International ICSC Congress on

COMPUTATIONAL INTELLIGENCE: METHODS AND APPLICATIONS (CIMA'2001)

Second International ICSC Symposium on
ADVANCED COMPUTING IN BIOMEDICINE
(ACBM'2001)

Second International ICSC Symposium on
ADVANCED COMPUTING IN FINANCIAL MARKETS
(ACFM'2001)

Second International ICSC Symposium on
ADVANCES IN INTELLIGENT DATA ANALYSIS
(AIDA'2001)

Second International ICSC Symposium on
FUZZY LOGIC AND APPLICATIONS
(FLA'2001)

June 19-22, 2001

University of Wales
Bangor
United Kingdom

ICSC
International Computing Sciences Conventions
Canada/The Netherlands

NAISO
Interdisciplinary
Research

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Welcome by the General Chair

It is a pleasure and a great honour to welcome you to the Second International Congress on Computational Intelligence: Methods and Applications, CIMA 2001.

It is difficult, if not impossible, to bring together in a single formal definition disparate areas with their own established individualities such as fuzzy sets, neural networks, evolutionary computation, machine learning, Bayesian reasoning, etc. “Computational Intelligence” is rather the intuition behind the synergism between these and many more, at the meeting place of Computer Science, Mathematics and Engineering. Having written that, I inflicted upon myself the wrath of some “hardliners” for whom Computational Intelligence is defined once and for all. An angry professor warned us to `stop distorting the terminologies'. Is `Computational Intelligence' a fixed list of areas or is it as general as the idea of inventing smarter computational methods, technologies and algorithms? What do you think? CIMA 2001 is your forum to state your point of view, debate and discover, and build a contemporary profile of Computational Intelligence.

To address the diversity of disciplines, CIMA 2001 features four symposia: FLA 2001 (Fuzzy Logic and Applications), AIDA 2001 (Advances in Intelligent Data Analysis), ACBM 2001 (Advanced Computing in BioMedicine), and ACFM 2001 (Advanced Computing in the Financial Markets). We received 168 submissions of which 146 were accepted. CIMA 2001 attracted participants from 32 countries. We hope that you will find the program interesting, educational and entertaining. More importantly, we hope you will enjoy your off-session times which are anyway more relevant (once upon a conference banquet I sat next to Jim Bezdek, the legend, and this changed my life!).

Why Bangor? Because of the spectacular coast scenery, fabulous medieval castles around, and remarkable number of pubs per capita. Watching the peacefully grazing sheep on the green hills of Wales might not be top Computational Intelligence experience but it certainly makes a great break from the office rush, paperwork and pressure. North Wales is now opening for the 21st century technology in computing on a larger than just academic scale. Let us hope that CIMA 2001 will be an inspiration and a catalyst for this process.

I wish to thank first and foremost you, the author, for sharing with us your thoughts, ideas and experience. Sincere thanks to the keynote speakers and tutorial presenters. The hard work of the symposia Chairs: Vilem Novak and Irina Perfilieva, Czech Republic (FLA'01), Mayer Aladjem, Israel (AIDA'01), Friedrich Steimann, Germany (ACBM'01), and Christian Haefke, USA (ACFM'01) is greatly appreciated. Thanks to the members of the International Program Committees for reviewing the papers and putting up with short notices and miscommunication. Many thanks to the organizers from ICSC NAISO Jeanny Ryffel and Susan Kraaijeveld and their teams for making CIMA 2001 happen.

May you all have a great time in Bangor. Welcome to CIMA 2001!

Ludmila I. Kuncheva
General Chair of CIMA 2001
Bangor, United Kingdom

Chairs

General Chair
Dr. Ludmila I. Kuncheva
University of Wales
School of Informatics
Bangor
Gwynedd LL57 1UT
United Kingdom

Co-chair
Prof. Tim Porter
University of Wales
School of Informatics
Bangor
Gwynedd LL57 1UT
United Kingdom

International Programme Committee

ACBM' 2001
Dr. Friedrich Steimann (Symposium Chair)

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ACFM' 2001
Dr. Christian Haefke (Symposium Chair)

International Scientific Committee
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AIDA' 2001
Dr. Mayer Aladjem (Symposium Chair)

International Scientific Committee
Anderson P., RIT, USA; Armstrong B., U of Alberta, Canada; Arsham H., U of Baltimore, USA; Ben-Arie J., Univ. of Illinois at Chicago, USA; Biswas G., Vanderbilt, USA ; Cios K., University of Colorado, Denver, USA; Duin, R., Delft University of Technology, The Netherlands; Ferri F., U of Valencia, Spain; Gori M., U of Siena, Italy; Guterman H., Ben-Gurion University of the Negev, Israel; Ho T., Lucent Technologies, USA; Hoffman A., University of New South Wales, Australia; Jain A.K., Michigan State University, USA; Kittler J., University of Surrey, U.K.;A Krzanowski, W.J.University of Exeter, U.K.; Kudo M., Hokkaido University, Japan; Lerner B., Ben-Gurion University of the Negev, Israel; Mardia K., U of Leeds, U.K.; Mayer H. A., University of Salzburg, Austria; Meer P., Rutgers University, USA; Oja E., Helsinki U of Technolgoy, Finland; Posse C., KangarooNet Inc., USA; Preece A., University of Aberdeen, Scotland, U.K; Pudill P., Institute of Information Theory and Automation, Czech Republic; Raveh A., The Hebrew University of Jerusalem, Israel; Roberts S., Imperial College London, U.K; Singh S., University of Exeter, U.K.; Steele N., U of Coventry, U.K.; Tax D., Delft University of Technology, The Netherlands; Webb A., Defence Research Agency, Malvern, U.K.; Wnek J., Science Applications International Corporation, U.S.A.; Xu L., U of Hongkong, Hongkong; Zelterman D., Yale University, U.S.A.

FLA' 2001
Dr. Vilem Novak (Symposium Chair)

International Scientific Committee
Armstrong W., Dendronic Decision Limited, Canada; Babuska R., Delft University of Technology, Netherlands; Bodenhofer U., Software Competence Center Hagenberg, Austria; de Baets B., University of Gent, Belgium; di Nola A., Università di Salerno, Italy; Dubois D., Université de Liège, France; Esteva F., Inst. d'Investigacio en Inel.ligencia Artificial, Spain; Gabrys B., University of Paisley, United Kingdom; Godo L., Spanish Scientific Research Council, Spain; Grabisch M.l, Université Pierre et Marie Curie, France; Hajek P., Institute of Computer Science, Czech Republic; Halgamuge S., The University of Melbourne, Australia; Klawonn F., Fachhochschule Oldenburg/Ostfriesland/Wilhelmshaven, Germany; Kreinovich V., University of Texas at El Paso, USA; Lakov D., Bulgarian Academy of Sciences, Bulgaria; Kerre E., University of Gent, Belgium; Mesiar R., SvF STU Bratislava, Slovakia; Mukaidono M., Meiji University, Japan; Nauck D., BT's Advanced Communications Technology Centre, United Kingdom; Ono H., School of Information Science, Japan; Steele N., Coventry University, United Kingdom; Turunen E.,Tampere University of Technology, Finland; Ulieru M., University of Calgary, Canada; Vachkov G., Kitami Institute of Technology, Japan

Congress Organizer

ICSC/NAISO The Netherlands (Operating Division)
P.O. Box 1091
3360 BB Sliedrecht
The Netherlands
Phone: +31-184-496999
Fax: +31-184-421065
Email: cima@ITStransnational.com
operating@ITStransnational.com

Who is ICSC?

International Computing Sciences Conventions is a non-profit making multinational association interested in development of science and technology. Participation in its activities is encouraged on a worldwide basis.
The main purpose of ICSC is to assist the communication between researchers in the field of computing science and its technological applications. The science of computing and the range of technological applications are both rapidly developing.
ICSC will achieve this purpose in the first instance by the arrangements of symposia, conferences, seminars and workshops in cooperation mainly with universities and industries. The activities include the interchange and circulation of information on science and technology between national, international and private organizations, as well as the production of relevant publications.

Who is NAISO?

The **Natural and Artificial Intelligence Systems Organization (NAISO)** was recently founded and is presided by **Peter Anderson**, RIT New York, USA.
The objectives of NAISO are the encouragement of efficient communication between scientists, researchers, engineers and practitioners in the field of natural and artificial intelligence systems.
Sharing the work with people in other, perhaps unrelated, fields, new thinking about our own work is generated. Fresh, lateral thinking is the aim of NAISO.
The promotion of interaction between research and industry worldwide is one of the principal aims. NAISO will meet these objectives by the arrangements of international conventions, conferences, mini-tracks and workshops.
NAISO is represented by its International Academic Advisory Council (IAAC), designed as a source of academic guidance and active support for future projects.

