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 1 December 2003.

Contents

Editorial: *Some Thoughts on Prize Papers*

The conference season is now over and most of us are back at our desks or in our laboratories thinking about new research and possible future publications. However, it is instructive to think back not only to the criteria for acceptance of papers at conferences, but also to what makes a good paper. Some notable examples are illustrated by the list of prizes and awards presented at BMVC 2003 (see overleaf). To decide on these, members of the BMVC Committee separately considered the best twenty or so papers submitted to the Conference and made their own short-lists for prizes. The suggestions were pooled at a meeting held on the first evening of the Conference, and after considerable discussion – I hesitate to say argument – the final selection was made. In fact, the result was fair and unanimous, every member of the Committee having plenty of chance to make his feelings known.

Yet selecting papers for prizes is an extremely difficult task. First, there is the obvious problem that papers are as different as chalk and cheese, so that they are being compared on a linear scale when they should be characterised by profiles in a multi-dimensional space (and I would not insult the knowledge of the readership by trying to lecture on that aspect here in just a few lines). This aspect adds difficulty, but there is another aspect that warrants special attention, for papers at the very top of the list. Indeed, the Committee asked themselves the very question as to whether in 10 years time they might regret missing a paper that is in some sense a breakthrough and a substantive step forward in the subject. In some cases, such papers can only be identified in retrospect: they are the ones that anticipate a new direction or fashion in the subject, and prove in

the fullness of time to be truly original. Yet at the point when they are introduced, even for special committees set up for the purpose, it is extremely difficult to spot such papers. And then, one member of the committee might think he's spotted one, only to be told by others that he's wrong, or that another paper is even better placed for such an accolade, or that there's too much risk in a particular judgement. In addition, one can have the *feeling* that a paper is in this special category, but not at that point in time be able to say cogently why. Indeed, one could imagine that in time the methodology it introduces may turn out to be applicable only in a limited regime, so that it may not live up to its original promise.

My own personal bet for a landmark paper – which if anything has strengthened since BMVC – is that by Torr and Fitzgibbon. For authoritative writing it is unsurpassed, a possible weakness being the relative lack of supporting experimental data. Yet its incisiveness in overcoming the hitherto unassailable advantage and even the need for the 8-point algorithm, and logically stripping away various alternative strategies, all seemed to me quite remarkable. I have a feeling we'll be hearing a lot more about this interesting way forward!

Professor Roy Davies
Editor, BMVA News
email: e.r.davies@rhul.ac.uk

Report on BMVC 2003

This year's BMVC was held in Norwich. One hundred and twelve delegates were registered for the two-and-a-half day conference, with extra visitors on the Wednesday – which coincided with a meeting organised by the Faraday Imaging Partnership. An innovation this year was the BMVC Art Show, which featured works both from conference delegates and from other interested parties. At dinner, over a glass of Nelson's Blood, the conference awarded the following prizes:

- Best Science Prize: Philip A. Tresadern and Ian Reid for their paper "Synchronising image sequences of non-rigid objects".
- Industry Prize (sponsored by CRS Ltd): John P. Collomosse, David Rowntree and Peter M. Hall for their paper "Video analysis for cartoon-like special effects".
- Model-Based Vision Prize (sponsored by Image-metrics PLC): Craig A. Hack and Chris J. Taylor for their paper "Modelling 'talking head' behaviour".
- Best Poster: J. Andrew Bangham, Stuart E. Gibson and Richard Harvey for their paper "The art of scale-space".

- Best Demonstration: Nicolas Gehrig, Vincent Lepetit and Pascal Fua for their paper "Visual golf club tracking for enhanced swing analysis".

Additionally, the Sullivan Thesis Prize was announced (Rhodri Davies for his thesis "Learning shape: optimal models for analysing shape variability"); and there was a presentation to Professor Josef Kittler who was awarded the BMVA Distinguished Fellow Award.

Extra copies of the proceedings are available from Richard Harvey (rwh@cmp.uea.ac.uk) priced £50 plus P&P.

