BMVA News

BMVA News[1] is published every three months. Contributions on any activity related to machine vision or pattern recognition are eagerly sought. These could include reports on technical activities such as conferences, workshops or other meetings. Items of timely or topical interest are also particularly welcome; these might include details of funding initiatives, programmatic reports from ongoing projects and standards activities. Items for the next edition should reach the editor by 22nd October 1999.

Contents

Computer Vision Summer School '99

The BMVA held another Summer School for Computer Vision at the University of Surrey. Forty-five doctoral students attended, eagerly awaiting the knowledge of the experts in the field. This came in the form of lectures, tutorials and practicals on various topics in the areas of computer vision, image processing and pattern recognition. The course was very well organised by Maria Petrou from the University of Surrey.

The course was residential over five days in Guildford, so for me it meant jumping on a plane and finding my way to the university. Awaiting everyone's arrival, as more and more males filled the room, I was wondering what all the females in research were doing! Nevertheless the three of us females who did attend were later rewarded for our 'courage' (!!) and endurance throughout - more to follow later on this one!

Having the registration and initial introductions out of the way, we were shown to our accommodation. Following this we had our first meal of the week - not the usual kind of food like beans and toast us students are used to - so it was thoroughly enjoyed by all. We had our first lecture on *Image Formation* by Tim Ellis. Next on schedule was dinner followed by an evening of poster presentations where everyone contributed. The topics ranged from Interactive Talking Faces to Maritime Tracking and a prize was promised for the best or most interesting poster. The

evening concluded with everyone re-grouping at the Student's Union bar.

Day two and what had we on offer? First we had Maria Petrou endeavouring to enlighten us on the topic of *Low-Level Image Processing*. Some found the mathematics bewildering - it seemed fine for me as my degree was Mathematics. Following this Bernard Buxton told us his views on *Image Modelling*. Loads of pictures to look at but the theory took time to sink in! In the middle of this hectic day Adrian Clark gave a much-needed break from theory with a discussion on *Software Tools for Vision*. We were advised on certain packages and software, where MatLab and C / C++ seemed to get the most votes. Generally we were told that correctness is the most important virtue in writing code even if it means that extra effort.

Moving on, we had a lab session on the use of *Khoros* and *MatLab*. MatLab came up trumps although the results did not always come out the way they were supposed to! Khoros did not seem to work on the 1st, 2nd or 3rd attempts so most seemed to give up. Well day two still wasn't quite complete - we still had *Biological Vision* to live through. The thought of it was worse than the actual experience itself. The talk by Mark Bradshaw turned out to be one of the most interesting and thought provoking of the week. We were exposed to visual illusions and demonstrations, an example of which was the 'swinging room', while other experiments led to neighbours' noses expanding and such like! At the much-awaited close of the day - many again retired to the bar.

Day three and luckily only four lectures in all, the first of which was given by Maria Petrou on the subject of *Theory versus Ad Hoc*. This incorporated many do's and don'ts. Again a lot of mathematics – it felt like home! Neil Thacker took over for the next four and a half hours with a break for lunch. He spoke on *Neural Networks and Performance Characterisation*. Many still didn't quite understand the neural networks idea by the end of the first lecture although the second was more easily understood. Generally the main idea seemed to be to test algorithms on a lot of images and to make programs and data available on the Internet for others to test and use.

To finish the days' lectures Stuart Robson delivered a lecture on *Photogrammetry and Computer Vision*. A well presented set of slides helped revitalise some of us and most appreciated a 'skip-over' of the mathematics theory behind the ideas. Example applications and more pictures kept us amused, although the kidney and liver pictures didn't do much for our appetites for the school dinner! So after a wel-

comed break for a rest, the school dinner arrived. A well-deserved prize was awarded to Dave Dupplaw of Southampton for the best poster. During the dinner many enjoyed the free sherry and wine, after which the Student's Union was again given the daily trip. Everyone went on to a bar in town with some carrying on into the early hours boogying the night away (in cages!!!) in a local club. Others retired to kitchens on campus for light-hearted early morning discussions.