General Information: Bangor

Bangor is a small rural city of approximately 15,000 people. It is located between the Menai Straits and the foot of the Snowdonia National Park. With the surrounding medieval castles at Caernarfon, Conwy, and Beaumaris and the Roman fort of Segontium, tourists to Bangor will find themselves swept away deep into the history of Wales.
The university in Bangor was founded in 1884 and has become an integral part of the community. During the school year, the population of Bangor increases by approximately 5,000 people. There is a diverse range of shopping and entertainment to be found throughout Bangor and various activities are ongoing.
For more information please visit the local Bangor website at:
www.bangor.ac.uk/university.html

Important Telephone Numbers

Bank/Cash Machine

Barclays Bank	273 High Street, Bangor	+44 (0)1248 370070
Lloyds	268 High Street, Bangor	+44 (0)1248 370132
HSBC	42 Holyhead Road, Bangor	+44 (0)1248 370266
HSBC	274 High Street, Bangor	+44 (0)1248 370134
Nat West	247 High Street Bangor	+44 (0)1248 671222
TSB	264a High Street, Bangor	+44 (0)1248 370804
Post Office	Deiniol Road, Bangor	

The nearest cash machines are situated at Safeway Supermarket and HSBC on Holyhead Road.

Chemist, Medical, Doctors

The Pharmacy, Safeway, Holyhead Road, Upper Bangor	+44 (0)1248 351131
Barbara Roberts, 29 Holyhead Road, Upper Bangor	+44 (0)1248 353382
Boots, High Street, Bangor	+44 (0)1248 362822

In an emergency please dial 999

If you require the services of a doctor please call:
Bodnant Surgery, Menai Avenue, Upper Bangor
+44 (0)1248 364567
Out of hours – for medical emergencies only during evenings and weekends:
+44 (0)1248 678999

Transport

Lunns Taxi's	+44 (0)1248 353535
City Cabs	+44 (0)1248 372222
Arriva Bus Service	+44 (0)1248 750444

Electricity
The voltage in The United Kingdom is 240 volts. Adapter is needed.

Shopping
Bangor is well serviced with a variety of shops in High Street and in the Wellfield and Deiniol Shopping Centres. Opening hours are from 9.00am – 5.30pm. Some of the smaller shops still have half day closing on a Wednesday.

Church Services

Bangor Cathedral, Bangor	Denomination – Church in Wales
St James Church, Holyhead Road, Bangor	Denomination – Roman Catholic
Assembly of God, Pentecostal Church, Princes Road, Bangor	Denomination – Pentecostal
St John's, High Street, Bangor	Denomination – Methodist
Baptist Church, Penrallt, Bangor	Denomination – Baptist
Quaker Meeting House, Dean Street, Bangor	Denomination - Quaker
Mosque, High Street, Bangor	

Newpapers
Local, National and International newspapers can be purchased from the Newsagents on Holyhead Road, Upper Bangor open 7.00am – 11.00pm daily.

Restaurants
Herbs is a sit-in and take-away restaurant, specialising in vegetarian food. There are meat dishes to be found in this place as well.
307 High Street, Bangor. +44(0)1248 351 249

The Pepper Mill is situated in the Wellfield Shopping Centre, hence it is only open during normal shopping hours. It serves a good range of health foods and home-made cakes.
Wellfield Shopping Centre, Bangor.

The La Bella Vita is an Italian restaurant on the High Street. The food is pretty good, with a good variety.
166 High Street, Bangor. +44(0)1248 362 920

The Fat Cat is a stylish cafe/bar with excellent food. There is a good variety to be had there at reasonable prices. The beer prices are however a bit expensive. Remember to book a table in advance, as the place becomes quite busy at times.
161 High Street, Bangor. +44(0)1248 370 445

General Information: Congress

Registration Desk / Hospitality Desk

The registration desk will be located at the main college complex, entrance hall
Opening times:

Monday 18 June 2001	16.00–18.00
Tuesday 19 June 2001	08.30–16.30
Wednesday 20 June 2001	08.30–13.00
Thursday 21 June 2001	08.30–13.00
Friday 22 June 2001	08.30–13.00

Paper Presentations

Please note that the scheduling of the presentations is final and that changes cannot be made without affecting many other speakers and listeners. Thank you for your cooperation.

Each paper will be presented by one of the authors. The speakers are requested to report to the session chairman in the assigned conference room not later than 10 minutes before the session starts. The time assigned for each paper is 20 minutes (including 5 minutes for discussion). All speakers and session chairs must strictly adhere to the time schedule.

Each conference room is provided with a screen, overhead projector and data projector.

Congress Proceedings Publications

The congress proceedings will be available at the conference either on cd-rom or as printed edition. All papers presented at CIMA 2001 are published in these proceedings. Additional copies are available from ICSC Academic Press, The Netherlands.

ISBN3-906454-26-6
Selected papers will be considered for publication in leading international journals.

Optional Social Program

Excursion to Historic Conwy. Tickets can be purchased next to the registration desk.

Welcome Reception, Lunches, Dinner and Coffee Breaks

Welcome Reception will take place on the Terrace at the University
Coffee Breaks will take place in PJ Hall
Lunches will take place in John Morris Jones Hall
Conference Dinner will take place in John Morris Jones Hall

General Information: University

Address of the Conference Site
Main Arts Building
University of Wales
College Road
Bangor LL57 2 DG
Wales United Kingdom

History
The University of Wales Bangor came into being as a direct result of a campaign in the late nineteenth century for better higher education provision in Wales.
The University opened on 18 October 1884 in an old coaching inn with 58 students (29 of them women) and 10 teaching staff.

Today the University has over 7000 students, 17 academic departments and over 300 teaching staff. It is therefore large enough to ensure a breadth of academic and social activities, but is sufficiently compact to enable the individual student to maintain a sense of identity in a friendly and caring community. A feature of University life is its close-knit community spirit, and its ability to integrate within the life of the city. Although not a campus university, all the departments and halls of residence - with the exception of the School of Ocean Sciences - are within easy walking distance of one another.

Disabled Facilities
There is access to meeting rooms and also toilet facilities for wheelchair users in the Main Arts Building.

First Aid
First Aid facilities are situated in the Porters Lodge in the Main Arts Building. There will be a First Aider on duty in this lodge when the conference is taking place.

Food and Beverage
Bar is opened each evening from 5.30 p.m.-11.00 p.m. Location: on Friddoed site
Vending machines are located in the foyer of Plas Gwyn Hall offering a variety of snacks, chocolates and cold drinks

Smoking Policy
There is a no smoking policy in operation in the Main Arts Building. Delegates must go outside if they wish to smoke.

Congress Schedule

Congress Schedule Tuesday, 19 June 2001

09.00-10.30	Tutorial: Multivariate Adaptive Regression Splines: An alternative to Neural Nets Dr. D. Steinberg	Lecture Room 4	19
10.30-11.00	Coffee break	PJ Hall	
11.00-12.00	Tutorial: Multivariate Adaptive Regression Splines: An alternative to Neural Nets Dr. D. Steinberg	Lecture Room 4	19
12.00-13.00	Lunch	John Morris Jones Hall	
13.00-14.30	Tutorial: An Introduction to Learning Probabilistical Graphical Models Dr. B. Lerner	Lecture Room 4	20
14.30-15.00	Coffee Break	PJ Hall	
15.00-16.00	Tutorial: An Introduction to Learning Probabilistical Graphical Models Dr. B. Lerner	Lecture Room 4	20