Dr Richard Harvey
University of East Anglia
email: r.w.harvey@uea.ac.uk
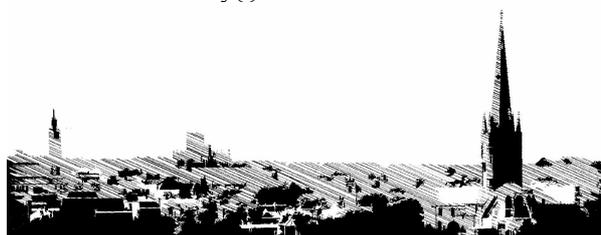
Meeting on Machine Learning

Pattern Recognition and Machine Learning in Machine Vision

One-Day BMVA symposium in London, UK on 17 December 2003: Call for Participation

To be chaired by: Richard Harvey (Univ. of East Anglia) and Charles Taylor (Univ. of Leeds)
http://www.bmva.ac.uk/meetings

Machine Learning has historically been taken to encompass automatic computing procedures based on logical or binary operations, that learn a task from a series of examples. Attention initially focussed on decision-tree approaches, but later developments included genetic algorithms, neural networks, support vector machines, and inductive logic procedures, which allow more general types of data. The task at hand is usually classification or pattern recognition, but can also be prediction (of real-valued outcomes) or clustering. In Machine Vision, feature selection and feature extraction are critical components for machine learning methods, since images live in very high-dimensional space.

The purpose of this meeting is to bring together researchers interested in specific applications of

Machine Learning in Machine Vision. Topics of interest will include those listed above as well as measures of performance evaluation, and application of recent ML advances, such as boosting.

Please submit an extended summary of about one A4-sized page (no longer than two pages) in length (PDF preferred) and which includes links or pointers to web-based illustrations, demonstration material or papers giving more details.

Please submit the extended summary by email attachment (1 Mb max please!) to Charles Taylor (c.c.taylor@leeds.ac.uk) by 17:00 on Friday, 26 September 2003.

> Dr Daniel Alexander
> University College, London
> email: d.alexander@cs.ucl.ac.uk

New BMVA Committee

The following stepped down after two years service:

Dr Tim Ellis
Professor Maria Petrou
Dr Richard Bowden
Professor Roy Davies
Dr Charles Taylor

(Our thanks to them all)

The newly elected members of the committee are:

Professor Roy Davies
Dr Peter Hall
Dr Andrew Fitzgibbon
Dr James Ferryman
Dr Richard Bowden

Those elected in 2002 were:

Professor Josef Kittler
Dr David Marshall
Dr Tim Cootes
Dr Mike Chantler
Dr Adrian Clark

> Dr Tim Cootes
> University of Manchester
> email: tim.cootes@man.ac.uk

Crime Prevention Meeting

The Imaging Faraday Partnership (www.imagingfp.org.uk) and the BMVA are hosting a joint technical meeting on security imaging technologies, which will take place on 19 November 2003 at the Royal College of Pathologists in Central London.

The meeting will cover a diverse range of security imaging technologies ranging from smart CCTV systems to concealed weapons detection – technologies being developed collaboratively through UK universities, government departments, SME manufacturers and end-users of the technologies. The meeting will feature the following presentations:

1. The Police Scientific Development Branch (PSDB) who will be talking about the development of their intelligent CCTV test database – VITAL which will be used by both industry, academia and the Home Office to test and train algorithms for tasks such as event detection, people tracking and human behavioural analysis.

2. Kingston University will demonstrate intelligent image classification techniques as well as an overview of their current security and surveillance projects under development at the Digital Image Research Centre.

3. EPSRC will be presenting their Crime Prevention and Detection Programme, including imaging themes highlighted for the third call to be launched in early 2004.

4. Image Scan Holdings will be talking about some of their recent work on 3D X-ray baggage-scanning systems.

5. Visionmetrics Ltd and the University of Kent will be demonstrating eigenfaces for the use of generating photo-quality facial composites.

6. JVC will give an overview of Internet based CCTV systems and live demonstration of IP based camera tracking with remote image access.

7. QinetiQ (Malvern) and Heriot-Watt University will give a joint presentation on mm wave imaging for automatic detection and visualisation of concealed weapons.

8. University of Manchester will be presenting their work with the Greater Manchester Police on the use of virtual reality for crime scene reconstruction using automatic computer-vision techniques to aid in the extraction of geometric and illumination information from image sequences

The Imaging Faraday Partnership brings together ideas, people and resources from research organisations, intermediaries and industry/business in order to engage industry and researchers in an exchange of knowledge and experiences and to ensure the exploitation of collaborative research. The Partnership assists organisations in developing underpinning research to enable new technologies to be robustly applied in commercial environments and offers both companies and universities funding advice, project management services and technology and market roadmapping activities.

