy paper submission rate with over 100 already received and many more promised! He is anticipating a high quality event.

The contacts are Dr Peter Mowforth for programme details and Tanya Oliver for registration. Both can be contacted at BMVC 91, Turing Institute, George House, North Hanover Street, Glasgow G12 AD (telephone 041 552 6400). Reduced price registrations can be obtained up to 19 July.

IEE Image Processing Conference

The fourth IEE International Conference on Image Processing and its Applications will take place at Maastricht, The Netherlands between 7 and 9 Aprail 1992. The scope of the conference is broad. It covers the theory, implementation and applications of image processing. Results on all types of multidimensional image data (e.g. visual, infrared, radar or sonar) are elicited.

There will be oral and poster sessions plus an exhibition. The working language is English. Bursaries and Scholarships are available for non-UK residents and student members of the IEE.

Synopses of oral or poster papers should be submitted to the IEE Conference Services Department, Savoy Place, London WC2R QBL by 12 June 1991 at the latest. These should consist of a minimum of 2 A4 pages. Selected papers are required in full form (up to 4000 words) by 29 November 1991.

11th ICPR- The Hague

The eleventh ICPR will take place in the Hague between August 30 and September 3 1992. This is again to be held as an umbrella event with specialist conferences on Computer Vision, Pattern Recognition, Architectures, and, Image, Speech and signal Analysis. All four conferences will share social functions and will be included in the same published proceedings. There will be oral and poster sessions. Contributions in the fields of remote sensing, medicine, robotics and industrial applications are especially welcome.

Paper submission is in the form of an 2500 word extended abstract. These should reach the Conference Secretariat, Delft University of Technology, Department of Electrical Engineering, PO Box 5031, 2600 GA Delft, The Netherlands by 31 October 1991.

Future BMVA Programme.

The following is a list of BMVA meetings currently planned

- 19 June 1991 *"Applications of Machine Vision to Medicine, Remote Sensing and Surveillance."*
- 16 July 1991 *"Image Compression"*
- 23-26 September 1991 *BMVC91*
- 23 October 1991 *"Natural Vision"*
- 20 November 1991 *"Active Vision"*:
- 11 December 1991 *"Rigorous Neural Nets"*

The majority of meetings will be in Central London and are scheduled as one-day events. No registration fee is payable by BMVA members although a charge of £5 will be levied for non-members (unless they are members of a co-sponsoring organisation). Arranged lunches will be available on prior registration but a small fee may be payable for these. Fuller details including final programme will be mailed to members nearer the time of each meeting.

The programme for 1992 is presently being planned and will be published in the next newsletter.

DIARY

27-30 May 1991 International Conference on Visual Form, Capri, Italy.
28 May 1991 IEE Colloquim on "Adaptive interpolation in images.", London.
3-6 June 1991 Int Conf on Computer Vision and Pattern Recognition, Hawaii
13-16 August 1991 7th Scandinavian Conference on Image Analysis, Aalborg, Denmark
4-6 September 1991 6th Int Conf on Image Analysis and Processing, Como, Italy
23-26 September 1991 2nd British Machine Vision Conference, Glasgow