Many stories unravelled on day four of the previous nights' antics. Gladly (in terms of theory) this was the last full day of lectures. Josef Kitler lectured on *Statistical Decision Making*. A lecture followed on *Multiple View Geometry*, which was excellently delivered by Andrew Fitzgibbon. Well-explained diagrams and theory left no one with any doubts about projective transformations. Ian Reid's lecture on Active Vision was one of the most interesting for me in particular as it touched on the basis of my own research – the algorithms for the computation of optical flow.

Nearly there – Patrick Courtney delivered a lecture entitled *'From the Lab to Real Life'*. This generally covered the ideas involved on the transition from research life to industry life. The day drew to a close with a light talk on *'How to write a good paper'* by John Illingworth. Advice on presentations, paper writing and attendance of conferences was all attentively listened to.

The evening's entertainment incorporated an awards ceremony in the Student's Union. The students resident at Surrey, who were also attending the summer school, produced awards certificates and proceeded to award them to the following people for expertise in certain areas: Abdul Sayeed – Medical Excellence Award; Anil Rao – 'Shmoooooothe' Award; Gavin Powell – Road Inspection Award; Joss Knight – John Travolta Award; Joan Graham, Sarah Porter, Melanie Harvey – Oestrogen Award; Paul Fermor – Personal Restraint Award.

Only those who actually attended the school will know exactly why these people were awarded such awards. Such information cannot be disclosed at this stage!! Following the awards ceremony on the Thursday evening some carried on drinking into the early hours while others retired to their rooms to start packing for home!

After a tiring and indeed 'intensive' week, the last day was warmly greeted with only one lecture to face and a lab tour. Most made it in for Josef Kitler's lecture on *Statistical Pattern Recognition in Image Analysis*. The lab tour followed which was extremely

interesting – it included topics like Mobile Robotics and Biometrics. This saw in the end of the '99 Summer School at Surrey. A final lunch was enjoyed by all before we said our goodbyes and agreed to set up a mail system through which the '99 Summer School attendees could keep in contact. The week turned out to be an enjoyable and most rewarding experience.

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Do many cameras make light work?

This one-day BMVA meeting was held on the 26th May at the British Institute of Radiology. The meeting was jointly supported by the BMVA and Photogrammetric Society, and was a repeat of a previous successful joint event. The organisers were Tim Ellis and Stuart Robson.

Many of us don't pre-register for these events and cheerfully turn up on the day. However I got a rude shock the day before when informed by `bmva@mailbase.ac.uk` that the meeting was "sold out". Obviously a popular topic!

The meeting was opened by Ian Reid with an excellent multimedia tutorial on self-calibration. My understanding of degenerate dual-space disc quadrics was much improved, although I don't see why he was so fixated on points at infinity? Ian concluded by analysing a painting entitled "The Flagellation of Christ" from the Italian Renaissance. A bit more highbrow than his World Cup '66 obsession...

Phil Maclauchlan followed with a talk on gauge ambiguities. Gauge freedoms have been prominent in particle physics recently, and what the heck, why not computer vision too? The problem is a coordinate frame ambiguity leading to rank deficiency. Phil presented an approach to deal with this. He concluded with a plug for his public domain software library "Horatio". Phil revealed that he has uncovered a new level of mathematical proof, "because Bill Triggs says so!"

In Pompeii mosaics of skulls were used to remind people to enjoy life while they had the chance. Tim Niblett from the Turing Institute uses a 3D model of a skull instead. He cheerfully revealed that most of his data is rubbish, but his surface integration routine integrates only the good pixels. The important thing is always to know where the model isnt!

If you liked Phil Maclauchlan, you'll love the sequel. Phil Maclauchlan II addressed the incorporation of surface constraints into scene reconstruction.