There is no fee to attend this joint technical meeting with the BMVA, however we hope you would subsequently like to join the Imaging Faraday Partnership and benefit from both the technology awareness and networking opportunities provided through membership. Places are limited, if you or a colleague would like to attend please and find out more about the Partnership, please contact Dr Noel Brahma at Sira Innovation Ltd on: noel.brahma@sira.co.uk.

Dr Noel Brahma
Sira Innovation Ltd
email: noel.brahma@sira.co.uk

Dr Mike Chantler
Heriot-Watt University
email: m.j.chantler@hw.ac.uk

MIUA 2003

The Medical Image Understanding and Analysis 2003 (MIUA 2003) was held at the University of Sheffield on 10–11 July. Set in pleasant surroundings within the City of Sheffield, this was the 7th annual meeting, designed to provide a forum for the discussion of medical imaging topics.

Submissions covered a wide range of imaging and analysis techniques ranging from 3D Ultrasound to retinal image registration and endoscopy to genetic programming. Attendance was predominantly UK based and from a variety of medical, vision and industrial backgrounds. The atmosphere was very friendly and the format of the meeting provided ample time to meet and discuss current and future work on an informal basis.

The committee awarded Maria Lorenzo-Valdes from Imperial College London the "Best Presentation" prize for her presentation on "Segmentation of cardiac MR images using a 4D probabilistic atlas and the EM algorithm". Jeong-Gyoo Kim from the University of Oxford was given the "Best Poster" award for work entitled "Modelling an average planar shape", narrowly receiving more votes than Philip Allen *et al*. from the University of Manchester with "Computer based system for acquisition and analysis of nailfold capillary images".

Thanks go to Professor David Barber at the Royal Hallamshire Hospital, Sheffield for organising the event and all the people behind the scenes for ensuring that everything ran smoothly. Thanks also to the BMVA for providing funding for me to attend this informative gathering which I found to be both interesting and stimulating.

Robert King
University of Surrey
email: r.king@eim.surrey.ac.uk

Call For Papers: ICPR 2004

17th International Conference on Pattern Recognition hosted by the BMVA

Cambridge, United Kingdom
23–26 August 2004

ICPR 2004 is the 17th conference of the International Association for Pattern Recognition (IAPR). Started in 1973, ICPR is a major biennial event, aiming to stimulate research, development, and the application of pattern recognition, and to advance international co-operation in related disciplines.

The ICPR 2004 Theme is "Pattern Recognition in the Digital World". The conference will provide an international forum for discussions on recent advances in the fields of:

- computer vision and robotics
- pattern recognition
- neural networks
- image and signal processing,
- architectures, technology and tools for pattern recognition and image processing
- applications
  - biomedical, multimedia, document analysis,
  - remote sensing, biometrics, e-commerce
  - industrial automation, others

The conference programme will be organised into five tracks. For a detailed list of topics and the paper submission procedure, please visit:

http://www.ee.surrey.ac.uk/icpr2004/

ICPR 2004 will take place in Cambridge, in the heart of the UK. In addition to the technical program, participants can also enjoy the City with its culture and old English tradition. This historic City with its world-renowned University is within easy travelling distance from the main international airports in London and is extremely well served by rail and coach services.

Cambridge can boast of ancient monuments, a wealth of museums and galleries, as well as its famous book-shops and markets. Visitors should walk along the famous grass-covered banks of the River Cam or take a lazy summer punt along the river and enjoy the architectural glories of the riverside colleges. The best known of all Cambridge buildings is Kings College Chapel, with its world-famous choir.

Important Dates

Full paper submissions due: 15 December 2003
Notification of acceptance: 15 April 2004
Final camera-ready papers due: 15 May 2004

The paper page limit is 4 pages. Anonymous papers should be written in English and submitted in PDF format. Formatting instructions provided by the IEEE Computer Society Press are available from the ICPR 2004 conference website (see below).

Registration

Information on registration for the conference will be posted on the conference website in due course:

http://www.ee.surrey.ac.uk/icpr04/

Technical Programme Committee

General Programme Committee Chair: Maria Petrou, Univ. of Surrey, UK

TRACK ONE: Computer Vision, with associated theme: Machine Vision Applications
CHAIRS: Edwin Hancock, Univ. of York, UK, Mike Brady, Univ. of Oxford, UK, Yuichi Ohta, Univ. of Tsukuba, Japan

TRACK TWO: Pattern Recognition and Neural Networks, with associated theme: Document Analysis
CHAIRS: Anil K. Jain, Michigan State Univ., USA, Horst Bunke, Univ. of Bern, Switzerland

