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Editorial

Dear members of the EUSFLAT Society,

Let me take this opportunity to wish you all a Merry Christmas and a happy and successful new year 2007! I want to thank you all for your active membership in our society; I hope for your kind support and participation in the next year as well.

I would like to remind you that we have a EUSFLAT conference in Ostrava, Czech Republic, next year and ask you for your active participation. Please keep in mind that the submission deadline is approaching (January 12, 2007). For more information, please visit <http://www.eusflat2007.cz/>.

Another issue I would like to mention is our journal *Mathware & Soft Computing*. The subscription that is included in the membership of our society is one of the most important benefits our society offers. Therefore, it is important for EUSFLAT that the journal performs well and is renowned. So, if you contribute to *Mathware & Soft Computing*, you also contribute to our society. Therefore, I want to ask you once again to consider publishing in this journal. Please also consider organizing special issues on special topics or in the sequel of workshops or conferences. If you are interested, please contact the editors for more information (cf. <http://docto-si.ugr.es/Mathware/>).

In the last two years, two new, highly active, working groups were established in EUSFLAT. Working groups are intended to coordinate scientific activities on specially focused topics inside the EUSFLAT society, so they are highly important to ensure that EUSFLAT is not only an organizational or social network, but actually — in line with its core goals — an active scientific society. Currently, after some rectification, EUSFLAT has five working groups on important and future-oriented topics (see <http://www.eusflat.org/research/wgroups.htm> for more information). If you have the impression that some important topics are missing, please consider establishing a new working group. Eyke Hüllermeier, our working group representative, and the whole EUSFLAT Board, are welcoming all ideas.

Finally, let me once again wish you and your beloved ones all the best for Christmas and the new year.

Cordially yours,
Ulrich Bodenhofer
president@eusflat.org

The winter landscape panorama picture above was taken on the occasion of this year's FSTA conference in Liptovský Mikuláš, Slovak Republic.

Society briefs:

EUSFLAT Vice-President Nominated ECCAI Fellow



Prof. Lluís Godo (IIIA-CSIC) was nominated a Fellow of the European Coordinating Committee for Artificial Intelligence (ECCAI; see <http://www.eccai.org>).

11 other ECCAI fellows were nominated this year. The other 10 were: Grigorios Antoniou (FORTH, Greece), Christian Bessiere (LIRMM-CNRS, France), Patrick Doherty (Linköping University, Sweden), Tom Eiter (Technical University of Vienna, Austria), Floriana Esposito (University of Bari, Italy), Malik Ghallab (LAAS-CNRS, France), Marco Gori (University of Siena, Italy), András Lörincz (Eötvös Loránd University, Hungary), Sebastian Thrun (Stanford University), and Gerhard Widmer (Johannes Kepler University, Austria).

The EUSFLAT Society cordially congratulates!

EUSFLAT Member Awarded with the 6th Kaufmann Prize



Our renowned member, Prof. Janusz Kacprzyk (Polish Academy of Sciences), will receive the 6th Kaufmann Prize, Gold Medal for Medal for Research into Fuzzy Management and Economy. The awarding ceremony will take place on January 22, 2007, at the City Hall of Reus (Catalonia, Spain). This prize is delivered by the Foundation FEGI (Fundació per a l'Estudi de la Gestió en la Incertesa / Fuzzy Management Research Foundation) and SIGEF (Sociedad Internacional de Gestión y Economía Fuzzy / International Association for Fuzzy Set Management and Economy). Additional information on SIGEF and the Kaufmann Prize can be found at <http://www.fcee.urv.cat/sigef/>.

Previous recipients were Profs. H.-J. Zimmermann (1997), M. M. Gupta (1998), G. Klir (1999), J. Gil Aluja (2002) and L. A. Zadeh (2004).

The EUSFLAT Society cordially congratulates!

PhD Dissertation:

Abraham Otero Quintana

A fuzzy constraint network model for abstraction and recognition over signals

Abstract: In this work we start from the thesis that processes of abstraction over perception are organised hierarchically. The recognition and interpretation of that which is observed is carried out by means of the aggregation of items of information (findings) that are obtained from observational data. This operation entails a reduction in the volume of the original data, and an enhancement of their meaning.