Congress Schedule Wednesday, 20 June 2001

09.00-10.30	Opening Ceremony	Main Arts Lecture Theatre	
	Welcome by the Congress General Chair: Dr. Ludmila I. Kuncheva, University of Wales, Bangor		
	Welcome address by Prof. Roy Evans, the Vice-Chancellor of the University of Wales, Bangor		
	Keynote lecture by Dr. James Bezdek		
	Some Remarks on Computational Intelligence in the 21st Century		21
10.30-11.00	Coffee Break & Poster Viewing	PJ Hall	
11.00-13.00	Parallel Technical Sessions		
	W 1.1: ACBM Discrimination and Classification	Lecture Room 1	22
	W 1.2: FLA Theory 1	Lecture Room 2	23
	W 1.3: ACFM Conditional Volatility, Dependence and Risk	Lecture Room 3	24
	W 1.4: FLA Applications	Lecture Room 4	25
	W 1.5: AIDA Invited Session Computational Models for Predicting Biologic Activity from Chemical Structure Dr. Vincent Arena	Lecture Room 5	26
13.00-14.00	Lunch	John Morris Jones Hall	
14.00-14.45	Poster 'Question and Answer' Sessions	PJ Hall	27
14.45-15.30	Keynote lecture by Dr. Stephen Roberts Model Selection - Computational Methods and Applications	Main Arts Lecture Theatre	29
15.30-16.00	Coffee break & Posters	PJ Hall	
16.00-18.00	Parallel Technical Sessions		
	W 2.1: ACBM Medical Decision making and AI	Lecture Room 1	30
	W 2.2: FLA Theory 2	Lecture Room 2	31
	W 2.3: ACFM Computing in Business	Lecture Room 3	32
	W 2.4: ACFM Option Pricing	Lecture Room 4	33
	W 2.5: AIDA Invited Session Data Mining and its Applications: Algorithms and Techniques Dr. Tatjana Welzer	Lecture Room 5	34
	W2.6: AIDA Neural Networks and Machine Learning	Powis Hall	35
18.00-19.30	Welcome Reception	Terrace University	

Congress Schedule Thursday, 21 June 2001

09.00-09.45	Keynote lecture by Dr. Andrew Webb Advances in Applied Statistical Pattern Recognition	Main Arts Lecture Theatre	36
09.45-10.30	Keynote lecture by Dr. Jihad Nader Cultural and Historical Perspectives on the Prospects for the Development of Computational Intelligence the Arab Wolrd	Main Arts Lecture Theatre	37
10.30-11.00	Coffee Break & Posters	PJ Hall	
11.00-13.00	Parallel Technical Sessions		
	T 1.1: ACBM Medical Image processing	Lecture Room 1	38
	T 1.2: FLA Fuzzy Modeling	Lecture Room 2	39
	T 1.3: ACFM Forecasting and Trading 1	Lecture Room 3	40
	T 1.4: FLA Decision-Making	Lecture Room 4	41
	T 1.5: AIDA Invited Sesion Perceptual Computation Dr. Minechi Kudo	Lecture Room 5	42
13.00-14.00	Lunch	John Morris Jones Hall	
14.00-14.45	Keynote lecture by Dr. Chistian Posse Latent Semantic Pursuit	Main Arts Lecture Theatre	43
14.45-15.30	Keynote lecture by Dr. Gautam Biswas Applying the Hidden Markov Model Methodology for Unsupervised Learning of Temporal Data	Main Arts Lecture Theatre	44
15.30-16.00	Coffee Break & Posters	PJ Hall	
	Afternoon off Optional Excursion to Conwy		
20.00-22.00	Conference Dinner	John Morris Jones Hall	

Congress Schedule Friday, 22 June 2001

09.45-10.30	Keynote lecture by Dr. Mayer Aladjem Recursive Training of Neural Networks for Pattern Recognition		Main Arts Lecture Theatre	45
10.30-11.00	Coffee break & Posters		PJ Hall	
11.00-13.00	Parallel Technical Sessions			
	F 1.1: ACBM	Medical Signal processing	Lecture Room 1	46
	F 1.2: ACFM	Forecasting and Trading 2	Lecture Room 2	47
	F 1.3: FLA	Fuzzy Control 1	Lecture Room 3	48
	F 1.4:AIDA	Classification Techniques & Applications	Lecture Room 4	49
	F 1.5: ACBM	Invited Session Data Mining and its Applications: Data Mining in Medicine Dr. Peter Kokol-Dr. Milan Zorman	Lecture Room 5	50
13.00-14.00	Lunch		John Morris Jones Hall	
14.00-16.00	Parallel Technical Sessions			
	F 2.1: ACFM	Forecasting and Trading 3	Lecture Room 1	51
	F 2.2: FLA	Fuzzy Control 2	Lecture Room 2	52
	F 2.3: AIDA	Data Mining	Lecture Room 3	53
16.00-16.30	Coffee Break		PJ Hall	
16.30-17.30	Closing Ceremony		Main Arts Lecture Theatre	

Tuesday

09.00-10.30 Title Tutorial: **Lecture Room 4**
11.00-12.00 Multivariate Adaptive Regression Splines: An Alternative to Neural Nets
Author: Dr. D. Steinberg
Salford Systems, San Diego, USA

CART¨ (Classification and Regression Trees)
CART¨ is the only decision-tree tool based on the original CART code developed by Stanford and UC Berkeley statisticians. Offering superior speed and ease-of-use, CART automatically provides insight into data and produces highly accurate, intelligible predictive models.
MARSú (Multivariate Adaptive Regression Splines)
MARSú, is a high-speed flexible regression tool for data mining and predictive modeling that is a natural alternative to neural networks and more conventional regression models.

Dan Steinberg has over 20 years of experience in data mining and statistical consultation. Steinberg, who received his Ph.D. in Econometrics from Harvard University, has served on the technical staff (MTS) at AT&T Bell Laboratories, as Assistant Professor of Economics at the University of California, San Diego, and as a consultant for numerous Fortune 100 clients. In addition to publishing articles in statistical, econometric, computer science, and marketing journals, he has developed a series of advanced statistical-analysis programs for Salford Systems. Steinberg has received awards from the SAS Usersâ Group International and the American Marketing Association and has been a featured speaker on data-mining issues for the American Marketing Association, the American Statistical Association, the Direct Marketing Association and at DCIâs Database and Client/Server Conference. A book on CART¨ by Dan Steinberg, Yuji Horie and Atsushi Ootaki was just awarded Japanâs Nikkei Quality Control Literature Prize by the Deming Prize Committee.

Tuesday

13.00-14.30 Title Tutorial: Lecture Room 4
15.00-16.00 An Introduction to Learning Probabilistical Graphical Models
Author: Dr. B. Lerner
Ben-Gurion University, Beer-Sheva, Israel

The tutorial will focus on inference and learning issues in probabilistic graphical models. It will distinguish between directed and undirected graphical models, where the former are usually called Bayesian (or Belief) networks and the latter Markov random fields. Supervised and unsupervised learning of the structure and parameters of Bayesian networks will be demonstrated. Since inference and learning in graphical models representing real-world problems are often found to be intractable, different approximations, such as Laplace, Monte Carlo and variational, will be suggested. The framework of variational methods will be described and the application of the methods to inference and learning in intractable graphical models will be presented.

Wednesday

09.45-10.30 Title Keynote lecture: Main Arts Lecture Theatre
Some Remarks on Computational Intelligence in the 21st Century
Author: Dr. J. Bezdek
University of West Florida, Pensacola, Florida, USA

This talk is pretty far afield from the other talks that will be presented at CIMA. Last year, I was asked (by Peter Sincak) to write a forward for the book "Quo Vadis CI". I struggled with it, but finally, produced the forward, and then gave a talk based on it at the COIL meeting in Chios, Greece. This talk is based on that forward and talk, and quickly passes by any technical issues that might be challenges to Computational Intelligence in the 21st century. Instead, I will use my platform to discuss the evolution of our educational system in the brave new world of electronic communications. The future of science is, as always, in the hands of education. Computational Intelligence is part of science, so will be pulled along for the ride. In my view, the ride ahead will be very bumpy indeed.

Wednesday

11.00-13.00 SESSION W 1.1: Lecture Room 1
Discrimination and Classification (ACBM)
Chair: Dr. Hajek, P.

Paper: 1733-041 11.00-11.20

Five Approaches to Computational Personality Type Classification Problem

AUTHORS:
Janku, L.; Sorf, M.; Lhotska, L.; Eck, V.
Czech Technical University in Prague, Prague, Czech Republic

Paper: 1734-076 11.20-11.40

Profile Analysis as a Discrimination Method applied to Wavelet Transformed Biomedical Spectra

AUTHORS:
Pizzi, N.; Summers, A. R.; Alexander, M. E.
National Research Council Canada, Winnipeg, Canada

Paper: 1734-094 11.40-12.00

Parallel Computation for Dynamic Programming

AUTHORS:
Xiangzhen Qiao; Zhao Li, Mingfa Zhu
Chinese Academy of Sciences, Beijing, China

11.00-13.00 SESSION W 1.2: Lecture Room 2
Theory 1 (FLA)
Chair: Dr. Novak, V.