TRACK THREE: Image and Signal Processing with associated theme: Medical Applications
CHAIRS: Josef Bigun, Univ. of Halmstad, Sweden, Vaclav Hlavac, Czech Technical Univ., Prague, Czech Republic, Chris Taylor, Univ. of Manchester, UK

TRACK FOUR: Multimedia Systems, with associated theme: Image and Video Database Retrieval
CHAIRS: Thomas Huang, Univ. of Urbana, Champagne, USA, Alberto Del Bimbo, Univ. of Florence, Italy, Ruud Bolle, IBM, USA

TRACK FIVE: Architectures, Technology and Tools
CHAIRS: Virginio Cantoni, Univ. of Pavia, Italy, Markus Vincze, Vienna Univ. of Technology, Austria

Organising Committee

General Chair: Josef Kittler, Univ. of Surrey, UK
Technical Chair: Maria Petrou, Univ. of Surrey, UK
Conference Manager: Rachel Gartshore, Univ. of Surrey, UK
Tutorials Chair: Richard Harvey, Univ. of East Anglia, UK
Satellite Workshops Chair: Andrew Fitzgibbon, Univ. of Oxford, UK
Publications Chair: Mark Nixon, Univ. of Southampton, UK
Publicity and Sponsorship Chair: Majid Mirmehdi, Univ. of Bristol, UK
Demos Chair: Adrian Clark, Univ. of Essex, UK

ICPR 2004 website:
http://www.ee.surrey.ac.uk/icpr04/

Dr Majid Mirmehdi
University of Bristol
email: m.mirmehdi@cs.bris.ac.uk

Report on ICIAP 2003

Mantova, England, 17–19 September 2003

The 12th International Conference on Image Analysis and Processing Conference, held bi-annually since 1980, was held in Mantova from 17 to 18 September. The conference, organised by GIRPR the Italian Chapter of the International Association for Pattern Recognition, was chaired by Marco Ferretti (Univ. of Pavia) and provided a single track of podium presentations over three full days. This year 45 podium

presentations were scheduled, and a total of 71 poster papers were available to conference delegates attending from 26 countries, a further proof of the conference's established international status.

The conference provided a well-structured and coherent program of talks and posters representing a good selection of the latest research in the theoretical foundation and real life applications in the field of Pattern Recognition. The conference program was organised into subject areas associated with shape analysis, face recognition, 3D and statistical extraction, Hough and voting based methods, segmentation, matching, 3D objects, graphs, video analysis, stereo and 3D matching and finally, applications. In addition, each day started with an invited talk reflecting the main topics of the conference:

- "Multimodal biometric authentication using quality signals in mobile communications" (Josef Bigun, Halmstad Univ. and Chalmers Institute of Technology);
- "Content-based video summarisation and adaption for ubiquitous media access" (Shih-Fu Chang, Department of Electrical Engineering, Columbia Univ.);
- "Modelling the world: the virtualisation pipeline" (Hans-Peter Seidel, Max-Plank Institut für Informatik, Universität des Saarlandes).

The conference venue was the magnificent 18th century Teatro Bibiena, opened with an inaugural concert by Mozart – only fourteen at the time – which proved relaxing and amiable for attendance of the oral presentations. The only criticism of the conference seemed to be the presentation of the posters located in a small side-room up a stairwell and always overlapping a coffee break or oral session, which resulted in a low attendance.

Overall, the conference was well organised and with something to interest everyone. Many speakers provided interesting demonstrations of their work varying from virtual gaze redirection in face images to combining words and object-based visual features in image retrieval to the mantis head camera showing why the praying mantis is so good at catching its prey. The proceedings fill one large softback volume (almost 700 pages) available from the IEEE Computer Society.

Besides the presentations the conference orientated very much around food! Delegates were provided with an excellent lunch each day and on the first evening dinner was provided during a boat trip on one of the three lakes that surround Mantova showing off some amazing views of the beautiful historic town. This was following a guided tour of the Palazzo Ducal, or the Duke's Palace, an outstanding complex with more than 500 rooms, 15 courtyards, little squares and overhanging gardens. On the Thursday night was the conference dinner at Villa Schiarino, a fantastic 8-course feast of Italian food. A welcomed break between courses provided an opportunity to present the best paper award for young authors, in honour of Professor A. Caianiello, which went to Massimiliano Pavan (Univ. of Venice) for the paper "Unsupervised texture segmentation by dominant sets and game dynamics".

