ncaf Natural Computing Applications Forum

Networks

Support NCAF at Royal Holloway

As Royal Holloway is the home of the Support Vector Machine (SVM) it seemed an obvious choice for the first day theme. The SVM is a learning machine that can perform binary classification and regression estimation, with good generalisation in high dimensional space.

Royal Holloway College, University of London 20–21 September 2001

The Autumn NCAF meeting will be hosted by the Computer Learning Research Centre (CLRC) at Royal Holloway College. The CLRC was established in January 1998 to provide a focus for fundamental research, academic leadership and the development of commercial-industrial applications. Led by Prof. Alex Gammerman, the CLRC focuses on the fields of computer learning, high dimensional data analysis, inductive/transductive inference and universal prediction.

As Royal Holloway is the home of the Support Vector Machine (SVM) it seemed an obvious choice for the first day theme. The SVM is a learning machine that can perform binary classification and regression estimation, with good generalisation in high dimensional space. An all-star line up of speakers will provide an in depth review of latest developments in the field. Confirmed speakers for the first day include Craig Saunders (Royal Holloway) Peter Sollich (King's College, London) Mike Tipping (Microsoft Research) and a keynote talk from Vladimir Vapnik (AT&T and Royal Holloway).

The second day will see a range of general papers in the field of natural computing. Mark Plumbley (King's College) will talk about musical analysis using independent component analysis, Romina Jose (King's College) will give a presentation on the analysis of renal nuclear medicine images using neural networks and Tony Wicks (Searchspace Ltd.) will discuss the use of genetic algorithms in intelligent business systems. To view the full programme, please visit the web-site.

Based on the available data (a high quality line up, beautiful surroundings and a relaxed atmosphere) the only solution is to support NCAF at Royal Holloway this September.

Mark Cheeseman
Rolls-Royce plc

INSIDE

Emergent behaviour in sweltering Oxford

3–4 July 2001

The punters thought that the day's proceedings were over, but they were wrong. Coming the other way was a party from a rival conference and the girl with the pole gave a first rate demonstration of a rival technology known as submergent behaviour as she disappeared below the surface.

In his preview of the meeting, Neil Townsend of Oxford University stated that the traditional NCAF/Oxford glorious weather was already pre-booked. How right he was! We all enjoyed the warmest two days of the summer.

The meeting itself took place in the subterranean, nay even below the level of the Isis, Claus Moser theatre, which was splendidly air-conditioned. Our host, Neil, welcomed us to the venue. This meeting was to be NCAF's first meeting at Wadham College right in the centre of Oxford; a mere stone's throw from the Camera and Bridge of Sighs and a mere bus ride from the nearest parking space. Wadham has enjoyed a singularly heterogeneous selection of Alumni, amongst whom we may count Sir Christopher Wren, Michael Foot, Melvyn Bragg and Roger Penrose. The last mentioned is famous for his many publications as Rouse Ball Professor of Mathematics and his unique pentagonal tiling, an example of which may be seen outside the Junior Common Room (JCR).

The main theme on the first day was Emergent Behaviour. No one definition is fully accepted, but the consensus seems to be, an interactive behaviour of units which emerges but is not directly deduced from the behaviour of the individual units. Several speakers presented a range of perspectives on this theme.

First to bat

First to bat was Andy Wright, well known to NCAF members, particularly those that have ever visited BAe Systems in Bristol. Andy told us of his work on flocks of bodies connected by springs and dashpots. He described how the springs had to be non-linear to behave realistically and how the behaviour changed dramatically with changes in damping. The concept of rewards was introduced and the evolving behaviour of multiple runs was investigated. It was found that more reproducible behaviour often emerged with a little noise added. Andy then moved on to the simulated games of Monsters and Princesses. This game with multiple autonomous agents can be related to air-to-air combat strategies but looked pretty good fun to many of us.

We then had a presentation on the theme of Emergence in Social Behaviour from a sociologist, Edmund Chattoe. He claimed that human foibles move simulated behaviour into realms not seen in physical systems. He cited riots to support his case, and then went on to discuss his studies in investment practice. The presentation, in particular the views on physical systems, gave much food for thought and stimulated considerable discussion.

