BMVA News

The Newsletter of the British Machine Vision Association and Society for Pattern Recognition

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http://www.bmva.org/

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 March 2009.

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[1] The British Machine Vision Association and Society for Pattern Recognition is a Company limited by guarantee, No. 2543446, registered in England and Wales. Registered Office: Granta Lodge, 71 Graham Road, Malvern, WR14 2JS. The Association is a non-profit-making body and is registered as charity No. 1002307.

Editorial: *Demonstration, Validation or Proof?*

Nowadays it is *de rigueur* to give good training to graduate students, and to this end many excellent courses are put on. However, every now and again, students can miss out for a variety of reasons. Here I have particularly in mind those embarking on writing a thesis. By that time any writing skills that were once well-practised could easily have atrophied as the students will have spent so much of their time communicating with a computer in C, Java or Matlab, and it will hardly have been helping them to write clear English. And computers, though highly sensitive to punctuation, are obviously impervious to whether colons, semi-colons or dashes should be used in the written language.

But there are far deeper problems in writing theses or papers for publication. One of these is validation. When I recently had to explain its significance to the author of a paper who received adverse comments from referees, I realised that a suitable definition or explanation is difficult to find. Knowing what it means from one's own point of view is insufficient when it comes to explaining it to others, so I decided to have a crack at writing something. The first point is that validation is different from demonstration, and is half-way to proof. One could say that conference papers are only expected to give *demonstrations* of the effectiveness of new algorithms whereas journal papers are also expected to *validate* them. (Yes, yes – I do know – good conference papers such as those in BMVC will also attend to validation.) In fact, I am trying to illustrate the point that the first stage in the process is to invent a new algorithm, and then to check it out on real data to be sure that it operates satisfactorily in a variety of cases. That is the

demonstration phase, and if enough data is used, and if it is sufficiently complex and variegated, demonstration could actually form the basis of a good paper.

Next, it becomes necessary to compare the algorithm with others, again using a fair amount of variegated data. Here things become difficult, because judging from pictures that one algorithm is better than another is, to say the least, subjective. So we need numerical data – tables, graphs, dropout rates, ROC curves, and the like, in order to provide a sound assessment. However, if an algorithm is claimed to be both more effective *and* more efficient, one also needs relative timings and other measures. In the end, each algorithm will have some type of data on which it excels and provides a better *combination* of performance measures than other algorithms (of course 'better' is a loaded word, and in the end personal judgements cannot be left out of the equation).

Overall, validation involves comparisons on various datasets proving that the new algorithm is a serious, valid one, and is superior to other algorithms in its own sector of performance space. But what sector of performance space, and can we back this concept up further? One question is whether author-generated data is to be used or data from publicly available datasets (though note that none may be available that will allow the new algorithm to show what special tasks it is capable of, or indeed designed for). Also relevant is testing on data for which ground truth is available so that absolute rather than relative comparisons can be made. But if only manually annotated data is available, the 'ground truth' itself may be shaky. Arguably, the only way of overcoming that problem is by generating suitable data, in which case we will have a simulation that may be unrealistic through being too 'clean'. However, simulation has the capability for revealing potential limitations quite well, and providing much-needed links with theory.

Then there is the question of whether a theory paper is allowable in a conference or journal. Why should a vision paper not be allowed to be theoretical in the way that a theoretical physics paper is? For example, it could provide mathematical *proof* of some algorithm viability or limitation. In principle, experimental validation should not be necessary in a theory paper, and could be left for other papers to deal with.

Overall, validation is an idealisation that papers should aspire to, and it is only achievable to the extent required by the policy of the time, for a particular conference or journal. Devoting as much as a third of a paper to

Continued on p. 16, column 2

BMVA Distinguished Fellow Awards for 2008 and 2009

The BMVA Distinguished Fellow award is a special award in order to honour some of the most prominent members of our community in recognition of their services. The award is made every year to one person, and only one person. The BMVA Executive Committee is very pleased to announce that the *BMVA Distinguished Fellow* ***2008*** is Professor Andrew Zisserman (Oxford University). In addition, the Committee is pleased to announce that the *BMVA Distinguished Fellow* ***2009*** is Professor Bernard Buxton (UCL).

It should be explained that the reason for the double announcement is that for historical reasons the BMVA Distinguished Fellow awards fell out of step, and we are now rectifying this anomaly. Hence both awards will take place at BMVC 2009, which is to be held at Queen Mary, University of London.

Professor Majid Mirmehdi
Bristol University
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Update on the BMVA Executive Committee

Following the elections which took place last summer, Professor Majid Mirmehdi stood down as Chairman. I would like to thank Majid for his outstanding contribution as Chairman over the past few years. In fact, this has necessitated further changes of responsibility, as a result of which the current officers of the Executive Committee are:

Chairman: Dr Andrew Fitzgibbon
Secretary: Dr Neil Thacker
Treasurer: Professor Mike Chantler
Newsletter Editor: Professor Roy Davies
Meetings Organiser: Dr Simon Prince
Publicity Officer: Dr Peter Hall
Bursaries Officer: Dr Adrian Clark
IAPR Representatives: Professors Edwin Hancock and Mark Nixon

Dr Andrew Fitzgibbon
BMVA Chairman
email: chair@bmva.ac.uk

Around and About at ICPR

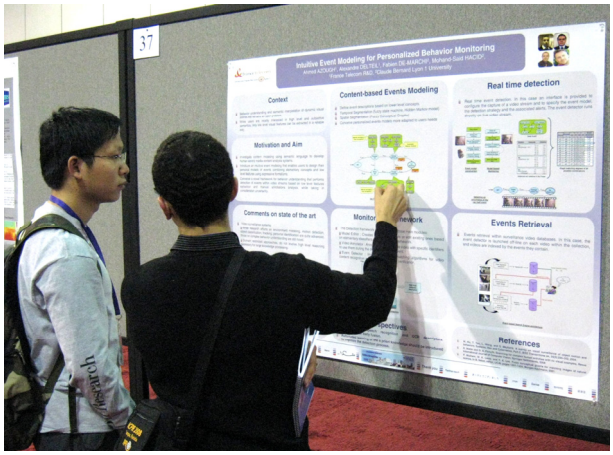
Tampa Convention Center by day …

… and by night.

