

# BMVA News

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

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**BMVA** News<sup>1</sup> 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 2003.

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## Editorial: *Algorithm Complexity*

A year ago I had chance to remark that the effort we used to devote to fast architectures for machine vision, which had been very much an end in itself for many workers, was now much diminished – even desk PC's being able to run quite complex algorithms in real time. Ultimately, the reason for this is the continuation of Moore's law, with computer speeds and storage doubling roughly every 18 months or so. With such exponential rates of growth, every algorithm would in the end run in real time for any application. Well, not quite, because NP-complete algorithms get more complex at exponential rates that exactly match Moore's law, so for instance a matching algorithm would only be able to cope with one additional feature point every  $n$  years. This exception apart, I doubt if we have thought sufficiently about the consequences. Are our algorithms growing in complexity at the same exponential rate? Can we cope intellectually with the problems of designing very large chunks of code? How are we going to match the capabilities of the human brain if the software doesn't match the hardware we have available? It seems that we need to be thinking much more about automatic code generation: well, "much more" implies that we are already thinking about it, but I don't think we are, to anything like the required extent. To some degree, learning algorithms such as neural networks and genetic algorithms can help, though it is not obvious that success will lie in that direction, as training multilayer machines of the complexity of the brain must be altogether more problematic than training a 4- or 5-layer neural network. What, for example, about the need to collect all the necessary training data?

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<sup>1</sup>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.

## BMVA Elections and Appointments

As announced in the last issue of BMVA News, the newly elected members are: Prof ER Davies, Dr P Hall, Dr A Fitzgibbon, Dr J Ferryman, and Dr R Bowden. Co-optees are: Dr R Harvey, Prof T Ellis, Dr G Jones, Dr D Alexander, Dr J Gilby, Dr M Mirmehdi.

At a recent meeting of the Executive Committee, it was decided that the principal officers would be as follows:

- Dr D Alexander: Meetings officer
- Dr M Chantler: Treasurer
- Dr T Cootes: Chair
- Prof ER Davies: Newsletter
- Dr J Gilby: Industrial Liaison
- Prof J Kittler: IAPR representative
- Dr D Marshall: Secretary
- Dr M Mirmehdi: Publicity
- Prof CJ Taylor: Company secretary

Dr Tim Cootes  
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## BMVC 2005

After due consideration by the BMVA Executive Committee, it has been decided that BMVC 2005 will be hosted by Oxford Brookes and Oxford Universities.

## BMVC proposals

One thing that came out of the proposals for BMVC'05 was that although it is clear to the Committee what is expected in BMVC and what it is looking for in a proposal, this has not previously always been transparent to the bidders. To remedy this, a web page has been put together summarising what information should be provided in a proposal:

[http://www.bmva.ac.uk/admin/bmvc\\_proposals.html](http://www.bmva.ac.uk/admin/bmvc_proposals.html)

If anyone would like further clarification on the situation, please contact Dr Tim Cootes, Chair of the Executive Committee.

Dr Tim Cootes  
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## BMVA to participate in IPOT

The BMVA shall be taking part in the annual IPOT and Machine Vision show at the Birmingham NEC. The BMVA stand is provided free of charge by the organisers. This year we have the following members of the BMVA demonstrating their work at the stand.

1. Dr Andrew Davison, University of Oxford, Real-time Simultaneous Localisation and Mapping
2. Prof Maria Petrou, University of Surrey, Reverse Engineering the human Vision system, next generation artificial vision systems
3. Dr Alastair Allen, Aberdeen University, Real-time object identification/discrimination.
4. Prof Jim Austin - University of York, 3D face recognition system

A complimentary ticket for free entry to the event is included in this issue of the Newsletter (as long as they were delivered to the distributor on time – otherwise order your free ticket online).

Anyone wishing to send light materials for display and dissemination at the event please email me in the first instance.

Dr Majid Mirmehdi  
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## UKIVA celebrates 10<sup>th</sup> IPOT and Machine Vision exhibitions

The UK Industrial Vision Association (UKIVA) celebrates the 10th anniversary of the IPOT and Machine Vision exhibitions in February 2004 by hosting two days of free seminars. UKIVA has worked in close collaboration with Trident Exhibitions to support and promote the shows since before the first IPOT was launched. Nineteen members of the Association will be supporting the exhibitions, which will be located in Halls 11 and 12.

This year's seminars have the theme: "What's New in Machine Vision?" and a different programme will be run on each day of the exhibition. Full details can be found at: <http://www.ukiva.org>, and it is recommended that places are booked in advance. They can be booked on-line or by calling: 01763 261419. There will be contributions from UKIVA members Cognex UK,

FirstSight Vision, Framos Ltd, Jai UK Ltd, Multipix Imaging, Simac Masic + TSS and Stocker Yale (IRL) Ltd.

The UKIVA will also have its own stand (B131) where free advice to potential users of automated vision technology will be available, as well as the chance for manufacturers and distributors of vision products, components and services to discover the full benefits of membership.