Paper: 1714-034 11.00-11.20

Compactness of Fuzzy Logics

AUTHORS:
Bodenhofer, U.; Navara, M.
Software Competence Center Hagenberg, Hagenberg, Austria

Paper: 1714-047 11.20-11.40

Set Functors and L-fuzzy Set Categories: Towards a Fuzzy Programming Paradigm

AUTHORS:
Aciego, M.; Medina, J.; Valderde, A; Galan, M. A.; Eklund, P.
Dept. Computing Science, Umea University, Umea, Sweden; Universidad de Malaga, Malaga, Spain

Paper: 1714-066 11.40-12.00

Tree Decomposition of Disjunctive Fuzzy Temporal Constraint Networks

AUTHORS:
Bosch, A.; Torres, M.; Navarrete, I.; Marin, R.
Universidad de Almeria, Almeria, Spain

Paper: 1714-160 12.00-12.20

T-transitive closures

AUTHORS:
De Baets, B.; De Meyer, H.
Ghent University, Ghent, Belgium

Wednesday

11.00-13.00 SESSION W.1.3: Lecture Room 3
Conditional Volatility, Dependence and Risk (ACFM)
Chair: Dr. Chandra, B.

Paper: 1744-132 11.00-11.20

Asymmetric Exchange Rate Depence and the Conditional Copula

AUTHORS:
Patton, A.J.
University of California, San Diego, USA

Paper: 1743-186 11.20-11.40

Solving for Biased Estimates of Aggregated GARCH Processes

AUTHORS:
Komunje, I.
Groupe HEC, Jouy-en-Josas, France

Paper: 1743-122 11.40-12.00

High Frequency Data and Exchange Rate Volatility

AUTHORS:
Morana, C.; Beltratti, A.
Università Bocconi, Milano, Italy

Paper: 1744-137 12.00-12.20

Multi-step Estimation of Multivariate GARCH Models

AUTHORS:
Sheppard, K.; Engle, R.F.
University of California, San Diego, USA

Paper: 1744-155 12.20-12.40

Simulation Monte Carlo Methods to Extended Stochastic Volatility Models

AUTHORS:
Soukup, T.; Simandl, M.
University of West Bohemia, Plzen, Czech Republic

Paper: 1744-133 12.40-13.00

What is a pausible stress scenarios?

AUTHORS:
Breuer, T.; Krenn, G.
Fachhochschule Vorarlberg, Dornbirn, Austria

11.00-13.00 SESSION W 1.4: Lecture Room 4
Applications (FLA)
Chair: Dr. Khanmohammadi, S.

Paper: 1713-026 11.00-11.20

Application of Fuzzy Sets in Political Science

AUTHORS:
Silva Borges P. S; Cid Bastos R.; Gleiber Fernandes Royes; Globert Fernandes Royes
Pontificia Universidade Catolica do Rio Grande do Sul, Porto Alegre;
Universidade Federal de Santa Catarina, Florianópolis – SC, Brazil

Paper: 1711-036 11.20-11.40

Delay Time Estimating in Project Management Using Fuzzy Delays and Fuzzy Probabilities

Authors:
Khanmohammadi, S.; Charmi, M.; Nasiri F.
University of Tabriz, Tabriz, Iran

Paper: 1714-045 11.40-12.00

Fuzzy logic applications to environmental engineering Systems: Case studies

Authors:
Deshpande, A.; Raje, D. V.,
NEERI, Pune, India

Paper: 1714-065 12.00-12.20

Using Fuzzy Similarities to Analyze Heavy Metal Distribution in a Marine Environment

AUTHORS:
Al-Zaidan, A.S.; Kuncheva, L.
University of Wales, Wales, United Kingdom

Paper: 1713-032 12.40-13.00

Colorimetric Alterations by way of Linguistic Modifiers: A Fuzzy Approach

AUTHORS:
Truck, I.; Akdag, H.; Borgi, A.
Universite de Reims Champagne-Ardenne, Reims, France

Wednesday

11.00-13.00 SESSION W 1.5: Lecture Room 5
Computational Models for Predicting Biologic Activity from Chemical Structure (AIDA Invited)
Dr. V. Arena
University of Pittsburgh, Pittsburgh, USA

Paper: 1723-183 11.00-11.10

Introduction: Decision Tree (CART) SAR Models for Developmental Toxicity Based on the FDA/TERIS Database

AUTHORS:
Mazumdar, S.; Sussman, N. B.; Shui Yu, Arena, V.; Thampatty, P.
University of Pittsburgh, Pittsburgh, USA

Paper: 1724-161 11.10-11.40

Computational Predictive System for Rodent Organ-Specific Carcinogenicity

AUTHORS:
Kodell, R. L.; Young, J.F.; Tong, W.; Fang, H.; Beger, R.D.; Chen, J.J.; Cheeseman, M.A.
NCTR, Jefferson, USA

Paper: 1723-182 11.40-12.10

Decision Tree (CART) SAR Models for Developmental Toxicity

AUTHOR:
Arena, V.
University of Pittsburgh, Pittsburgh, USA

Paper: 1723-184 12.10-12.40

Chemistry in Silico as a tool for hazard assessment and drug discovery. Prospects and problems

AUTHORS:
Basak, S.; Mills, D.; Gute, B.D. ; Grunwald, G. D.
University of Minnesota Duluth, Duluth, USA

14.00-14.45 Poster 'Question and Answer' Session: PJ Hall

ACBM Poster Papers

Effects of the Immune System on Human Immunodeficiency Virus Infection in Acute and Chronic Phases - A Mathematical Model of HIV Infection
Takayanagi, T.; Ohuchi, A.

Electrocardiosignal Processing based on Algorithms for Minimal Attractor Embedding Dimension Estimation
Krot, A.; Minervina, H.

A Mathematical Model of Human Circulation as a Basis for Extended Patient Monitoring During Cardiac Surgery
Naujokat, E.; Kiencke, U., Vahl, C.F.

Noise Suppression for Intramagnet Electrocardiograms
Pizzi, N.; Alexander, M.E.; Ede, M.; Somorjai, R.L.

Analysing the Diagnostic Performance of the Reprocessing Perceptron using ROC Curves
Kallin Westin, L.

Parametric Models with Stationarity Constraints in Cell Biology and Biomedicine
Van Riel, N.; Damen, Ad A. M.; Van den Bosch, P.P.J.

A Neural Network Based Breast Lesions Diagnosis Support System for Dynamic Magnetic Resonance Imaging
Morpurgo, A.; Monti, A ; Vergnaghi, D.

ACFM Poster Papers

Real- time Systems Under Maximum Load Regime
Kreimer, J.

The Discrete Singular Convolution for Pricing European and American Options
Zhao, S.; Wei, G. W.

AIDA Poster Papers

Parameter Identification in a Model For Microstructure Transformations in Steels Using Evolutionary Algorithms
Schmitter, E.; I.M. Zylla

RBFN's Modelling of Explosive Cutting Process of Plates Using Hybrid Genetic Algorithms
Zadeh, N. N.; Darvizeh, A.

Speech Recognition Based on Measuring Wiener Kernels
Krot, A.; Goncharov, B.A.; Tkachova, P.

Investigating Behavior of Complex Nonlinear Dynamic System Using Decompositions of Vector Funtions into State-Space
Krot, A.

GeoAIDA - A Knowledge Based Automatic Image Data Analyser for Remote Sensing Data
Stahlhut, O.; Buckner, J; Pahl, M; Liedtke, C. E.

Classification and Prediction of Medical Data by Adaptive Nonlinear Local Approximation Technique
Miyano, T.; K. Tsutsui; Y. Seki; H. Taniguchi

Multiple Prototype Classifier Design through Tabu Search
Ferri, F.; CerverÛn, V.

A Method for Discriminating Shady Mixtures in Kneaded Food Material Based on Light Transmittance
Okada, T.; K. Kanda, K. Ito

Formal Specification of a Statistical Sampling Method for Decision Tree Induction
Raileanu, L. E.; Stoffel, K.

Clustering Using Association Word Knowledge Base and Bayesian-CUG Algorithm for Collaborative Filtering
Su-Jeong Ko; Jung-Hyun Lee

Accelerating the Learning Process for Self-Organizing Maps by Parallelizing the Neighbourhood Function Calculation
Knezu, C.

FLA Poster Papers

A Design for a Class of Nonlinear Systems with Delay Time using Fuzzy Logic
Han, H.; Murakami, S.