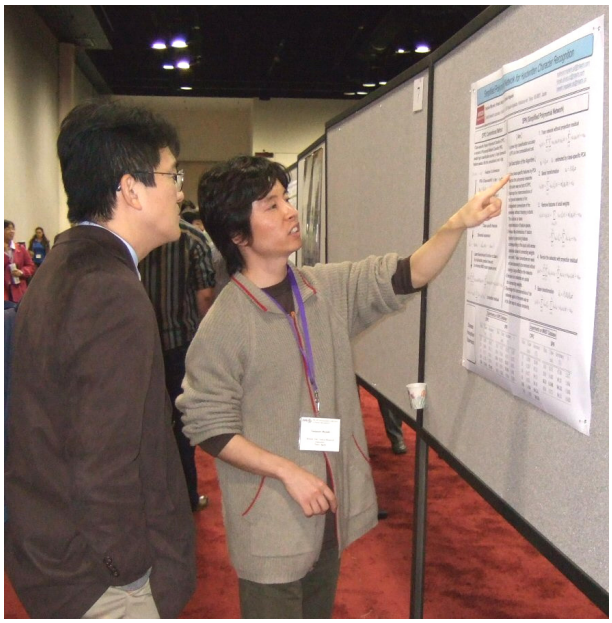
The Plenary Lecture Hall.

Josef Kittler introduces Professor Anil Jain, who is about to present his King-Sun Fu Prize Lecture.

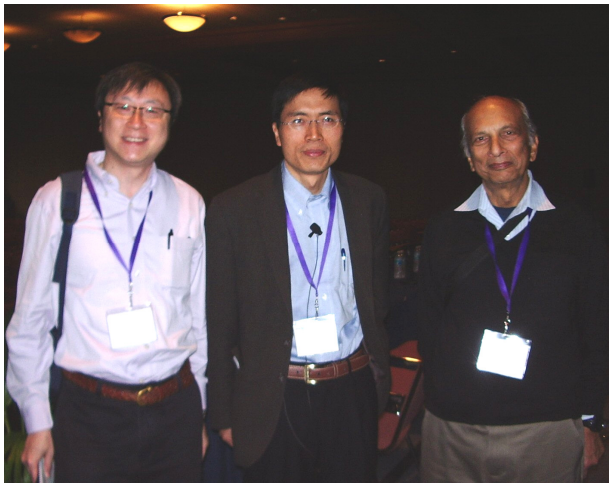
Long time colleagues Benedek Nagy, Herbert Freeman, Laveen Kanal and Josef Kittler caught in discussions. Herbert Freeman invented his famous ‘chain code’ as long ago as 1961.



Ahmed Azough presenting his poster on behaviour monitoring.



Toshinori Miyoshi (Hitachi) discusses his poster with Professor Uchida. (photo courtesy Hiroshi Sako)

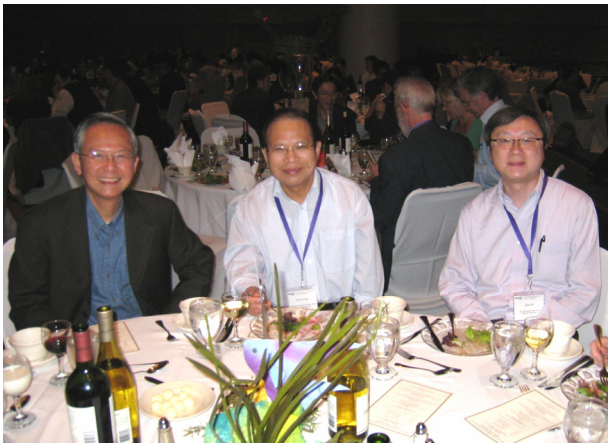


Horace Ip (left) with J.K. Aggarwal Prize winner Song-Chun Zhu (UCLA) and Jake Aggarwal (right). Jake has been hugely influential in the area of 3D matching and motion analysis.

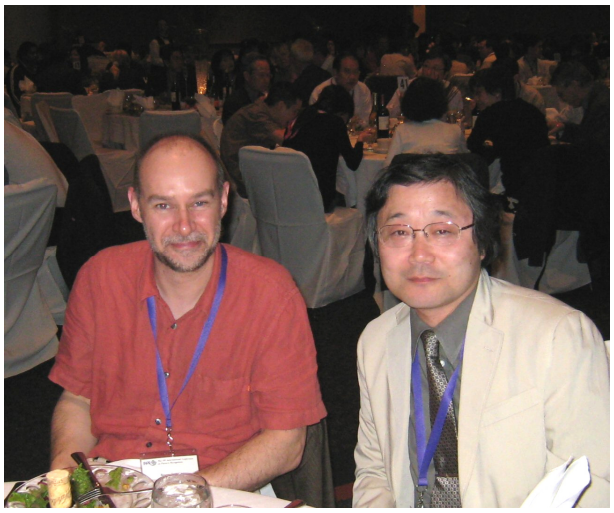
Aytul Ercil (ICPR 2010 Chair), Katsushi Ikeuchi and Masakazu Ejiri (2008 Co-Chair). Dr Ikeuchi did pioneering work in the early 1980s on the use of smoothness constraints for 'shape from shading'. (photo courtesy Hiroshi Sako)

Josef Kittler and his wife with Horst Bunke. Amongst his many activities, Horst is book editor with World Scientific, which publishes many Vision books. (photo courtesy Hiroshi Sako)

Professor Kenichi Kanatani (Okayama University) and his wife Noriko, with (right) Peter Harding and his wife Margaret. (photo courtesy Hiroshi Sako)