After lunch Tim Clarke spoke up for the photogrammetrists, giving an illuminating survey of the field from 1910-2000. He made the point that PG people aim for error estimates that are real, not just spat out of a bundle adjustment. In subsequent questioning he was more sympathetic to self-validation techniques, but argued that these are to generate trust amongst external users.

Kia Ng of Leeds introduced the ACTS project RESOLV. The project has autonomous and non-autonomous capture platforms following the standard paradigm of "acquire, register, integrate, triangulate, texture map, select viewpoint and navigate." A variety of results were shown and the audience became intimate with his bosses lounge.

Julian Norton from As-Built Solutions gave an upbeat presentation of his companies software products for site capture. The system is based on capture of image archives containing up to a million images, combined with photogrammetric measurement. The company has clearly done well over its five year lifetime.

Neil Woodhouse of UCL gave the last talk, [although the audience watched his PC reboot and perform a disk recovery with some apprehension]. His multimedia talk was worth the trouble. I confess that I don't really know what a Department of Geomatic Engineering is. They do seem to do a lot of machine vision including reconstruction and mosaicing.

In discussion several people grappled with the question "What is the difference between photogrammetry and machine vision?" Answers include:

1. MV gets lots of funding. [True.]

2. PG does proper systematic validation by independent measurement. [True.]

3. PG does geometry, MV does interpretation. [False.]

4. MV is automatic, PG manual. [False.]

5. PG design a capture geometry to achieve a goal, MV takes what it gets. [True.]

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Industrial Inspection

One Day BMVA/UKIVA Technical Meeting at British Institute of Radiology, London, UK on 1st Dec 1998

Industrial Inspection is one of the most profitable areas of Computer Vision as it is one of the few areas which can truly provide working, practical, real-world solutions to real-world problems. It combines image acquisition devices, high-speed computers, simple and complex algorithms, and robotics to oversee and automate manufacturing processes.

The British Machine Vision Association will be holding a one-day Technical Meeting on Industrial Inspection at the British Institute of Radiology in London, on Dec 1st 1999. The aim of this meeting is to bring together a number of talks on the application of novel image processing and computer vision techniques to solve real-world problems. Academic and Industrial contributors are equally welcome. Prospective contributors should submit a short (100 words) abstract describing their recent or current work in this area. The deadline for contributions is September 10th, 1999.

Submissions should be made by email, fax or post using the details below.

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[See www.bmva.ac.uk/meetings for the latest list of forthcoming BMVA technical meetings – Ed.]

MICCAI 99

The Medical Image Computing and Computer-Assisted Intervention Conference (MICCAI) will be held in Cambridge, England, 19–22 September 1999. MICCAI has become the premier large-scale conference with in-depth papers on medical image computing and computer-assisted intervention including robotics. It brings together scientists and clinicians. The focus is on the introduction of new image computing and image-guided intervention techniques into clinical practice and their validation. Clinicians as well as scientists attend the conference and are involved in its organisation. Many papers are jointly authored by clinicians and basic scientists. Presentations are run as a single track, without parallel sessions. For further information please visit our web page http://neuromedia.ukc.ac.uk/miccai99/ or email us for further information at miccai99@ukc.ac.uk

BMVC 99

The 10th British Machine Vision Conference

The University of Nottingham

13–16 September 1999

The British Machine Vision Conference is the main UK conference on machine vision and related areas. BMVC 99, the tenth BMVC, will be held from September 13th to 16th 1999 at The University of Nottingham, Nottingham, UK. The Conference will comprise high- quality papers describing recent and novel research on aspects of computer vision, image analysis, image processing and pattern recognition. BMVC 99 will be a single-track meeting with both oral and poster presentations and demonstrations. A selection of the best papers will be published separately in a special issue of Image and Vision Computing.