Development of Rule- Based Expert System using Fuzzy logic with Application to Seismic risk Evaluation
Gupta, A.; Agrawal, D. P., Sahu, R

Wednesday

14.45-15.30 Title Keynote lecture: Main Arts Lecture Theatre
Model Selection-Computational Methods and Applications
Author: Dr. S. Roberts
University of Oxford, Oxford, United Kingdom

Data driven machine learning and all computational data analysis is performed under a model. It is clear that the choice of model, both in terms of its architecture and, importantly, its complexity, effect the analysis results. How then can models be evaluated and the appropriate model complexity inferred? Although many partially successful heuristic approaches exist, the overarching framework of Bayesian learning offers an elegant and principled methodology in which many alternative methods may be seen as special or limit cases. This talk will review the principles behind model selection paradigms and offer a series of case studies.

Wednesday

16.00-18.00 SESSION W 2.1: **Lecture Room 1**
Medical Decision making and AI (ACBM)
Chair: Mazumdar, S.

Paper: 1734-016 16.00-16.20

The Auguste Project: Decision Support for Patient Care

Authors:
Marling, C.; Whitehouse, P.J.
Ohio University, Ohio, USA

Paper: 1734-096 16.20-16.40

Using Regression Techniques for the Automated Selection of Radiosurgery Plans

AUTHORS:
McCrickard, L.; Koenig, S.; Ezquerra, N.; Fox, T.
Blacksburg, USA

Paper: 1734-124 16.40-17.00

Medical Knowledge Representation by Arden Syntax with Fuzzy Extensions

Authors:
Tiffe, S.; Adlassizig, K.-P.
Siemens AG, Erlangen, Germany

Paper: 1733-116 17.00-17.20

Use of Artificial Neural Networks (ANN) To Estimate Glucose - Insulin Indexes

AUTHORS:
Diab, J.; Aly, A. F.; Kalifa, A. M.
Damascus University, Damascus, Syria

Paper: 1733-050 17.20-17.40

Biomedical Systems Investigation By Delayed Feedback Modeling and Locally Asymptotical Approaches

AUTHOR:
Dailyudenko, V.

16.00-18.00 SESSION W 2.2: **Lecture Room 2**
Theory 2 (FLA)
Chair: Dr. De Baets, B.

Paper: 1714-080 16.00-16.20

Generalized Opening and Closure Operators of Fuzzy Relations

AUTHORS:
Bodenhofer, U.
Software Competence Center Hagenberg, Hagenberg, Austria

Paper: 1714-130 16.20-16.40

Fuzzy Functions and Fuzzy Equality

AUTHOR:
Novak, V.
University of Ostrava, IRAFM, Ostrava, Czech Republic

Paper: 1714-144 16.40-17.00

Logical Approximation

AUTHORS:
Perfilieva, I.; Dankova, M.
University of Ostrava, Ostrava, Czech Republic

Paper: 1714-147 17.00-17.20

A New Method for Ranking Fuzzy Numbers with Index of Optimism

AUTHORS:
Mahmood, A.; Xi Zhi Shi; Xu Ji Jun

Wednesday

16.00-18.00 SESSION W 2.3: Lecture Room 3
Computing in Business (ACFM)
Chair: Dr. Deshpande, A.

Paper: 1743-006 16.00-16.20

On Optimal Loan Limits

AUTHORS:
Falkowski, B. J.
University of Applied Sciences, Stralsund, Germany

Paper: 1744-044 16.20-16.40

A Fuzzy Credit Rating Approach for Small Firm Creditworthiness Evaluation in Bank Lending. An Italian Case

AUTHORS:
Facchinetti, F.; Cosmo, S.; Mastroleo, G.; Ferretti, R.
University of Modena e Reggio Emilia, Modena, Italy

Paper: 1743-089 16.40-17.00

On the Ability of Classification Techniques in Ranking Customers Based on the Likelihood of Belonging to Each Predefined Group

AUTHORS:
Boonyanunta, N.; Zeephongsekul, P.
RMIT University, Melbourne, Australia

16.00-18.00 SESSION W 2.4: **Lecture Room 4**
Option Pricing (ACFM)
Chair: Dr. Albanese, C.

Paper: 1744-052 16.00-16.20

Improved Modeling of Derivatives with Mixture Density Networks

AUTHOR:
Dorffner, G.; Schittenkopf, C.
Austrian Research Institute for Artificial Intelligence, Vienna, Austria

Paper: 1744-136 16.20-16.40

Approximating the Optimal Exercise Boundary for American Options via Monte Carlo

AUTHOR:
Mallier, R.
University of Western Ontario, Ontario, London, Canada

Paper: 1744-139 16.40-17.00

Method of Lines for Pure Jump Processes

AUTHORS:
Albanese, C.; Jaimungal, S.; Rubisov, D. H.
University of Toronto, Ontario, Canada

Lecture 17.00-17.20

Hypernormal Densities

AUTHOR:
Haefke, C.
Universitat Pompeu Fabra, Barcelona, Spain

Wednesday

16.00-18.00 SESSION W 2.5: Lecture Room 5
Data Mining and its Applications:
Algorithms and Techniques (AIDA Invited)
Dr. T. Welzer
University of Maribor, Maribor, Slovenia

Paper: 1723-171 16.00-16.20

ART Model for Generating Object Relation Object Constructs

AUTHORS:
Chandra, B.; Bhat, R.
Indian Institute of Technology, New Delhi, India

Paper: 1723-172 16.20-16.40

The GUHA Method and Mining Association Rules

AUTHOR:
Hajek, P.
Institute of Computer Sciences AS CR, Prague, Czech Republic

Paper: 1723-174 16.40-17.00

Data Mining - An Overview

AUTHORS:
Welzer, T.; Brumen, B.; Rozman, T.; Golob, I.
University of Maribor, Maribor, Slovenia

Paper: 1723-170 17.00-17.20

Black-box Approach to Assessment of Performance of Classification Models

Authors:
Brumen, B.; Welzer,T; Golob, I.; Jaakkola, H.
University of Maribor, Maribor, Slovenia

Paper: 1723-173 17.20-17.40

Knowledge Discovery with Genetically Induced Decision Trees

AUTHORS:
Kokol, P.; Yamamoto, R.; Podgorelec, V; Masuda, G.; Sakamoto, N.
University of Maribor, Maribor, Slovenia

Paper: 1734-180 17.40-18.00

Ensemble Feature Selection with Dynamic Integration of Classifiers

AUTHORS:
Skrypnyk, I.;. Tsymbal, A; Puuronen, S.
University of Jyvaskyla , Jyvaskyla, Finland

16.00-18.00 SESSION W 2.6: **Powis Hall**
Neural Networks and Machine Learning (AIDA)
Chair: Dr. Posse, C.

Paper: 1724-027 16.00-16.20

Event Detection and Identification from Multivariate Data with Missing Values

AUTHORS:
Bongers, D.; Gurgenci, H.; Wilson, R.; Orlowska, M.
University of Queensland, St. Lucia, Australia

Paper: 1724-039 16.20-16.40

Dynamic Integration of Virtual Predictors

AUTHORS:
Terziyan, V.
University of Jyvaskyla, Jyvaskyla, Finland

Paper: 1723-064 16.40-17.00

Multiword Concept Detection Model Based on Neural Networks for Indexing Full-Length Text Documents

AUTHORS:
Perez, C.; de Mora, C.
Spanish Distance Learning University, Madrid, Spain

Paper: 1723-082 17.00-17.20

Introduction of Prior Information Through Linguistic Approaches About Relevance of Variables Used for Classification in Self-organizing ANNs Based on Kohonen's Model

AUTHOR:
Florez Lopez, R.
University of León, Leon, Spain

Thursday

09.00-09.45 Title Keynote lecture: **Main Arts Lecture Theatre**

Advances in Applied Statistical Pattern Recognition.
A Data Fusion Perspective

Author:
Dr. A. Webb
Defence Evaluation and Research Agency, UK

Research into techniques for combining outputs from different sensors, opinions from different experts and combining sensor and collateral information has received some considerable effort in recent years. A consistent approach to the 'fusion' of such disparate sources of data is provided by the Bayesian paradigm. Ambiguities in sensor outputs, sensor failure, noisy and correlated data, mixed numeric and symbolic data, and prior knowledge are handled in a consistent manner. A major difficulty of the Bayesian approach is that it is computationally costly for large problems. This talk will review two approaches to 'data fusion' that incorporate Bayesian principles without inheriting the full computational cost of the Bayesian approach, namely Bayesian networks and self-organising systems. The particle filter and stochastic vector quantisation will be introduced. Applications in engine monitoring, clutter suppression, tracking, and monitoring semiconductor growth, amongst others, will be described.