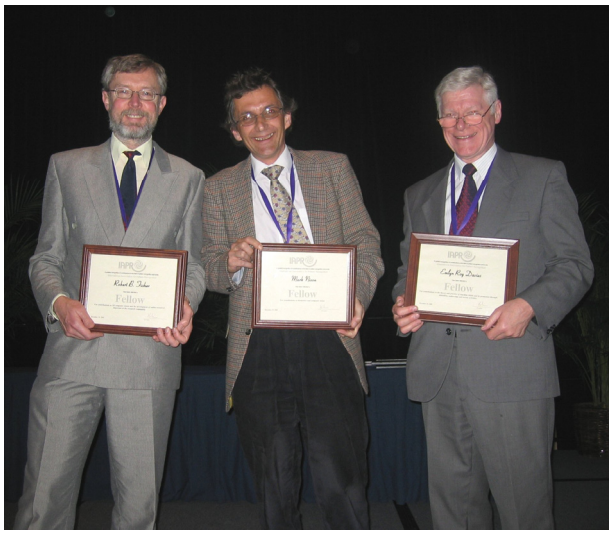
Tien Bui (Concordia University), Y.Y. Tang from Hong Kong Baptist University) and Horace Ip (Hong Kong City University).



Bryan Scotney (University of Ulster) with colleague Hiroshi Sako (Hitachi).

Guest of Honour, Robert Ledley (left), with Laveen Kanal (University of Maryland) and C.Y. Suen (Concordia University).

Professor Yamashita, Dr. Sato with his Best Student Paper certificate, and Professor Wakahara. (photo courtesy Hiroshi Sako)



Bob Fisher (Edinburgh), Mark Nixon (Southampton) and Roy Davies (Royal Holloway, London) exhibit their IAPR Fellowship awards! Unfortunately, Fionn Murtagh (also of Royal Holloway, London), the fourth UK recipient, couldn't be present to accept his award in person.

ICPR Guest of Honour, Robert Ledley

It will be of interest to many why Robert Ledley was invited to be Guest of Honour at the ICPR banquet. In fact there were many reasons, for he was not only the inventor of the CT body scanner but also highly influential in the field of computer pattern recognition since the inception of the subject. One particular instance is that he founded the journal *Pattern Recognition* and has continued as its Editor-in-Chief until the present. Another is that he has been president of the National Biomedical Research Foundation since its inception in 1960. Yet another is his seminal (1965) textbook on the use of computers in biology and medicine. It should be remarked that in the early days when Dr Ledley embarked on his medical imaging work, computers were hugely less powerful than today, and to design and build a complete CT body scanner required immense ingenuity, effort, persistence and dedication. He evidently possessed all these in good measure, and now is the holder of many patents, publications and prizes that reflect this. If any of our members are in need of a role model, they could do far worse than choose Robert Ledley!

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Context and Reality at ICPR – Father Christmas does exist!

Doing anything for the first time at sixty is bound to be interesting but going to Tampa, USA, in December can be exhilarating. On the first walk to the Convention Centre, for the International Conference on Pattern Recognition, I began to realize a further significance to the concept of pattern recognition and context as the heat contrasted with the displays of Father Christmas, Snowmen, Christmas trees and fake snow against a backdrop of palm trees in borders lined with brilliant geraniums.

Even in the Conference Centre the image of Christmas was represented by a mock fireplace and hearth side chair, compounding the affect of the extraordinary context albeit "out of context".

Tampa was an excellent choice for the conference, being held in the Tampa Convention Centre which was large enough to accommodate the thousand or so delegates with room to spare. The people of the city were most hospitable. On arrival at the airport, illuminated signs welcomed delegates to ICPR and ICPR was also in lights outside the convention centre. In fact, it was one of my first observations about Tampa that everything was clearly signed by different electronic illuminations. I thought that Mark Nixon (Southampton University) had curiously been here in advance of most delegates, as at every road junction there was a white illuminated sign showing the gait of a man walking! However, I soon realised that it was a sign that advises you that it is safe to cross the road. But to advise you not to cross the road was an illuminated red hand – so even hand gesturing was acknowledged!

'Context' is also one of the issues that researchers have to deal with. Theo Pavlidis gave one of the excellent keynote speeches at the conference when he spoke of the problem of interpreting images by pixel values. Two different pictures of different pixel values can have the same meaning (e.g. different images of a pet) whereas two pictures with a few different pixels (e.g. two different facial features) can have very different meanings. He thought that pixel values have very little to do with human interpretation of an image and that there was a large gap in our understanding on how to tackle this problem.

Another contextual point that was made by some of the presenters was the use of numbers and their interpretation. A familiar example was quoted about the performance of an OCR system having a success rate of 98%. This type of figure can be very misleading as a typical sheet of typed words would then probably contain some 50 errors. Anil Jain also spoke about the need for 'ground-truth' data in the context of clustering. He noted that there is no 'silver bullet' clustering algorithm and in reality clustering algorithms will always find clusters, whether they exist or not.

The last guest speaker, Ludmila Kuncheva, gave a very entertaining but wise lecture on classification approaches. One of the most amusing topics was about how new ideas are accepted by researchers. An accompanying graph of expectation against time displayed how new ideas are first accepted with naïve enthusiasm; then move to full hype followed by over-reaction; then depth of cynicism before true benefit is found as the expectation moves to the asymptote of reality.

Maybe the most striking thing I learned about human behaviour was from Klaus Mueller (Towards Brain-Computer Interface), who has been investigating how the brain works, in relation to movement. Although the brain has some very noisy signals, it appears to work well in real time without the need to apply low-pass filtering. Apparently, if I have understood it correctly, 600 ms before an action occurs the brain has started to form the appropriate signals to perform the action. This is 300 ms before one has some conscious idea of the

impending action. The muscles only know that they are going to work 100 ms before the action!

I'm not sure whether it was my brain or 'me' that enjoyed the conference – I think all parts did. It was an inspirational experience and a great opportunity to meet a wide range of people of all nationalities from all over the world. We shared knowledge, experience, and enthusiasm; overcame language differences to enjoy one of the great benefits of a conference – the meeting of like-minded people who can forge new friendships and perhaps gain fresh insight into their own area of expertise. I cannot wait to go to the next conference in Istanbul, but I have also promised myself the joy of another visit to America.