There followed a brief commercial break by Jim Fleming on behalf of EPSRC. He told of a new initiative called the GRID, which is intended to mobilise computing resources across the country for the benefit of all. It was envisaged that petaflops of processing power, exabytes of memory and data flows of terabits per second would all be available. This would all come about due to many tens of megapounds of government investment. If we visit http://www.research-councils.ac.uk/escience/ in the coming weeks we should see more about this.

Publications review

Andrew Swann's (Rolls-Royce plc) presentation reverted to the Emergent Behaviour theme with a review of publications on Reinforcement Learning. He cited over 20 references in detail and summarised them all in a compact presentation. Summarising this in a couple of sentences is beyond my ability, but I'm sure this presentation will be on the NCAF web site, and it looks a good starting point for workers in this field.

Paul Kearney of BTExact Technologies did not present until the second afternoon, but his contribution was at the heart of Emergent Behaviour hence we note his contribution here. Paul had developed autonomous workstation agents in Java that negotiated up and down stream for their work in an integrated environment. Thus there was the possibility to create an ensemble of independent work centres under autonomous control. The interaction and flow of work between the stations could be viewed through an appropriate graphics interface to see total work patterns emerge.

Nigel Allinson of UMIST took the stage after Andrew Swann. He tried lamely to explain how he came to be photographed with a 70 year old *Playboy* centrefold called Lena to while the time away as his Macintosh booted up. He then moved faultlessly into a polished presentation on the design of filters with nets. He gave two most impressive instrumentation examples. Micro-electrophoretic Particle Velocity detection was shown to be considerably enhanced with discrete wavelet filter techniques. Noisy Diffraction pattern spots were then located to a most impressive 1/50 of a pixel using tuned non-linear RBF models. In part two of the presentation Nigel talked of several forms of self-organising Maps and introduced a clever attraction/repulsion technique called ViSOM to separate data clusters. Once again we were very pleased to see Nigel's Sammon Mapping of The Times League Table of Universities. One had to expect the usual comments; as ever Fen Poly and the other place were at the top. The binary divide between redbrick and the new lot was still very evident, and with great fortitude no one mentioned John Betjeman's "Come, friendly bombs, and fall on Slough!"

Correct Solution

Puzzle Corner was almost brought to an untimely halt as the correct solution was inadvertently blurted out from the audience before proceedings had begun. Not to be put off Fenella continued to press gang volunteers. If twisting ends, inserting batteries and simulating bells was not enough, Emma was particularly disturbed at having to play the role of a radioactive room, clearly a part to challenge the most talented of method actors. Notwithstanding she acquitted herself with glowing thingamajigs just in time for Lionel's presentation.

Lionel Tarrasenko of Oxford University concluded the formal business of the day with a brief history of the Oxford BioSignals flotation which had been assisted by Isis Innovation. He explained how their BioSleep monitor now had FDA approval and was all set to support the company through the more challenging multi-sensor monitoring development activities.

This led nicely up to Oxford BioSignals hospitality canapés and drinks in the cloister gardens. The weather could not have been better and somewhat refreshed the attendees departed for The Bold and Saucy Theatre Company's performance of *The Taming of the Shrew* or punting on the Cherwell.

The punters thought that the day's proceedings were over, but they were wrong. Coming the other way was a party from a rival conference and the girl with the pole gave a first rate demonstration of a rival technology known as submergent behaviour as she disappeared below the surface.

The four punting parties and the playgoers all assembled in a first rate Indian Restaurant known as The Bombay. All 24 of us ate well for a very reasonable price. Drinks on the terrace outside the JCR rounded off the evening, as the assembled party tried to spot the Penrose tiles.

Some of us straggled into breakfast the following morning, but all of us managed to get down in good time for the second day's technical sessions.

Charles Johnston of Coventry University gave a very clear presentation on Fitting Densities and Hazard Functions with Neural Networks. He showed how well logistic curves match cumulative Gaussians and how his techniques amply modelled linear mixing of inputs for melanoma sufferers.