09.45-10.30 Title Keynote lecture: Main Arts Lecture Theatre
Cultural and Historical Perspectives on the Prospects for the Development of Computational Intelligence the Arab World

Author:
J. S. Nader
School of Business Administration, American University Dubai

In this Keynote Address a multi-paradigm approach is advocated for solution of complex problems. It is shown how through adroit integration of wavelets with neurocomputing and fuzzy logic complicated and noisy pattern recognition problems can be solved effectively. Wavelets are used for de-noising the data and to enhance computational intelligence. The approach is explained through solution of a complicated pattern recognition problem, the automatic detection of traffic incidents in freeways from observed data series obtained from loop detectors. The dimensionality of the training input data is high and the embedded incident characteristics are not easily detectable. A computational model is presented for automatic traffic incident detection using discrete wavelet transform, neural networks, and fuzzy logic. It is shown that use of the wavelets to de-noise the traffic data increases the incident detection rate, reduces the false alarm rate and the incident detection time, and improves the convergence of the neural network training algorithm substantially.

Thursday

11.00-13.00 SESSION T 1.1: **Lecture Room 1**
Medical Image processing (ACBM)
Chair: Dr. Paradi, J.

Paper: 1733-014 11.00-11.20

Visual Target Tracking for Medical Applications

AUTHORS:
Brazier, K.; Wen, Q.-P.; Russel, P.C.; Jones, G.R.
University of Liverpool, Liverpool. United Kingdom

Paper: 1733-042 11.20-11.40

A Fast, Two-Stage Strategy for the Exploratory Analysis of Functional MRI Data by Temporal Fuzzy Clustering

AUTHORS:
Somorjai, R.; Jarmasz, M.; Baumgartner, R.
National Research Council Canada, Winnipeg, Canada

Paper: 1734-163 11.40-12.00

Study of the Tibio-Femoral Joint Using Active Contours

AUTHORS:
Rousselle, J. J.; Brilhault, J.; Vincent, N.; Champion, D.; Favard, L.
Ecole d'Ingenieurs en Informatique pour l'Industrie, Tours, France

Thursday

11.00-13.00 SESSION T 1.2: **Lecture Room 2**
Fuzzy Modeling (FLA)
Chair: Dr. Turunen, E.

Paper: 1713-012 11.00-11.20

Fuzzy Model For Real-Time Reservoir Operation

AUTHORS:
Turunen, E.; Dubrovin, T.; Jolma, A.
Tampere University of Technology, Finland

Paper: 1714-022 11.20-11.40

Database Schema with Fuzzy Classification and Classification Query Language

AUTHORS:
Meier, A.; Savary, C.; Schindler, G.;Veryha, Y.
Institut für Informatik, Fribourg, Switzerland

Paper: 1713-154 11.40-12.00

Use of Genetic algorithms and Semi-active Fuzzy Control to Optimize the Model and Dynamic Response of Vibration Isolation Systems with Magnetorheological Dampers

AUTHORS:
Sireteanu, T.;Ghita, G.; Giuclea, M.; Stammers, C. W.
Institute of Solid Mechanics, Bucharest, Romania

Thursday

11.00-13.00 SESSION T 1.3: Lecture Room 3
Forecasting and Trading 1 (ACFM)
Chair: Dr. Enke, D.

Paper: 1744-087 11.00-11.20

Optimization of Trading Rules with a Penalty Term

AUTHORS:
Hellström, T.
Umeå University, Umeå, Sweden

Paper: 1744-107 11.20-11.40

Multiple Generalized Regression Neural Networks with a Gating Network for Global Stock Index forecasting

AUTHORS:
Enke, D.; Disorntetiwat, P.; Dagli, C. H.
University of Missouri – Rolla, Rolla, USA

Paper: 1744-134 11.40-12.00

Using Genetic Algorithms to Find Technical Trading Rules: An Asset-Allocation Perspective

AUTHORS:
Strobl, G.; Fahlenbrach, R.
University of Pennsylvania, Philadelphia, USA

Paper: 1743-140 12.00-12.20

Tactical Asset Allocation with Artificial Neural Networks

AUTHOR:
Casas, A.
Nova Southeastern University, Fort Lauderdale, USA

Paper: 1744-148 12.20-12.40

Optimizing Portfolios With Ant Systems

AUTHORS:
Maringer, D. G.
University of Vienna, Center for Business Studies, Vienna, Austria

11.00-13.00 SESSION T 1.4: Lecture Room 4
Decision-Making (FLA)
Chair: Dr. Novak, V.

Paper: 1714-048 11.00-11.20

Operations Between Knowledge Bases of General Fuzzy Decision Systems

AUTHORS:
Turcan, M.; Holcapek, M.
Faculty of Economics, Ostrava, Czech Republic

Paper: 1714-049 11.20-11.40

Mappings Between General Fuzzy Decision Systems (GFDS)

AUTHORS:
Holcapek, M.; Turcan, M.
Faculty of Economics, Ostrava, Czech Republic

Paper: 1713-098 11.40-12.00

Fuzzy Logic Based Model For Decision Making

AUTHOR:
Scopel Simoes, M. A.
Universidade Federal do Espirito Santo, Vitória ES- CEP, Brazil

Paper: 1714-131 12.00-12.20

Application of Fuzzy Set Theory to Aggregation of Expert Judgments

AUTHOR:
Mahmood, A.; Xi Zhi Shi; Xu Ji Jun
Shanghai Jiao Tong University, Shanghai, China

Thursday

11.00-13.00 SESSION T 1.5: Lecture Room 5
Perceptual Computation (AIDA Invited)
Dr. M. Kudo

Paper: 1724-165 11.00-11.20

An Interactive Global Maximization Method Using a Multidimensional Representation Technique

AUTHORS:
Kanemitsu, H.; Konno, H.; Komiya, Y.; Shimbo, M.
Hokkaido University of Education, Hakodate, Japan

Paper: 1724-166 11.20-11.40

Comparison of Low-Dimensional Mapping Techniques Based on Discriminatory Information

AUTHORS:
Mori, Y.; Kudo, M.; Shimbo, M.; Toyama, J.
Hokkaido University, Sapporo, Japan

Paper: 1724-167 11.40-12.00

Visualization of High-Dimensional Supervised Data Structure using Piecewise Linear Classifiers

AUTHORS:
Tenmoto, H.; Mori, Y.; Kudo, M.; Shimbo, M.;
Kushiro National College of Technology, Hokkaido, Japan

Paper: 1724-168 12.00-12.20

Clustering Consistent with Human Perception

AUTHORS:
Kudo, M.; Murai, T.; Shimbo, M.
Hokkaido University, Sapporo, Japan

Paper: 1724-169 12.20-12.40

Error Analysis of MAP Solutions under Laplace Prior in Underdeterminded Blind Source Separation

AUTHORS:
Takigawa, I.; Kudo, M.; Shimbo, M.; Toyama, J.
Hokkaido University, Sapporo, Japan

14.00-14.45 **Title Keynote lecture:** **Main Arts Lecture Theatre**
Latent Semantic Pursuit
Author:
Dr. C. Posse
KangarooNet Inc., Redwood Shores, USA

A common approach to information retrieval consists of literally matching terms in documents with those of a query. This strategy may retrieve irrelevant or inaccurate documents due to many ways of expressing a specific concept (synonymy) or to the fact that many words have multiple meanings (polysemy). A remedy consists of retrieving information based on the meaning of a document (and a query). A successful example of this approach is Latent Semantic Indexing (LSI). LSI extracts the latent or underlying concepts in word usage that are obscured by variability in word choice via Singular Value Decomposition (SVD).
In this talk we introduce Latent Semantic Pursuit (LSP). LSP produces latent concepts via Projection Pursuit, which has better feature extraction capabilities than SVD. LSP improves on LSI in two directions. It provides better recall/precision performances and significant storage reduction (which implies significant lower query time).