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Vision Systems for Perception and Action: Call for Participation

One-Day BMVA technical meeting in London, UK, on 6 March 2009.

Chairs: Dr Neil Thacker, University of Manchester, Dr E. Charles Leek, Bangor University

The task of constructing artificial vision systems still holds many challenges, many of which are thrown into sharp relief by the apparent ease with which humans solve visual processing tasks. By comparison, many computer vision algorithms have very restricted applicability, particularly with respect to natural scenes. There appears to be more to be learned regarding which information is used and at what point during human visual processing it is obtained. What should be regarded as a semantically useful description of the world? Which tasks are inevitably 'top down', and which should be achievable 'bottom up'?

Great strides have been made within the last twenty years in our understanding of the cognitive and neurobiological substrates of visual perception and motor control. These advances have begun to unravel the complex inner workings of the human brain, providing us with unique insights into the powerful computational systems that have evolved to support seemingly effortless activities like perceiving shape, reaching and grasping.

The purpose of this one-day BMVA meeting is to bring together researchers from areas of biological modelling, psychophysics and computer vision, to discuss the strengths and weaknesses of the computational models used when attempting tasks equivalent to human visual perception. It is intended that, as well as covering material describing the latest results in understanding human vision, there will be more general talks which summarise the experiences and opinions of representatives from these disciplines, including challenges to current approaches. We will investigate how our understanding of human vision and motor control may be exploited by computer vision researchers, and provide constraints on the development of more efficient artificial vision and robotics systems. In turn, it is also recognised that advances in computer vision themselves provide further insights into human cognitive processing.

Time will be allocated for discussion of the issues raised so that the possibilities for consensus and future synergies between these fields can be explored. If you have views on this subject please attend and join in the discussions.

Although the agenda has been organised by invitation, some space is still available for additional speakers which fit in with the objectives of the meeting. If you wish to discuss the possibility of making a presentation please send an email to Dr Neil Thacker at neil.thacker@manchester.ac.uk by 6 February 2009.

Dr Dimitrios Makris
Kingston University
email: d.makris@kingston.ac.uk

Reminder – Student Bursaries

If you are a PhD student at a UK university, and are presenting a paper at a major vision conference, then you are eligible to apply for a BMVA bursary worth up to £500.

Further details are available though the BMVA website:

http://www.bmva.org/

Dr Adrian Clark
University of Essex
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BMVC 2009: First Call for Papers

British Machine Vision Conference, 7–10 September 2009, London

The British Machine Vision Conference is one of the major international conferences on machine vision and related areas. Organised by the British Machine Vision Association, the 20th BMVC will be held at Queen Mary, University of London.

Authors are invited to submit full-length high-quality papers on image processing and machine vision. Topics include, but are not limited to:

- Biomedical applications
- Document processing and recognition
- Image processing techniques and methods
- Model-based vision
- Motion, flow and tracking
- Person, face and gesture tracking
- Segmentation and feature extraction
- Statistics and machine learning for vision
- Stereo, calibration and geometry
- Texture, shape and colour
- Video analysis
- Vision for visualization and graphics.

Submitted papers will be refereed on their originality, presentation, empirical results, and quality of evaluation. All papers will be reviewed *doubly* blind, normally by three members of our international programme committee. Please note that BMVC is a single-track meeting with oral and poster presentations.

Proposals are also invited for a workshop to be held on the 10 September: please contact the organisers if you are interested.

Important dates

Submission deadline:	27 April 2009
Notification of acceptance:	22 June 2009
Camera ready papers:	21 July 2009
Conference:	7–10 September 2009

Further information

The conference will include keynote presentations by Rama Chellappa (University of Maryland) and Alexei Efros (Carnegie Mellon), and a tutorial by Andrew Fitzgibbon (Microsoft Research).

General chairs: Andrea Cavallaro (Queen Mary, University of London), Simon Prince (University College London).

Technical programme chair: Daniel Alexander (University College London).

Local organising committee: Lourdes Agapito, Shaogang Gong, Peter McOwan, Ioannis Patras, Tao Xiang.

BMVC 2009 Website: http://bmvc2009.cs.ucl.ac.uk

Contact email: bmvc2009@cs.ucl.ac.uk

Conference venue: Queen Mary, University of London, Mile End Road, E1 4NS London. The Mile End campus is located a mile to the east of the City of London.

Dr Simon J.D. Prince
University College London
email: s.prince@cs.ucl.ac.uk

BMVA Sullivan Thesis Prize – Call for Nominations

The British Machine Vision Association annually awards a Best Thesis prize (to commemorate the contribution made by the late Professor Geoff Sullivan) to the best doctoral thesis submitted to a UK University, in the field of computer or natural vision.

Recommendations for the prize are considered by a Selection Panel appointed annually by the BMVA Executive Committee. The decision of the Selection Panel is announced at the end of the following July. When possible, the presentation will be made at the conference dinner of the British Machine Vision Conference, held annually during September.

The BMVA Executive Committee now seeks nominations for the Sullivan Prize for theses examined during the calendar year 2008. Please send any nominations to the BMVA Secretary, Dr Neil Thacker (secretary@bmva.ac.uk) by the end of February 2009.

Nominated theses should be made available through a web page: the successful author is expected to make his/her thesis available as a PDF for distribution via the BMVA web-site from September 2009 onwards.