On the basis of this idea, we have developed a computable model, the Multivariable Fuzzy Temporal Profile (MFTP) model, whose aim is to emulate those processes that are carried out by humans in the identification of patterns over the temporal evolution of a set of physical parameters. In this context, a pattern hierarchically organises the recognition of a set of findings, which in turn are patterns, each one of which is associated to the appearance of certain distinctive morphologies (profiles) over these parameters.

The MFTP model is based on the Fuzzy Set Theory and on the Constraint Satisfaction Problem formalism. An MFTP is defined recursively as a set of fuzzy constraints between a finite set of sub-MFTPs and a finite set of points from the temporal evolution of the system that are especially relevant for the description of the pattern. Between each pair of points defined over the same parameter, the model allows the user to constrain the fuzzy temporal duration, the fuzzy increment, the fuzzy slope and the way in which parameter evolves. Between points described over different parameters, it is possible to limit the fuzzy temporal duration and the fuzzy increment.

The recursive nature of the model organises the abstraction into successive levels. Each level aggregates the different pieces of information that have been abstracted from the observed data. Similarly, knowledge is reusable, as a particular MFTP may form part of the definition of other MFTPs.

The use of the Fuzzy Set Theory makes it possible to represent and handle the vagueness and uncertainty that are characteristic of human knowledge, and lends a degree of tolerance to imprecise and noisy data. The constraint network formalism provides the support for the computational representation of the model, and endows it with a high level of expressiveness: constraint networks allow multiple relations to be established between each pair of relevant events in the evolution of the system. The trade-off for the model's flexibility is the possibility of contradictory and/or redundant information being incorporated into the pattern description.

With the aim of eliminating redundant information and detecting any possible contradictions in the pattern definition, we have developed a set of procedures for the analysis of the MFTP's consistency. We demonstrate that obtaining the most precise representation possible (i.e. the minimal representation of an MFTP) is an NP-complete task. On the other hand, we supply procedures that ensure local levels of consistency in polynomial time, and we identify various specific tractable topologies with sufficient expressive power for many real applications.

We have developed hierarchical matching procedures that implement the pattern recognition task: the detection of a signal pattern of interest is carried out by means of the aggregation of those findings that the experts use to identify it. The explicit representation of the knowledge allows the model to provide an explanation of the results obtained, which enables experts to justify their conformity with them.

A signal pattern is acquired from the expert knowledge. This acquisition may be made in a linguistic manner, by means of a language developed for this purpose, or in a visual manner, through the use of the graphical tool TRACE (Tool foR anALysing and disCovering pattErns, <http://www-gsi.dec.usc.es/trace>). This tool enables signal patterns to be defined visually and intuitively, and is proposed as a solution to the bottleneck in knowledge elicitation. Both the MFTP model and the TRACE tool has been applied in two different domains: in the medical domain, for defining alarms capable of identifying situations of clinical interest that are not satisfactorily detected by the monitoring devices currently available; and in mobile robotics, for identifying topological elements in indoor settings and enabling maps of the environment to be drawn up. In both cases the matching procedures make it possible to comply fully with the real-time requirements of the domain. This, along with the detection quality, leads

us to be optimistic about their inclusion into an intelligent patient supervision system and an autonomous navigation system for mobile robots. The possible application of the MFTP model in other domains is also being studied.

Keywords: fuzzy logic, constraint networks, temporal abstraction, pattern recognition, intelligent alarms, knowledge acquisition, landmark recognition.

Advisors: Paulo Félix and Senén Barro, University of Santiago de Compostela.

About the author: Abraham Otero was born in Orense, Spain in 1978. He obtained an honours degree in Physics in 2000. He worked on his doctoral thesis in the Intelligent Systems Group in the Department of Electronics and Computation in the University of Santiago de Compostela, being awarded his PhD degree in February 2006. He is currently teaching in the San Pablo CEU University in Madrid, Spain. E-Mail: abraham@dec.usc.es.

Enrico Marchioni

Functional definability issues in logics based on triangular norms

Abstract: One of the peculiar properties of logics based on triangular norms is the fact that to each formula we can associate a real-valued function. Indeed, the intended semantics for such logics is given by algebras over the real unit interval $[0, 1]$ whose basic operations correspond to a left-continuous t-norm, its residuum, and the maximum and minimum operation.