Keynote presentations will be given by Dr Richard Szeliski (Microsoft Research) and Dr Dimitris Metaxas (University of Pennsylvania). A Tutorial, "Fusion of Information", will be given by Profs. Maria Petrou and Josef Kittler of the University of Surrey. On Industry Day formal conference presentations will mainly involve papers illustrating the practical uses of machine vision. Delegates will also be able to view poster presentations and see demonstrations by both industrial and academic researchers.
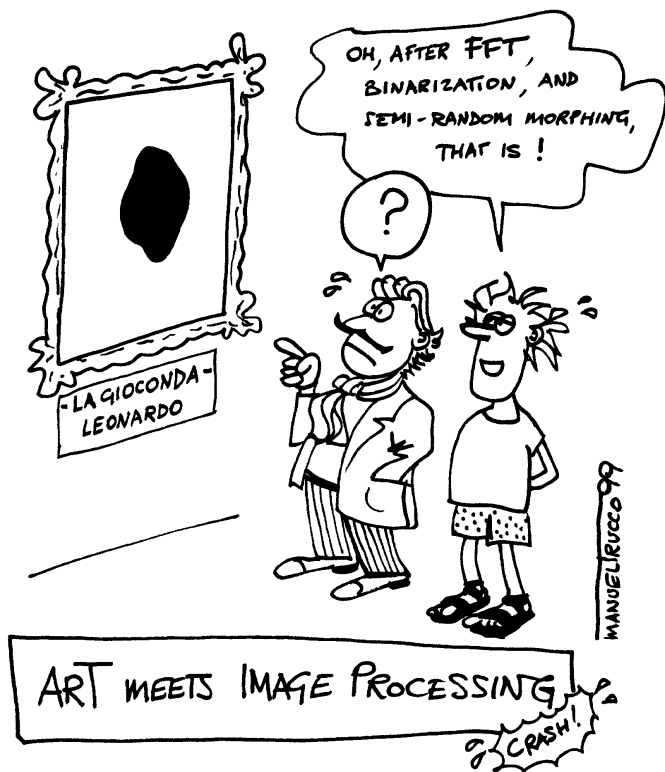
Accommodation will be available in Cripps and Wortley Halls on the University's University Park Campus close to the centre of the historic city of Nottingham. This year's Conference Dinner will be held in the Banqueting Suite at Trent Bridge Cricket Ground.

Road, rail and air links to Nottingham are plentiful so we look forward to seeing you here for BMVC99.

For further details contact the Conference Administrator Miss Caroline Brierley-Banga at `caroline.brierley-banga@nottingham.ac.uk` or visit `http://www.nott.ac.uk/meom/bmvc99.html`

Art and Representation

by John Willats

Princeton University Press, 1997

There are many areas in the study of fine Art which are fascinating to the image processing community. We see strange perspective systems, carefully constructed image constructions and are drawn into analysing their form. This book presents a wide range of analysis techniques drawn not only from art historians but also psychologists and image processing researchers. Initially it covers projection systems, topology, picture primitives such as regions and lines, using a good range of examples. An illustration of his varied approach to the different topics is that you can see references to Marr as well as Van Gogh in the following section on picture representation. There is also a frequent and fascinating link to his work on children's drawings, which is used to good effect in the section on the processes of picture production. By this stage it is possible to wish for more images of paintings, as there are frequent references in the book which can not be included because of space. This can be used as a good excuse to visit a few galleries! Proceeding to the functions of representational systems, marks, texture, symmetry and various styles stimulated my image analysis taste buds. How these change over time usefully draws on children's development once again and leads to a summary of historical changes. There could have been more on colour, which is sadly lacking, but as a book which summarises so much from the world of art analysis it has a lot to offer the image processing researcher.

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Active Shape Model Toolkit

Visual Automation Limited (VAL) has just announced the launch of the Active Shape Model Toolkit for use with the popular MATLAB package. The Active Shape Model (ASM) Toolkit is a powerful tool for analysing varying shapes within images. The Toolkit provides easy-to-use graphical tools that allow users to define, search for, recognise, and make measurements on image objects whose shape can vary.