UKIVA Enquiries: Jennie Harris or Don Braggins, UK Industrial Vision Association, PO Box 25, Royston, Herts, SG8 3TQ. tel: +44 (0)1763 261419; fax: +44 (0)1763 261961; email: [jennie@ukiva.org](mailto:jennie@ukiva.org); www: <http://www.ukiva.org>

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## BMVA mailbase

A few years ago I set up the BMVA mailbase (see <http://www.jiscmail.ac.uk/lists/bmva.html> for more details). This was back when I was running meetings and my main objective in setting it up was to provide a fast mechanism to reach our membership about forthcoming BMVA meetings. Previously our only method had been via the paper newsletter which meant that there was no way of providing last minute publicity and info prior to events. When I set up the mailbase I promised it would be low traffic – only meetings and other official BMVA business would be posted. My rational was to keep spam to a minimum in the hope that this would allow BMVA posts to remain salient in your inbox. Initially we received numerous posts from people who wanted to advertise jobs, conferences etc, but these were refused due to the above reasons (and a lot of spam which you don't see but if anyone wants Viagra I get several emails about it a month!). This served to be an unpopular choice with many, but hopefully our objective of keeping BMVA traffic to a minimum means that we gain more (rather than lose) subscribers. We currently have over 500 subscribers so I hope it has worked.

As a test we would like to try something new. We would like to allow you (the subscriber) to post to the list in a moderated form. It has therefore been decided to try an electronic newsletter that would be posted as a single mail similar to Pixel and Vislist where you can advertise conferences, vacancies or anything else such as questions etc. To keep emails to a minimum any such posts would be collated and forwarded to the list either

once a month or once every couple of months (depending upon interest). This would still mean you should receive no more than a couple of posts a month from BMVA hopefully still keeping our list free from SPAM and salient within you inbox.

If you have anything you would like to post, please forward it either to myself or to the mailbase for moderation.

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## BMVA Meeting on Spatiotemporal Image Processing

One-day BMVA symposium at the Royal Statistical Society, 12 Errol Street, London, UK on 24 March 2004.<sup>2</sup>

Chairs: Dr Adrian Hilton and Prof Mark Nixon

There is currently much research in the analysis of moving objects in sequences of images with application domains that include cinema, medicine, sport and biometrics. In order to provide a discussion forum for researchers and users of these new technologies, we welcome submissions that will present new technique for analysing sequences of images as well as submissions that concentrate on new application areas. We welcome research investigating novel representations and analysis of non-rigid scenes from both single and multiple view image sequences. Equally, submissions that focus on low-level feature extraction, as well as those which focus on higher-level shape analysis or content description are well within the scope of this meeting. Demonstrative working systems will be of especial interest to those seeking to apply these new techniques. The meeting will include an invited talk by Prof Andrew Blake. Those interested in presenting their work should email a 2 A4 page pdf mini-paper to Dr Adrian Hilton ([a.hilton@surrey.ac.uk](mailto:a.hilton@surrey.ac.uk)) by 10 January 2004.

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<sup>2</sup> For up-to-date information on this and other BMVA Technical meetings, see [www.bmva.ac.uk/meetings](http://www.bmva.ac.uk/meetings)

## Book Review – Yali Amit

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

This book discusses and develops a series of deformable template models, from coarse sparse models to more finely detailed models based on continuum formulations. Each model is defined in terms of a subset of points on a reference grid (the template), a set of admissible instantiations of these points (deformations), and a statistical model for the data give a particular instantiation of the object present in the image.

After the introductory discussion on various image analysis paradigms, chapter two provides an overview of the object detection and recognition models used and their mathematical description. Chapter three introduces a 1D deformable contour model and shows examples of such a model in MRI brain scan imaging. Chapter four extends this model to a 1D deformable curve to overcome issues where the 1D contour is confused by clutter. The calculation of the 1D curve is shown using both dynamic programming and global optimisation on a tree structure. Chapter five extends the model to a 2D deformable image and uses examples drawn from face recognition and MRI brain imaging. Both Gaussian and Bernoulli data models are described.

Chapter six introduces sparse models in an attempt to overcome the need for critical initialisation inherent with the 2D models due to the nonlinear nature of the cost function. A recurring theme of this and subsequent chapters is a coarse to fine approach. Chapter seven develops a dynamic programming model appropriate for when at most one instance of the object is expected in the image. A more general approach allowing for partial occlusions and multiple objects in the scene is described in chapter eight. Chapter nine develops tree and multiple tree classifiers for object recognition using OCR as an example application. Chapter ten discusses the more challenging problem of analysing complex scenes and merging detection and recognition. Rather than following the prevailing ‘bottom-up’ paradigm for analysing complex scenes, the author explores a different approach involving an initial processing stage to detect a sparse model.

Chapter eleven discusses neural network implementations but feels somewhat out of place from the other chapters which had followed a well structured development of the 2D non rigid image model. Chapter twelve describes in detail the use of software (freely available over the web) which runs many of the algorithms discussed in the book. The use of the software (which also contains the image sets used in the

book) means that readers can experiment with the methods developed in the book.

The book is logically laid out and a particularly nice feature is that all of the developed algorithms are described in stepwise detail, which together with the software source code means readers can fully understand the detailed implementation of the developed equations.

I would strongly recommend this book to any serious researcher in the field (the lack of example questions gives a clue that it is not a book for student use) with two warnings:

1. The author is a professor of statistics and despite the examples the book often feels more like a work on optimisation theory than machine vision.
2. The title should really be 2D non-rigid object detection. The author makes no secret that his aim is that all objects should be studied within one framework based on 2D views using non-rigid models. Researchers with a background of detailed analysis of 2D/3D rigid transforms and projections based on detection and labelling of lines, corners, junctions, etc will feel their valuable contributions to the field have been discarded.

Despite this the book makes a valuable contribution to this important area.

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## Book for Review

Here is another 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.

F Mokhtarian and M Bober *Curvature Scale Space Representation: Theory, Applications & MPEG-7 Standardisation*. Kluwer Academic, 2003, ISBN: 1-4020-1233-0

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