Charles' colleague from Coventry, Colin Reeves talked about Statistical Properties of Combinatorial Landscapes. Discrete spaces often have numerous local optima, furthermore the basins of attraction may vary in size. Searching for global solutions can be time consuming and taxing. Appropriate encoding and search of the space with GA's can simplify matters and Grey coding was advocated as one technique worthy of serious consideration. NCAF were pleased to hear from Coventry and hope to hear more in the future.

Egyptian Times

Julian Ashbourne of British Airways had to go back to Egyptian times to find the true origins of Biometrics. He catalogued a wide range of techniques used and explained how the technology coupled with computerised data bases was making significant inroads into the reduction in occurrence of repetitive bogus asylum seekers. The future international acceptability and standardisation of methods should be aided by BANTAM, a modelling language for Biometrics.

Having reported Paul Kearney's work earlier, that leaves just two more papers to report. Whether we are academics or industrialists we always like to welcome new young scientists to the fold. This meeting had two exceptional youngsters who reported on their thesis work.

Shelley Cazares of Oxford University made a most professional presentation on her analysis of a Foetal Distress Monitor. It was based primarily on a five vector representation of the foetal heart rate cross correlated with the mother's movements and then presented in a 2D feature space for clinical acceptability. This work was brought into sharp focus when Shelley pointed out that the stress during birth was probably in excess of that of bungee jumping.

Riz Choudrey of Oxford University performed a great Ali G when he discussed the relative merits of Bayesian systems to segregate hardcore maths journals from *Playboy* magazines. He showed a thorough command of the mathematical concepts when he talked of Mixed Gaussian Models, Bayesian techniques to avoid over-fitting and a variational method to allow computational tractability. He also showed acute social awareness as he de-convolved an image of his supervisor, one Dr Steve Roberts, from an image of 'a random punter' otherwise known to the audience as A. Einstein.

Well done Oxford, well done all the speakers, and well done whoever sorted the weather.

It was great. Here's to the September meeting where, as ever we can work hard, play hard and network more effectively than any other environment.

Peter Herdman
Arjo Wiggins

PUZZLE CORNER

Number 18

The Countess Portmanteau Von Shibboleth was hosting a gala dinner to celebrate the opening of a new faculty at the University of Solecism-on-Malaprop. The groundbreaking Department of Neology and Nematodic Alliteration, resplendent in its shining ivory towers, nestled precariously on the banks of the gently meandering Malaprop. The new faculty was to be headed by the illustrious Professor Buglecomfort and boasted no less than nine other icons of the etymological pantheon, namely Professors Chimneybuff, Doughfallen, Furbicandupe, Goodbluph, Hedgecamp, Lambdung, Maplebirch, Nordicflap and Puffingham.

Von Shibboleth seated her ten professors around their own circular table of honour, fully expecting the repartee to flow like fine wine. To her horror she was informed by Buglecomfort that he could not possibly lower himself to converse with anyone whose name did not contain his initial, i.e. B. As she started to organise the necessary swapping of his neighbours, the full enormity of the lexicological nightmare unfolded when ALL the professors insisted on the same treatment. No-one would agree to sit next to anyone whose name did not share their initial.

Fearing an embarrassing shambles of gastronomic proportions, Port, as her friends liked to call her, beseeched Lisa to try to find an acceptable seating plan for the egregious professors. Lisa studied their names for a moment and concluded that there had to be at least one workable arrangement. She then instigated a procedure which was guaranteed to terminate with a successful permutation.

What was Lisa's version of musical chairs, why was it guaranteed to succeed and what is an example of a satisfactory arrangement?

The answers will be given at the next NCAF meeting (20–21 September 2001, Royal Holloway College).

Fenella the Rottweiler

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COMMITTEE NOTES

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NEXT EDITION
Review of the Royal Holloway College meeting
Preview of the University of Exeter meeting

First Annual BCS Prize for Progress Towards Machine Intelligence

Fifty years ago, AI started off with a big vision – to make machines intelligent. The most famous of all AI tests, the Turing Test, has this very concept at its heart. But somehow this noble vision has been diluted over the years – if you visit most AI conferences these days you would be hard pushed to find anything of that original pioneering zeal amongst the papers on new forms of logic and algorithms for controlling distributed agents.