Sarah Porter
University of Bristol

Book Review – Starck and Murtagh

Jean-Luc Starck and Fionn Murtagh, Astronomical Image and Data Analysis, Astronomy and Astrophysics Library, Springer-Verlag, 2002, ISBN: 3-540-42885-2, hard-back, 289 pages, 102 figures, including 27 colour plates, and 10 tables. Price 59.95 Euros.

Readers may wonder what the astronomical community have to tell them about image analysis. This book describes the practical knowledge and theory that astronomers have been applying over the years to the analysis of archived photographic and modern CCD images. Astronomy pushes image analysis to the limits in terms of quality and quantity of information that astronomers are trying to extract. Many case examples are given in this book with its ten chapters covering: introduction to application and methods, filtering, deconvolution, detection, compression, multichannel data, entropy, astronomical catalog analysis, multi-resolution data and storage, and the virtual observatory.

In astronomy one of the classic problems image analysis has to cope with is to distinguish between signal (stars, galaxies, faint nebulosity) and noise. The filtering chapter details the different types of noise encountered and the relative merits between the Haar and à trous wavelet transforms. Chapter 3 covers deconvolution, a subject that was extensively revisited and researched shortly after the launch of the Hubble Space Telescope, when it was found that although the mirror had been very precisely figured it had been done so to the wrong shape. This chapter starts from basic deconvolution techniques ranging from the Fourier-quotient method to radio astronomy's CLEAN algorithm, and branches into Bayesian methodology, wavelet-based deconvolution, and super-resolution. Chapter 4 deals with the different aspects of object detection in astronomy. For example how to classify and distinguish between stars and galaxies in images using sixteen quoted parameters. A multiscale vision model approach is also discussed.

Some might consider that astronomers are becoming overwhelmed by astronomical data. The Canada–France–Hawaii telescope for instance has a 16000 × 16000 32-bit MegaCam that produces 1 Gb size images per snap. The total size of image archives from the whole astronomical community is estimated to be in the region of petrabytes. Naturally image compression is now a vital tool for astronomers and Pyramidal Median Transform (PMT) is used for lossy compression of images of up to 270:1; the compression ratio being determined by noise modelling. Illustrations are given of the application of PMT to star/galaxy field images without significant loss of positional or photometric information about stars, nor the degradation of weak background structures.

Like remote sensing, astronomical images are usually captured in multiple wavebands or data cubes, and so Chapter 6 details how to differentiate between signal and noise in multispectral data. Data cube analysis, such as principal component analysis, may be improved by the application of wavelet filtering – for instance the Haar-multichannel transform. The use of entropic image methods is given in the next chapter going from first principles and leading into multiscale entropy filtering, deconvolution, and multichannel filtering. Chapter 8 describes the analysis of astronomical catalog data, for example the 3D distribution of galaxies, how many clusters are present, and the use of graph data structures. Chapter 9 breaks into multi-resolution data storage and retrieval and gives as an example the use of the wavelet transform for finding clusters in bibliographical databases. The final short chapter of three pages covers the Grid, e-science and distributed astronomical databases. The book has six appendices and these give a welcome summary of specific software packages and define some of the transforms and iterations.

I have four minor criticisms. A glossary of abbreviations and astronomical terms would have been helpful for non-astronomers. It would have been nice to include work on image acquisition and analysis in the planetary sciences where similar data quantity problems are encountered. It was surprising not to find much discussion about high-resolution telescopic imaging of solar system objects, or the automated analysis of solar features. Finally, I wish the publishers would release these types of books in paperback to lower the purchase price.

I am very happy to see such an astronomical image analysis book, by these experienced authors, in print. So as to my recommendation to buy or not: if you are a professional astronomer, definitely yes. If you are a machine/computer vision researcher/lecturer, then it is always useful to have applied examples to hand. However, I felt that it is unlikely to be understandable by most advanced amateur astronomers, despite a mention on the back cover. For BSc/MSc vision students I think this should be a good library book for occasional background reading, or if they were working on an associated project.

Tony Cook
University of Nottingham
email: acc@cs.nott.ac.uk

Book for Review

Would you like to have the opportunity to review a book for BMVA News? If you review a book you can of course keep it for your own use! Books will be sent out on a first come–first served basis.

Herewith one that we've received for review: any offers? –

Yali Amit *2D Object Detection and Recognition: Models, Algorithms, and Networks*. MIT Press, 2002, ISBN 0-262-01194-8, hardback, xiv + 306 pp.

Professor Roy Davies
Editor, BMVA News
email: e.r.davies@rhul.ac.uk