For conditions, please see:

http://www.bmva.ac.uk/admin/sullivan.html

Professor Roy Davies
Editor, BMVA News
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Group Theory, Invariance and Symmetry in Vision

This one-day BMVA symposium will be held at the British Computer Society, 5 Southampton Street, London, WC2E 7HA on 21 January 2009.

www.bmva.ac.uk/meetings

Chair: Lewis Griffin (University College London)

10.00 Registration and coffee
10.25 Welcome and Introduction
10.30 Diffeomorphic alignment of MRI scans, John Ashburner (Functional Imaging Lab, UCL)
11:00 Paying attention to symmetry in man and machine, Gert Kootstra (AI Institute, Groningen, Netherlands)
11.30 Visual features from bispectral invariants, Risi Kondor (Gatsby Institute, UCL)
12.00 Local image symmetry type: the missing link between filters and features, Lewis Griffin (Computer Science, UCL)
12.30 Lunch
13.30 Group invariants in colour vision, David Foster (Electrical & Electronic Engineering, Manchester University)
14.00 Conical spaces: the geometry of non-negative signals such as colour spectra, Reiner Lenz (Science & Technology, Linkoping, Sweden)
14.30 Tea and Coffee
15.15 Discrete symmetries in statistical image analysis and beyond, Alexey Koloydenko (Mathematics, Royal Holloway, University of London)
15:45 Extending the SIFT image patch descriptor to second order structure, Martin Lillholm (Computer Science, UCL)
16.15 Closing remarks and finish

Members wishing to attend should complete a registration form in advance of the meeting, in order to be sure of reserving a place.

Dr Dimitrios Makris
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email: d.makris@kingston.ac.uk

BMVA Thesis Archive

In order to promote and improve access to the large base of high quality PhD research undertaken in Computer Vision in the UK, the British Machine Vision Association last year launched a new online repository. This will act as a single-source archive of all past, current and future PhD work undertaken in this area in UK academic institutions. The service will allow students to quickly and easily share the results of their work with the Computer Vision community, nationally and internationally, and it will be a tremendously useful database for searching and reviewing previous PhD research work undertaken in the UK.

The real value of this service can only be realised if the UK community support the effort and so the BMVC would like to encourage all members to use and, where possible, contribute material to the repository. Contributions are required to be in PDF format and

supplementary material such as videos and images are welcome.

The PhD repository can be accessed through the main BMVA website (www.bmva.org). If you have any problems submitting your thesis to the repository please contact Dr Aphrodite Galata.

Dr Aphrodite Galata
Manchester University
email: agalata@cs.man.ac.uk

The Imaging Science Journal: Past, Present and Yet To Come

Historical Background

The Imaging Science Journal is published on behalf of The Royal Photographic Society by Maney Publishing and is the Society's publication that covers exclusively both fundamental and applied scientific aspects of imaging. It has a long and distinguished history and is perhaps the oldest journal dedicated exclusively to the scientific and technological aspects of imaging. As one might expect, it originally dealt with photography as, at the time of its inception, this was the only means of making permanent recordings. Originally, these aspects were published as part of the Society's Journal which was first published in 1853.[2] In 1945 the Society decided to publish the reporting of its activities in two parts: A: general and pictorial; and B: scientific and technical. In the Society's centenary year, 1953, it was decided to provide the scientific community with its own separate journal,[3] the first issue of which can be considered to be the first issue of the current Imaging Science Journal.[4] This became the title in 1997 to reflect the changes in technology to electronic recording and to encourage submission of papers from wider areas where the future lay. The Journal has always responded to, and has provided a platform for, the dissemination of novel and developing aspects of imaging. It was the first to publish a paper on the then novel application of recording in spectral regions beyond the visible, with a paper dealing with photography in the infra-red and ultra-violet regions.[5] Since then, the Journal has published papers on virtually every aspect connected with the recording of visual information and visualising what is not seen by the human visual system.

Aims and Scope

The content of the Journal includes most areas of activity concerned with imaging science. The following, somewhat pedantic, definition defines the meaning of the term 'imaging' in the title of the Journal. The term 'imaging' is taken to mean the recording and visualisation of information recorded from radiation of any kind, emitted from, reflected by, or otherwise affected by, an object. The recording media include any medium for recording, manipulation, display or transfer of images, and include moving or time-based imaging, as well as still imaging.

The Imaging Science Journal publishes papers concerned with research and developments in imaging science, and its engineering and practical applications. Papers in areas of practical applications will be considered, especially if they are of more general interest and applicability than their immediate area of application. Although most of the papers submitted will be theoretical, quantitative or mechanistic in content, those based on experimental studies, monographs and reviews are also of great interest. The Journal also publishes papers presented at symposia, provided that they are full papers and are subject to the Journal's rigorous peer review process.

Examples of areas that come within the scope of the Journal include the following topics:

- Aerospace Imaging
- Applications & Display
- Colour Reproduction
- Consumer Imaging
- Detectors and Sensors
- Digitisation & Storage
- Displays

[2]The Journal of The Photographic Society of London, no. 1, 3 March 1853
[3]The Journal of Photographic Science, Section B of The Photographic Journal, Vol. 1, no. 1, January/February 1953.
[4]The Imaging Science Journal, Vol. 45, no. 1, 1997.
[5] R.W. Wood, Photography by Invisible Rays, The Photographic Journal, pp. 329–337, October 1910.

- Forensic Imaging
- Hard copy output
- High Speed Imaging
- Holography and 3-D Imaging
- Image Acquisition
- Imaging: mechanisms, modelling and properties
- Image Processing
- Image Quality
- Image Security
- Input/Output Devices
- Instrumentation
- Machine Vision
- Media Life Expectancy
- Medical Imaging
- Metrology & Metrics
- Multispectral Imaging
- Psychometric Scaling Methods
- Vision and Imaging

These subject areas should not be taken to be exclusive. The submission of papers in any of the above, or related areas, is most welcome. Readers of this newsletter will note that machine vision certainly comes within the scope of the Journal and additional papers in this area would be very much welcomed by the editorial team. In addition, specialist issues dedicated to individual topics are being considered; for example, issues on high speed imaging and on infra-red imaging in celebration of the 100th anniversary of its publication by The Royal Photographic Society are anticipated. Publishing a special issue devoted exclusively to machine vision would also be an interesting development for the future.

The Journal continues to go from strength to strength, and in 2008 moved from quarterly to bi-monthly publication – a good indicator of the interest and numbers of papers being submitted. More high-quality papers are always welcomed and full details of the journal, together with access to sample issues can be found at: www.ingentaconnect.com/content/maney/isj

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Report on FG 2008

The 8th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2008) was held in Amsterdam on 17–19 September 2008. FG2008 was the latest in a series of conferences that have acted as forums on the state of the art in image and video-based analysis and recognition of faces, gestures and body motion since 1995.