In this dissertation we investigate some issues concerning the definability of functions by terms in the framework of t-norm based logics. First, we study how to expand in general any t-norm based logic by means of an independent involutive negation. We establish the basic requirements for the obtained expansions to be complete w.r.t. to the related class of linearly ordered algebras, finitely strongly standard complete and standard complete.

Second, we focus on the variety of $LP_{i/2}$ -algebras, which form the strongest and most expressive variety of residuated algebras. We study the lattice of subvarieties of $LP_{i/2}$. We show how the universal theory of real closed fields can be faithfully translated in polynomial time in the equational theory of $LP_{i/2}$ -algebras. This means that such theories share the same complexity class: indeed, they are both in PSPACE. Moreover, we study the definability of triangular norms by terms and equations of $LP_{i/2}$, and prove that the main logics of the family of t-norm based logics are finitely strongly complete w.r.t. the related (class of) algebra(s) whose monoidal operation corresponds to a left-continuous t-norm definable in $LP_{i/2}$. From such completeness results we can prove decidability and PSPACE-containment for many t-norm based logics.

Finally, we study the representation of both conditional and unconditional measures of uncertainty (i.e. probability, possibility, etc.) in the framework of t-norm based logics. We provide general tools, techniques, and results for an adequate logical representation of several classes of measures.

Advisors: Lluís Godó IIIA-CSIC, Maria Manzano, University of Salamanca.

About the author: Enrico Marchioni was born in Brescia, Italy in 1977. He obtained an honours degree in Philosophy in 2002 at the Università degli Studi di Parma, Italy. Since 2003, he has been a research fellow at the Departamento de Lógica de la Universidad de Salamanca, where worked on his doctoral dissertation. He was awarded his PhD degree in November 2006. E-Mail: marchioni@usal.es, enrico@iia.csic.es.

Bibliographic Information: The thesis is available at: <http://www.iia.csic.es/~enrico/Thesis%20Final.pdf>

Book announcements and reviews

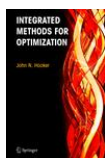


E. Herrera-Viedma, G. Pasi, F. Crestani, (Editors)

Soft Computing in Web Information Retrieval - Models and Applications, Series: Studies in Fuzziness and Soft Computing 197, Springer. 316 pages. ISBN 3-540-31588-8.

Link: <http://www.springer.com/west/home/engineering?SGWID=4-175-22-120133316-0>

Description: This book presents some recent works on the application of Soft Computing techniques in information access on the World Wide Web. The book comprises 15 chapters from internationally known researchers and is divided in four parts reflecting the areas of research of the presented works such as Document Classification, Semantic Web, Web Information Retrieval and Web Applications. This book demonstrates that Web Information Retrieval is a stimulating area of research where Soft Computing technologies can be applied satisfactorily.



J. N. Hooker,

Integrated Methods for Optimization, Series: International Series in Operations Research & Management Science 100, 2006. 490 pages, ISBN 0-387-38272-0.

Link: <http://www.springer.com/west/home/computer/artificial?SGWID=4-147-22-173675121-0>

Description: *Integrated Methods for Optimization* integrates the key concepts of Mathematical Programming and Constraint Programming into a unified framework that allows them to be generalized and combined. The unification of MP and CP creates optimization methods that have much greater modeling power, increased computational speed, and a sizeable reduction computational coding. Hence the benefits of this integration are substantial, providing the Applied Sciences with a powerful, high-level modeling solution for optimization problems. As reviewers of the book have noted, this integration along with constraint programming being incorporated into a number of programming languages, brings the field a step closer to being able to simply state a problem and having the computer solve it.

Brief announcements

- C. Alsina, M. J. Frank, B. Schweizer, B., *Associative functions: triangular norms and copulas*, WorldScientific, 2006. 252 pages. ISBN 981-256-671-6.