Thursday

14.45-15.30 Title Keynote lecture: Main Arts Lecture Theatre

Applying the Hidden Markov Model Methodology for Unsupervised Learning of Temporal Data

Author:
Dr. G. Biswas
Vanderbilt University, Nashville, USA

The Hidden Markov Modeling (HMM) methodology has been successfully employed in the modeling and analysis of temporal processes. In particular, a number of impressive applications have been made in the field of speech recognition and synthesis. Given large speech corpora of word pronunciations, one or more HMMs have been employed for representing words and phrases. The speech recognition task involves matching actual pronunciations against the collection of HMMs, much like using finite state automata to track a sequence of symbols. For these applications, language experts use their knowledge to handcraft the HMM structures. The HMM learning problem is then a HMM parameter estimation process. A well known HMM parameter estimation process is the Baum-Welch process. It is a expectation maximization process, often works in conjunction with the Viterbi parameter initialization method. In our work, we have extended the application of the HMM methodology to modeling of dynamic processes in situations where sufficient domain knowledge may not be available to define model structure. Dynamic processes are characterized by time-varying features, i.e., variable values describing system behavior can change significantly over time. Our goals is to develop models that help in understanding the underlying phenomena governing dynamic system behavior, and use this information for decision making and problem solving tasks. HMM models provide a compact discrete-event representation for temporally evolving behavior, and the states of a HMM effectively model the set of potentially valid states in a dynamic process. Data collected from real world systems may include diverse phenomena, therefore, model building has to be preceded by partitioning the data objects into sets of homogeneous groups. The focus of this talk is on developing unsupervised classification or clustering, techniques to automatically par tition temporal data into homogeneous groups, and to construct HMM models for each group. We propose a Bayesian methodology with the HMM representation to drive the clustering process. Our proposed methodology improves upon existing HMM clustering methods in two ways: (i) an explicit HMM model size selection procedure is incorporated into the clustering process, i.e., the sizes of the individual HMMs are dynamically determined for each cluster. This improves the interpretability of cluster models, and the quality of the final clustering partition results, and (ii) a partition selection method to ensure an objective, data-driven selection of the number of clusters in the partition. The result is a simplified heuristic sequential search control algorithm that is computationally feasible. Our experiments with artificially generated data have show that the HMM model size selection algorithm is effective in re-discovering the structure of the generating HMMs, the HMM clustering with model size selection significantly outperforms HMM clustering using uniform HMM model sizes for re-discovering clustering partition structures, and the algorithm is not sensitive to data skewness. In addition, we demonstrate empirical results on the stability of the clustering algorithm, and data sufficiency issues related to HMM learning. More recently we have begun experimenting with real world data sets. The talk will conclude with a presentation of preliminary results on modeling of real data, their applications, and directions for future research in this area.

Friday

09.45-10.30 Title Keynote lecture: **Main Arts Lecture Theatre**

Recursive Training of Neural Networks for Pattern Recognition

Author:
Dr. M. Aladjem
Ben-Gurion University of The Negev,
Dept. of Electrical and Computer Engineering, Beer-Sheva, Israel

The training of neural networks for pattern recognition is carried out by minimizing an error function which allows the outputs of the network to represent classification functions. We are interested in error functions which are highly nonlinear with respect to the adjustable weights of the networks. Such objectives appear in the multi-layer networks for classification and in the networks for non-parametric linear discriminant analysis. In these cases the training must be carried out by an iterative optimization algorithm. The primary goal is to find the global minimum of the error function. By a naive use of a training algorithm (a local minimizer of the error function) the computed value for the observed minimum can be merely a local minimum. The solution depends strongly on the starting point of the local optimizer. This talk will discuss our recursive method for searching for several small local minima of the error functions. It is not a global minimization method, but rather a tool for escaping from a minimum already found and directing the local optimizer to a new solution. The results and analysis of the experiments with linear and non-linear classification functions and comparative studies of other methods for the minimization of error functions will be presented.

Friday

11.00-13.00 SESSION F 1.1: **Lecture Room 1**
Medical Signal processing (ACBM)
Chair: Dr. Steimann, F.

Paper: 1733-071 11.00-11.20

A Multi-Channel Analysis Using PCA Applied to Diagnostic and Prediction of Epileptic Seizure

AUTHORS:
Peyrodie, L.; Pebay, P.; Morineaux, T.; Gallois, P.; Forzy, G.
Hautes études industrielles, Lille, France

Paper: 1734-119 11.20-11.40

Characterization of the Electroencephalogram of Microsleeps using Self-Organized Feature Maps

AUTHORS:
Sommer, D.; Golz, M.; Seyfarth, A.; Trutschel, U.; Moore-Ede, M.
University of Applied Sciences, Schmaldalden, Germany

Paper: 1734-121 11.40-12.00

Application of Vector-Based Neural Networks for the Recognition of Beginning Microsleep Episodes with an Eyetracking System.

AUTHORS:
Sommer, D.; Golz, M.; Seyfarth, A.; Trutschel, U.; Moore-Ede, M.
University of Applied Sciences, Schmaldalden, Germany

11.00-13.00 SESSION: F 1.2 **Lecture Room 2**
Forecasting and Trading 2 (ACFM)
Chair: Sousa, P.

Paper: 1743-061 11.00-11.20

Predicting Stock Indices n-days Ahead: A Comparison of Techniques Using Australian Data

AUTHORS:
Barnes, M.; Rimmer, R. J. ; Kai Ming Ting
Deakin University, Clayton, Victoria, Australia

Paper: 1744-073 11.20-11.40

A New Finite Difference Procedure for Fixed-Strike Asian Options

AUTHORS:
Rasmussen, H.; Anderson, C. L.; Davison, M.
University of Western Ontario, London, Ontario, Canada

Paper: 1743-112 11.40-12.00

Neural Network Prediction of Stock Values

AUTHORS:
Smith, L.; Smith, M.
University of the West of England

Paper: 1744-143 12.00-12.20

A Reference Architecture for Multi-Agent Simulation ofside Derivative Markets

AUTHORS:
Streltchenko, O.; Narendra, N. C.; Yelena Yesha
University of Maryland, Baltimore, USA

Friday

11.00-13.00 SESSION F 1.3: **Lecture Room 3**
Fuzzy Control 1 (FLA)
Chair: Dr. Bodenhofer, U.

Paper: 1714-011 11.00-11.20

Title:Fuzzy Control of an Unstable Nonlinear System Under State and Input Constraints

AUTHORS:
Schnitman, L.; Yoneyama, T.
Aeronautic Institute of Technology (ITA), Sao Paulo, Brazil

Paper: 1713-013 11.20-11.40

A Rectifying Control Method and System for Photoelectric Slitting by Fuzzy Control with Multi-Regulating

AUTHORS:
Xu Du, Yongping Jiang, Hang Liu
Shantou University, Shantou, China

Paper: 1713-040 11.40-12.00

Model Reference Fuzzy Adaptive Control with Self-tuning of Scaling Factors

AUTHORS:
Jones, K. O.; Banerjee, J.; Williams, D.
Liverpool John Moores University, Liverpool, UK

Paper: 1713-142 12.00-12.20

A Self Tuning Fuzzy Controller Based on Reference Model

AUTHORS:
Rodrigues de Azevedo, H.; Vasconcellos Bezerra C. A.
Faculdade de Engenharia Elétrica, Universidade Federal de Uberlândia, Brazil

11.00-13.00 SESSION F 1.4: Lecture Room 4
Classification, Techniques & Applications (AIDA)
Chair : Dr. Okada, T.

Paper: 1724-020 11.00-11.20

Bayesian Gamma Mixture Models for Target Recognition

AUTHORS:
Copsey, K.; Webb, A.
Defence Evaluation and Research Agency, Worcestershire, United Kingdom

Paper: 1724-074 11.20-11.40

Approaches to Imbalanced Data for Classification: A Case Study

AUTHORS:
Lee, G.; Harris, C. J.; Gunn, S. R.; Reed, P.A.S.
University of Southampton, Southampton, United Kingdom

Paper: 1703-097 12.00-12.20

Decision-Making Support Based on QFD. To Perform System Design Quality

AUTHORS:
Seklouli, A.; Gien, D.
Université Blaise Pascal, Aubière Cedex, France

Paper: 1724-110 12.20-12.40

Features Selection and Dimensionality Reduction in Web Pages Representation

AUTHORS:
Ribeiro, A.; Fresno, V.
Instituto de Automática Industrial, CSIC, Arganda del Rey, Madrid, Spain

Friday

11.00-13.00 SESSION F 1.5: Lecture Room 5
Data Mining and its Applications: Data Mining in Medicine (ACBM Invited)
Dr. P. Kokol-Dr. M. Zorman
University of Maribor, Maribor, Slovenia

Paper: 1733-175 11.00-11.20

Knowledge Discovery and Data Mining in Text Medical Reports

AUTHORS:
Alves, V. M.; Neves, J.; Maia, M.; Nelas. L.
Universidade do Minho, Braga, Portugal

Paper: 1733-176 11.20-11.40

Experiences of Mining a Diabetes Database

AUTHORS:
Picavet, M.; Duhamel, A.; Devos, P.
University of Lille, Villeneuve d'Ascq Cedex, France

Paper: 1733-179 11.40-12.00

The Influence of Different Databases to the Accuracy of Machine Learning

AUTHORS:
Zorman, M.; Eich, H.P. ; Kokol, P.; Ohmann, C.
University of Maribor, Maribor, Slovenia

Paper: 1733-177 12.20-12.40

Application of Data Mining in Health Care

AUTHORS:
Riano, D.; Prado, S.
Universitat Rovira I Virgili, Tarragona, Spain

14.00-16.00 SESSION F 2.1: **Lecture Room 1**
Forecasting and Trading 3 (ACFM)
Chair: Dr. Enke, D.