The conference was divided into seven oral sessions (23 presentations) and two poster sessions (120 presentations). Kevin Bowyer opened the proceedings with his keynote talk "Adventures In 3D Face Recognition", describing work with range data from sensors such as the "Qlonerator" from 3dMD (also featured in 3D face work at this year's BMVC). 3D recognition approaches appeared to offer a powerful complement to existing 2D techniques but entailed a different set of future challenges. Eight topics for future work were outlined and are available in full from the slides at http://www.nd.edu/~kwb/. The talk was followed by the first oral session on "Facial Expression Recognition". Those looking for 3D face data to crunch should see "A High-Resolution 3D Dynamic Facial Expression Database" by Yin *et al*. which demonstrated a database of 606 dynamic 3D facial expression sequences captured from 101 subjects of various ethnic backgrounds.

In the "Facial Feature Localisation" session, Nguyen *et al.* presented a method for the fast localisation of facial features by jointly performing relevant feature weighting and learning of Support Vector Machine parameters. After lunch, the "Face Recognition" session saw Marques and Costeira outline an approach to the recognition of near-neutral faces displaying large pose variations. The authors were the eventual winners of the Best Student Paper Award. The day concluded with the first poster session which ran alongside a demo session on "Gaze and Facial Expression Analysis". The conference venue, a former Remonstrant church, lies on the Keizersgracht (Emperor's Canal) in Amsterdam's old town and boats collected delegates for the drinks reception and a tour of the city.

In the second morning's keynote talk "Communicating with a Virtual Human or a Skin-Based Robot Head" Nadia Magnenat-Thalmann described work on the advancement of human-robot interaction at the University of Geneva's MIRALab. This included efforts to convert the parameters of the MPEG-4 standard for facial animation to a further standard for robotic face animation. This work features the mechanical head, Alice, and her skin of "flubber" which can be seen at: http://www.hansonrobotics.com.

Nguyen *et al.* presented further work in the "Active Appearance Models" (AAMs) session, outlining an approach to ensure smooth cost functions with good global minima during the AAM fitting process. Defying easy session categorisation, Morency *et al.* secured the Best Paper Award without the use of AAMs, instead uniting three independently effective paradigms in the automatic estimation of head pose to achieve impressive performance. This philosophy was again seen in the "Tracking" session with Sheikh *et al.* combining top-

down and bottom-up approaches to 2D human pose tracking to facilitate real-time tracking of drivers in vehicles.

Delegates watching a Paul Ekman DVD on the ground floor, the 'Face and Facial Expression Analysis' Poster Session on the first floor, and the 'Gaze and Facial Expression Analysis' Demo Session on the second floor.

The second poster session ran alongside a demo session on "Face Recognition and Body Gesture Analysis". Here delegates were able to enrol on (and unsuccessfully attempt to confuse) the CBSR-AuthenMetric face recognition system, running in 1:*N* mode. The system was used in 1:1 mode for ticket holder validation at this summer's Olympic Games.

The third day and final keynote talk saw Roderick Cowie discuss the need for large, realistic (rather than acted) and annotated databases to investigate the effective understanding of rich, spontaneous human behaviour. In the "Human Action" session Han *et al.* described work on the classification of motion capture data from the CMU database (http://mocap.cs.cmu.edu/) using hierarchical nonlinear dimensionality reduction for feature extraction. The final session on "Performance Evaluation" showcased the successor to PIE, the CMU database for face recognition research under Pose, Illumination and Expression variations. MULTI-PIE features fifteen view points, more expressions, more subjects and more recording sessions than its predecessor.

In addition, special sessions on "The Human Face and Ageing", "Multi-Sensor HCI for Smart Environments" and "Brains and Muscles: Learning about Facial Expressions and Gestures using EMG and EEG Measurements" were held, featuring lively panel sessions. More details – particularly on the special sessions – can be found through the conference website http://www.fg2008.nl. I would like to thank the BMVA for a student travel bursary which made my attendance at FG 2008 possible.

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Report on IEEE International Conference on AVSS 2008

The 7th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS) was held in Santa Fe, New Mexico, USA on 1–3 September. The technical programme of the conference consisted of 3 plenary sessions, a governmental session, an industrial session, 28 lecture presentations and 10 poster presentations covering various aspects of video-based surveillance.

The first day of the conference began with the plenary talk on "Eroding or Opening" by Professor Terrance E. Boult from the University of Colorado at Colorado Springs. Taking the support of Nobel prize-winning Economic theory of asymmetric information, the 'market for lemons' and Kerckhoff's principles for security, he showed that there are enough openings and room for improvements. The speaker also urged towards the need to improve quantitative evaluation standards for surveillance systems and suggested that algorithms must be tested on at least six different datasets. It was emphasised that more time should be spent on hypothesis testing and the analysis of why failure occurs than on the data itself. The plenary session was followed by object detection, recognition and tracking sessions. The most interesting paper of these sessions was on "Recognizing shapes in video sequences using multi-class boosting" where the author proposed to use Iwasawa features extracted using Iwasawa matrix decomposition. This is SVD-like decomposition but is unique and allows the factors to be used as features. The day ended with a colourful reception which included traditional local dances.

The second day turned out to be the most interesting. It consisted of two oral sessions, the government session and the industrial session, which was merged with the banquet. The day started with a plenary talk by Professor Nikos Papanikolopoulos of the University of Minnesota. The speaker took further the message from Professor Boult and discussed several research problems for security systems such as event analysis for activity monitoring, camera calibration for multi-sensor tracking and video forensics analysis. The speaker emphasised the need for network-centric algorithms. The plenary talk was followed by a session on activity monitoring during which I presented my work on "Object and scene-centric activity detection using state occupancy duration modelling": this was well attended and resulted in an interesting question/answer session. The second half consisted of the government session in which the Defense Academy for Credibility Assessment (DACA) showed the use of Avatars for interview automation. The automation enables the recreation of the same environment for all the interviews. The day ended with an industrial session held during the Banquet where representatives from Siemens and IBM demonstrated their video analytics solutions and discussed several challenges faced in real-life surveillance scenarios. The representative from Johnson Controls stressed the need for standardisation of surveillance hardware and video encoders. The representative from GE discussed what their slogan "Imagination at work" means through their various research activities. The day ended with a demonstration on the use of UAVs and spy planes by Lockheed Martin. The interesting issue that arises is that the advancement in research ends up increasing the accuracy of a surveillance system, but the threat level also increases at the same or even a higher rate. The cause of this issue is that aiming towards improving security conditions by advancement of video and signal based surveillance does not target its root cause. Hence it's a cure and not prevention.