Well, two organisations have decided to fight back, and try to set the sights of the AI community back on that original goal: intelligent machines.

The British Computer Society's Specialist Group on KBS and Applied AI (SGES) and the Applied Knowledge Research Institute (AKRI) are offering a prize for the best demonstration of progress towards machine intelligence. The first competition for this new annual prize will be held at SGES's conference, ES2001, to be held in Cambridge, UK in December 2001. Competitors will be invited to give a 10-15 minute demonstration of their systems to the conference delegates. The aim is not to discuss how their systems work, but to demonstrate that they are making progress towards intelligence. The delegates will then vote for the system they consider shows the most 'progress towards an intelligent machine', and the prize will be presented at the conference dinner, in the magnificent surroundings of Peterhouse College's thirteenth century hall.

The competition is open to all, and there is no fee for taking part. Competing systems can be hardware (eg a robot) or software. Competitors will be provided with a PC and an internet link, but can bring whatever additional equipment they wish. The prize will be a trophy and a cash prize of £250.

SGES and AKRI hope, of course, that this will provide an interesting element to the conference, but they also have a more serious agenda. They believe that AI is in danger of being marginalized by the community's navel gazing activities, where major conferences can feature a hundred papers with hardly a mention of practical applications or machine intelligence. The groups hope that this annual competition and prize will spur AI researchers and developers to produce and demonstrate machines that do things that the general public will recognise as being clever, appealing, surprising and interesting, and so promote a new debate about the nature and achievability of machine intelligence.

Full details of the competition can be found at the ES2001 website (see Diary Dates), or by contacting the organisers Prof. Max Bramer, Chairman, SGES (Max.Bramer@bcs.org.uk) or Dr. John Gordon, Director, AKRI (john@akri.org).

Richard Ellis, Stratum Management

DIARY DATES 2001/2

4–6 September 14th International Congress on Condition Monitoring and Diagnostic Engineering Management (COMADEM) 2001.
http://www.eng.man.ac.uk/mech/comadem.htm

20–21 September NCAF – Royal Holloway College. Contact: Mark Cheeseman
e-mail: enquiries@ncaf.org.uk
Tel: +44 0 (1332) 246989

10–12 December ES2001: Cambridge, England, http://www.bcs-sges.org/es2001/ Closing date for submission of papers is 25 May 2001.
Contact Richard Ellis e-mail: richard.ellis@stratum-management.co.uk

January 2002 NCAF – University of Exeter (provisional venue).
Contact: Mark Cheeseman
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Tel: +44 0 (1332) 246989

11-15 February 2002 Third WSES International Conference on Neural Networks and Applications (NNA '02). Interlaken, Switzerland.
Contact: interlaken2002@worldses.org

11-15 February 2002 Third WSES International Conference on Fuzzy Sets and Fuzzy Systems (FSFS '02). Interlaken, Switzerland.
Contact: interlaken2002@worldses.org

11-15 February 2002 Third WSES International Conference on Evolutionary Computation (EC '02). Interlaken, Switzerland.
Contact: interlaken2002@worldses.org

12–15 February 2002 ICAIS 2002. First International ICSC Congress on Autonomous Intelligent Systems. Deakin University, Waterfront Campus Geelong, Australia.
www.icsc-naiso.org/conferences/icais2002

16–17 April 2002 Operational Research Society (UK): Local Search Study Group Two Day Workshop. City University, London, UK.
http://www.orsoc.org.uk/

17–20 June 2002 IEA/AIE-2002 Fifteenth International Conference on Industrial & Engineering Applications of Artificial Intelligence & Expert Systems. Cairns, Australia.
http://iea2002aie.bsee.swin.edu.au

MEMBERS' NEWS AND VIEWS

Deadline for contributions for the next edition – 29 October 2001. Please send to: Managing Editor, Inspector Rick Adderley, e-mail: Insp1908@aol.com or r.adderley@westmidlands.police.uk