The ASM Toolkit incorporates techniques developed at the University of Manchester, by Dr Tim Cootes of the Wolfson Image Analysis Unit (WIAU). Active Shape Models allow image objects of a general category of shape, such as manufactured components, biological samples, medical organs, etc, to be described by visual models. The Toolkit is designed to tackle a wide range of 2D visual inspection tasks, including detection, recognition, measurement, classification, and tracking.

The Active Shape Model techniques have already been successfully incorporated into systems performing quality control on manufactured components, examining medical images, and the processing of human faces.

The ASM Toolkit is offered as an add-on product for use with MATLAB 5.2 and will run with Windows 95/NT and Solaris 2.5. It comes complete with user documentation and example images.

Visual Automation Limited is based in the Medical School of the University of Manchester. Founded in 1993, Visual Automation has established a solid track record of applying advanced techniques to real problems in the manufacturing, biotechnology, entertainment, and pharmaceutical industries.

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PhD EPSRC CASE Studentship

Brunel University Vision and VR Lab

Markerless Based Human Motion Capture and Human Simulation

Applications are invited for a PhD Studentship at Brunel University to work on the subject, but not limited to, Markerless based Human Motion Capture. This 3 year EPSRC CASE studentship in association with Televirtual Ltd, is concerned with extracting 3D structural motion about the human body and its applications to tracking and human simulation. The starting date is October 1999.

The student will work in close contact with Televirtual Ltd (Norwich) and will be instructed in the use of their 7-camera motion capture studio, with the strong possibility of a career with Televirtual upon completion. The studentship covers the tuition fees for the student and a maintenance grant of £11,060 per annum.

The group currently has research interests in

- Human Motion Capture
- Deformable Object Tracking
- Gesture Recognition
- Augmented/Virtual Reality
- Smart Room Technology

Applications are invited from suitably qualified candidates in any numerical discipline. However, preference will be given to candidates who demonstrate enthusiasm for working in Computer Vision, 3D Computer Graphics and the media production industry.

Do you wish to continue your study in an interesting and exciting field which will ensure they acquire cutting edge skills in for the next generation of IT? Do you want to enjoy your research and make a significant contribution to science? Do you have excellent problem solving abilities, good communication skills and require a career that meets your requirements? Do you want to enjoy your PhD?

Candidates should hold or expect to obtain a first or upper second class degree in a numerate discipline. Informal enquiries may be made to Richard Bowden by telephone 01895 274000 ex 2699 or via email to richard.bowden@brunel.ac.uk. Applications in the form of a CV and covering letter (2 copies) stating your suitability and the names and addresses of two referees should be sent to Richard Bowden, Vision and VR Group, Dept M & ES, Brunel University, Uxbridge, Middlesex, UB8 3PH.

Post-doctoral RA and PhD Studentship

Medical Image Processing

University of Wales – Bangor

School of Electronic Engineering and Computer Systems

This EPSRC-funded project aims to develop an objective aid to skin tumour diagnosis by combining image information from the analysis of skin surface features extracted from high resolution optical images and from new types of ultrasound images. The work will be carried out in collaboration with the Institute of Cancer Research, Sutton. The optical and ultrasound image capture and system test

will be carried out at Sutton and the image analysis at Bangor. The work at Bangor will involve the development of image analysis algorithms for image segmentation, determination of skin-pattern disruption and colour changes by malignant skin lesions, image simulation software for algorithm testing and artefact correction/elimination algorithms.

Both positions are 3 year fixed term available from 1st October 1999 The Research Fellow will be paid on the RA1 scale and the studentship is under standard EPSRC conditions. Informal enquiries to Andy Duller (01248 382716, `andy@sees.bangor.ac.uk`) or Peter Fish (01248 382753, `fish@sees.bangor.ac.uk`).