The last day of the conference started with a plenary talk by Dr Lakshman Prasad of Los Alamos National Laboratory on the use of Delaunay triangulation as a tool for image segmentation. The day consisted of two oral sessions on applications and a poster session. The paper entitled "Person tracking with audio-visual cues using the iterative decoding framework", which secured the best AVSS 2008 paper award, was presented on the last day. It demonstrated the use of iterative decoding for fusion of multiple modalities, particularly audio and video for extended tracking.

The city of Santa Fe, which is the capital of the state of New Mexico, is very historic and, unlike other cities, its downtown gives full exposure to its rich culture. Many of the contemporary houses are built with stucco surfaces reflecting the historic style. The city is full of tourist sites, and one that I managed to visit was the Cross of the martyrs. It is a monument located on a small hill and serves as a reminder of the 21 Franciscan monks that were slain during the Pueblo Revolt in 1680. The walkway up the hill to the monument unfolds the history of New Mexico through plaques, and gives a beautiful view of Santa Fe.

The next edition of AVSS will take place in Genoa on 2–4 September 2009. Finally, I thank the BMVA for providing me with a travel grant, which resulted in increasing my knowledge and experience.

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Report on BMVA Symposium on Machine Learning

The BMVA Symposium on Machine Learning held on 29 October 2008 was kicked off by an excellent talk from Professor Sergio Theodoridis, author of the well-known book *Pattern Recognition*. Professor Theodoridis introduced a geometrical approach to SVMs, culminating in a description of his Reduced Convex Hull algorithm which permits much faster training of SVMs than previous approaches. The first regular talk was given by Xu (M. Xu & M. Petrou) and introduced an architecture based on the 'Tower of Knowledge' principle to recognise objects in images using a minimal amount of training, relying instead on a layered contextual architecture to ease the recognition process. This was followed by a talk on fully automated (unsupervised) learning and categorization of events from video sequences by Sridhar (M. Sridhar, A.G. Cohn and D. Hogg) from Leeds University. Video retrieval was addressed by J. Collomosse and G. McNeil (Bath University), who presented a storyboard approach to describing and searching visual structure in video. A more 'traditional' pattern recognition presentation on mixture model estimation rounded off the morning, presented by C. Charron from Cardiff University (C. Charron and Y. Hicks).

Lunch was preceded by a second keynote talk by E. Gelenbe on spiked, stochastic networks and their role in learning and data approximation. A stochastic circuit for estimating transformations between stored and new image appearances was next presented by Z. Engin (Z. Engin, J. Ng, M. Barahona & A. Bharath). The authors demonstrated that the Map Seeking Circuit (MSC), a biologically inspired matching system for

reducing the dimensionality of search spaces in estimating transformation parameters between views of an object, could be significantly improved by formulating the MSC as a probabilistic estimator of spatial transformations. The next presentation was from Essex University (Oechsle and A. Clark), on the development (or rather, evolution!) of vision systems for performing image segmentation and shape classification using genetic programming in a more efficient manner than has previously been achieved.

After tea, there were two more presentations, the first from the University of York (R. Wilson) and the second from UCL (L.D. Griffin, D. Sadybekova, M. Lillholm and J. Muir). The former covered statistical models of graphs, and explicitly addressed the problem of matching graph representations constructed from visual data, and comparisons were presented between different strategies to deal with the issue of graph alignment: structural, feature and generative methods were compared. The last talk of the day, presented by the UCL team, focussed on active learning for tuning parameters of computer vision algorithms – a challenge that often arises when taking algorithms from the lab into the real world. The conclusion of this talk, as demonstrated through the oft-encountered background/ foreground labelling problem, was that by using an active two-stage process, requiring minimal human-supplied ground truth, one may achieve much more efficient tuning of algorithm parameters. This requires only fairly simple, widely applicable metrics, such as entropy, to achieve very good performance in live systems where new data is constantly being acquired, and thereby provides a ready source of information for active learning.

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Report on CVGIP 09

The 6th Indian conference on Computer Vision, Graphics and Image Processing was held in Bhubaneswar, India, in December 2008. My linkage with IIIT Hyderabad suggested that this conference, being India's BMVC equivalent, was worth a peep. So we submitted, got accepted and off I went.

It had the usual small conference mix of plenaries, tutorials, single- and double-track orals, and posters, spread over 4 days. It was held in the most swish hotel in Bhubaneswar (in Orissa, eastern India) and had the usual mix of faded glory, intermittent wireless, attentive service (when given a large tip) and disdain (when no tip was offered). I enjoyed it a lot.

The plenaries were excellent. Michael Unser (EPFL) told us of his new theoretical-based, invariance-led framework for wavelets. Marc Levoy (Stanford) told us of the new and fascinating approaches to light-field imaging. Bill Triggs (CNRS) told us of his new approaches to scene segmentation; Prem Kalra (IIT Delhi) showed some excellent improvements in using camera motion in animation. These alone were worth the visit. It made me think of new ways to improve my text on feature extraction, and we were wowed by the insight and advantages of the new approaches to imaging and the results on animation. I was not alone in enjoying them: all I talked to were similarly impressed.

That they were accompanied by what were largely tutorial sessions, called "Theme Sessions" was just a bonus. In the Event Recognition theme, Ramakant Nevatia told us of graphical models for activity recognition; Rahul Sukthankur told us of approaches to video event detection. In the Medical Imaging Theme, Guido Gerig (Utah) informed on computational neuroanatomy; Carl Westin (Harvard) on diffusion tensor imaging. The two themes continued with talks from GE Research, Govinadru (Buffalo) and Verma (Pennsylvania). And then there was a theme on Multimedia Pattern Analysis. There were a lot and they were very informative.