Paper: 1744-106 14.00-14.20

The Use of Data Mining, Neural Network Models, and Validation Techniques for Predicting Excess Stock Returns

AUTHORS:
Enke, D.; Thawornwong, S.
University of Missouri – Rolla, USA

Paper: 1744-153 14.20-14.40

Modelling Spot Rate Process in the Russian Treasury Bills Market

AUTHOR:
Drobyshevsky, S.; Moscow, Russia

Paper: 1743-158 14.40-15.00

Alternative Methods for Detecting and Dating Structural Breaks: An Application to The French-German Interest Rate Differential

AUTHORS:
McAdam, P.; Henry, J.
European Central Bank Eurotheum, Frankfurt am Main, Germany

Paper: 1743-138 15.00-15.20

A new approach to interest rate sensitivity using the complex plane

AUTHORS:
Osborne, M.J.,
Gulf International Bank, Manama, Bahrain

Friday

14.00-16.00 SESSION F 2.2: **Lecture Room 2**
Fuzzy Control 2 (FLA)
Chair: Dr. Bodenhofer, U.

Paper: 1713-059 14.00-14.20

A Self Tuning Fuzzy Control Based on Controller Output Error Method- An Application

AUTHORS:
Rodrigues de Azevedo, H.; Coutinho Gomes, L.
Universidade Federal de Uberlândia, Uberlândia, Brazil;
Fundacao Integrada Municipal de Ensino
Superior, Mineiros, Brazil

Paper: 1714-062 14.20-14.40

Fuzzy Model Based Sliding Mode Control

AUTHORS:
Knight, M.J.; Sutton, R.; Jenkins, D. F. L.
University of Plymouth, Plymouth, United Kingdom

Paper: 1714-077 14.40-15.00

New Two-Term Parameter Adaptive Fuzzy Control Structure for Time-Delay Systems

AUTHORS:
Escamilla-Ambrosio, P.J.; Mort , N.
University of Sheffield, Sheffield, United Kingom

14.00-16.00 SESSION F 2.3: **Lecture Room 3**
Data Mining (AIDA)
Chair: Dr. Sousa, P.

Paper: 1724-002 14.00-14.20

Information Compression by Multiple Alignement, Unification and Search as a Framework for 'Intelligent' Computing

AUTHOR:
Wolff, G.
University of Wales, Wales, United Kingdom

Paper: 1724-033 14.20-14.40

Four Measures of Data Complexity for Bootstrapping, Splitting and Feature Sampling

AUTHORS:
Shipp, C. A.; : Kuncheva, L.I.
University of Wales, Wales, United Kingdom

Paper: 1723-067 14.40-15.00

DEEPSIA - Focusing E-commerce on the Purchaser's Side;

AUTHORS:
Sousa, P.; Pimentao, J. P.; Steiger-Garçao, A.
Universidade Nova de Lisboa, Monte de Caparica, Portugal

Paper: 1724-069 15.00-15.20

Synergistic Genetic Algorithm for Inductive Learning (SynGAIL)

AUTHORS:
Lavangnananda, K.
University of Technology Thonburi, ThungKru, Bangkok, Thailand

Paper: 1724-083 15.20-15.40

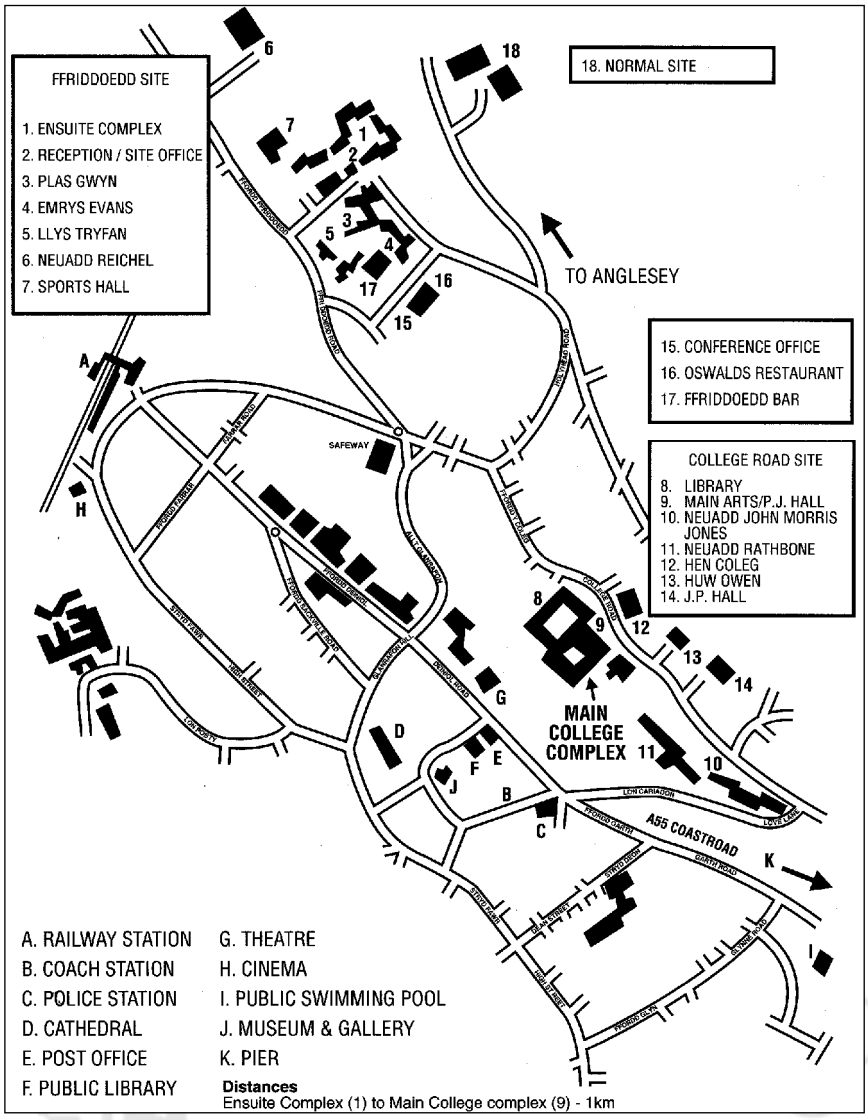
Efficient Service Allocation in Open Multi-agent Systems

AUTHORS:
Easwaran, A. M.; Pitt, J.
Imperial College of Science, Technology & Medicine, London, United Kingdom

University of Wales, Bangor

Directions and Town Map

Approach Bangor on the A5122 from the A5 / A55 Junction (signposted Bangor). The A5122 brings you into Bangor by the harbour (on your right). Follow this road as it bears left into the town, past the swimming pool and post office. At the railway station (traffic lights) turn right and at Safeways mini-roundabout turn left onto Ffriddoedd Road. The Ffriddoedd Site is second on your right, with reception at the top of the entrance road.



Upcoming Events

WMC'2001
WORLD MANUFACTURING CONGRESS
September 24-27, 2001
Rochester, New York, U.S.A.

NF'2002
NEURO FUZZY TECHNOLOGIES
January 16-19, 2002
Capitolio de La Habana, Cuba

ICAIS'2002
AUTONOMOUS INTELLIGENT SYSTEMS
Deakin University
Waterfront Campus, Geelong, Australia
12 - 15 February, 2002

NL'2002
NETWORKED LEARNING IN A GLOBAL ENVIRONMENT
Challanges and Solutions for Virtual Education
Technical University of Berlin, Germany
May 1 - 4, 2002

EIS'2002
ENGINEERING OF INTELLIGENT SYSTEMS
University of Malaga
Campos de Teatinos
29013 Malaga, Spain
September 24 - 27, 2002

ISA'2002
INTELLIGENT SYSTEMS AND APPLICATIONS
Shanghai, China
December, 2002

More Information:
www.icsc-naiso.org

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