One reason to travel is to enjoy cultural diversity, good food and new sights. I managed all those. In terms of culture, Unser gave his plenary amidst a sea of television cameras, people chatting on mobile phones (to the annoyance to some delegates), and some were chatting not in the hushed whisper of a western-culture conference. This is not unique to India as I had a similar experience plenarying in Pakistan. Other sessions were less populous, much quieter and didn't have television cameras, but the official photographer kept popping in to startle the presenter with his flash. All part of the rich diversity of life. The food was great (lunch was included in the conference) and I did do an afternoon's sightseeing at low cost (there's a world heritage Kornak Sun Temple, which was quite near).

All in all it was well worth a visit. Some talks were quite inspiring, especially the plenaries. The regular papers were a mixed bag, and that is usual. I suspect the overall standard of the good papers was around that of ICPR/ICIP; they are indexed on Explore (the acceptance rate was under 30%) as the conference is cosponsored by IEEE SP. I will likely go again, and might submit. A final note is that India is not for the fainthearted. The crush of humanity is awesome and its culture rich and diverse. Some might choose to stay with the conference

precincts, but they would miss a great deal – though they would enjoy a good conference.

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Segmentation of Anatomical Soft Tissue Regions in Medical Data

Report on BMVA Technical Meeting held on 5 December 2008

Chairs: Reyer Zwiggelaar (Aberystwyth University) and Xianghua Xie (Swansea University)

The workshop attracted 50 (registration closed before the meeting) researchers from across the UK and beyond.

Bill Crum (King's College London) started the workshop with an invited talk on spectral clustering, which provided an overview on how Graph Laplacians could be used for clustering. The talk linked these techniques to the segmentation of MRI brain data resulting in morphological and tissue classification. The theme of variation in brain images was picked up by Shiva Keihaninejad (Imperial College London) and Kola Babalola (University of Manchester). Shiva showed it was possible to track changes in the volume of ventricles across the human lifespan based on atlas modelling. Kola used advanced AAM modelling to segment sub-cortical structures, indicating that the fusion of classifiers improved segmentation results.

Atlas and shape modelling were also the basis for the next three talks of the morning session. Sofia Michopoulou (University College London) showed how atlas based methods could be used to segment inter-vertebral disc areas indicating differences between normal and degenerated cases. John Chiverton (University of Bristol) used active contours to model shape aspects, which were applied to extract anatomical structures in 3D and temporal data. Tony Shepherd (University College London) exploited nonlinear dynamics in statistical shape modelling to investigate the segmentation of abnormal regions.

Refreshed by lunch, Danny Alexander (University College London) delivered an invited talk on diffusion MRI and the potential this has in the development of advanced segmentation, covering connectivity and microstructures, in brain data. Future trends and challenges (see also www.humanbrainmapping.org) were discussed.

The remaining talks of the afternoon had in common either user- or data-driven segmentation and the use of level sets. Ik Soo Lim (Bangor University) showed how classifiers can be used to learn segmentation from sparsely annotated data. Subsequently, Vincent Luboz (Imperial College London) showed how hierarchical and level-set segmentation could be used to extract 3D vasculatures, but that some of the details that exist in the manual annotations are not always included – for which advanced 2.5D methods were developed. Level sets were also considered by Norberto Malpica (Universidad Rey Juan Carlos), who showed the advantages of a faster but equivalent de-noising model which was used for liver segmentation. The final talk of the day was given by Yi Song (University of Leeds) who also looked at the segmentation of the liver, exploiting both shape information and level sets, resulting in patient specific modelling. All these talks indicated that user-interaction is beneficial, but that used data-driven techniques might need further optimisation to minimise user-wait aspects.

The talks were followed by a networking opportunity (where the speakers carried a flyer/poster related to their talk). New contacts were made, which hopefully will develop into interesting collaborations.

The workshop closed with a (brief) discussion, which indicated that soft tissue segmentation is making strong progress, that there were unknown overlaps in techniques and application areas, and that there are a large number of avenues to be exploited – certainly enough to provide a stream of papers for future meetings such as MIUA 2009, which will be held in London (www.miua.org.uk).

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Multiple Camera Tracking 'i-LIDS' package now available from HOSDB

Following its earlier successes with i-LIDS (the Imagery Library for Intelligent Detection Systems), the Home Office Scientific Development Branch (HOSDB) has extended its work to cover a further much needed capability in this area. This is to provide definitive video datasets for multiple camera tracking (MCT). In summary, the new data incorporates the following:

- Five cameras – both overlapping and non-overlapping – filmed in a large transport hub
- A library of 140 hours of real-world footage
- Over 185,000 annotation points
- Single and multiple targets
- SABrE annotation tool.

Detailed information on the dataset is obtainable from the i-LIDS team on the Home Office website:

http://science.homeoffice.gov.uk/hosdb

Interested parties can also contact the HOSDB by email

(i-LIDS@homeoffice.gsi.gov.uk) or by telephone (+44 1403 213823).

To give a further idea of the sort of information provided, one of the downloadable publicly available documents on the website includes the following MCT scenario definition with the sample images: "Targets should be tracked once they are 10% screen height, 100% of their height is in the camera view, both shoulders can be seen. Systems should stop tracking targets when one or more of the above statements are no longer true."

The first MCT evaluation is due to be held in spring 2009. At the same time, pricing and policy and the means whereby interested parties in industry and universities can obtain the datasets appear to have been firmed up.

The Frequently asked Questions and answers section on the website is extremely helpful, and says that users can get a sample of i-LIDS before deciding to buy it.

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Editorial: continued from p. 2, column 1

experimental validation (~3 pages in BMVC) may not be possible if the sections on background and motivation are to be given adequate space. Is the answer always to include 50 tiny pictures in microstrips across page after page of a paper in order to prove that validation has been done?

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