<http://www.worldscibooks.com/mathematics/6036.html>

- E. Sanchez, (Ed.), *Fuzzy Logic and the Semantic Web*, Elsevier, 2006. 496 pages. ISBN: 0-444-51948-3.

http://www.elsevier.com/wps/product/cws_home/706920

- B. Bouchon-Meunier, G. Coletti, R. Yager, (Eds.), *Modern information processing: From Theory to Applications*, Elsevier, 2006. ISBN 0-444-52075-9.
<http://www.elsevier.com/inca/707741>
- J. J. Buckley, *Fuzzy Probability and Statistics*, Series: Studies in Fuzziness and Soft Computing 196, Springer, 2006. ISBN 3-540-30841-5.
<http://www.springer.com/west/home/engineering?SGWID=4-175-22-109923347-0>
- H. T. Nguyen, B. Wu, *Fundamentals of Statistics with Fuzzy Data*, Series: Studies in Fuzziness and Soft Computing 198, Springer, 2006. 195 pages, ISBN 3-540-31695-7.
<http://www.springer.com/west/home/engineering?SGWID=4-175-22-122343246-0>
- E. Herrera-Viedma, G. Pasi, F. Crestani, (Eds.), *Soft Computing in Web Information Retrieval - Models and Applications*, Series: Studies in Fuzziness and Soft Computing 197, Springer. ISBN 3-540-31588-8.
<http://www.springer.com/west/home/engineering?SGWID=4-175-22-120133316-0>
- M. Sato-Ilic, L. C. Jain, *Innovations in Fuzzy Clustering*, Series: Studies in Fuzziness and Soft Computing 205, Springer, 2006. 152 pages, ISBN 3-540-34356-3
<http://www.springer.com/west/home/engineering?SGWID=4-175-22-170209126-0>
- S. Kendal, M. Creen, *An Introduction to Knowledge Engineering*, 2006. 290 pages. ISBN 1-84628-475-9.
<http://www.springer.com/west/home/computer/artificial?SGWID=4-147-22-165247224-0>
- A. Gegov, *Complexity Management in Fuzzy Systems*, Series: Studies in Fuzziness and Soft Computing, Springer 211, 2007. 351 pages, ISBN 3-540-38883-4.
<http://www.springer.com/west/home/default?SGWID=4-40356-22-173676527-0>
- V. Torra, Y. Narukawa, *Modeling Decisions: Information Fusion and Aggregation Operators*, Springer, 2007. 240 pages, ISBN 3-540-68789-0.
<http://www.springer.com/3-540-68789-0>

Conferences and Calls for Papers

Conference reports

FSCS 2006 Symposium on Fuzzy Systems in Computer Science 2006 (<http://fuzzy.cs.uni-magdeburg.de/fscs2006/index.htm>)

Otto-von-Guericke-Universität Magdeburg, Germany September 27th and 28th, 2006

On the occasion of the 10th anniversary of Prof. Rudolf Kruse's Neuro-Fuzzy research group in the Computer Science department in Magdeburg, the symposium "Fuzzy Systems in Computer Science 2006" was jointly organized by the North German Softcomputing Association (AFN), the European Society for Fuzzy Logic and Technology (EUSFLAT), and several fuzzy-oriented research groups within the Otto-von-Guericke University of Magdeburg (the main organizers were Eyke Hüllermeier, Rudolf Kruse, Andreas Nürnberger, and Jens Strackeljan). The aim of this event was to provide an international forum for reporting recent advances in the research area of fuzzy systems, with a special focus on fuzzy methods for data mining and intelligent data analysis. Besides, special emphasis was put on the applicability of the methods to practical and real world problems.

The scientific program included a track on "Fuzzy Methods in Learning and Data Mining", organized by the homonymous Eusflat working group, a special session about the applications of Fuzzy Methods in Intelligent Data Analysis, and the Annual Meeting of the AFN. The keynote address was given by Lotfi Zadeh who spoke about "A New Frontier in Computation - Computation with Information Described in Natural Language". The program was complemented by an invited lecture about the history of fuzzy systems that was given by Rudolf Seising (Vienna).

All things considered, the symposium was a great success. In particular, the program consisting of more than 20 talks that were given by both well-known researchers in the field and practitioners from industry, turned out to be an interesting mix and, in conjunction with the pleasing size of about 40 attendees and the focused scope of the symposium, stimulated a lot of intensive and fruitful discussions.

Extended versions of selected contributions will soon appear in a special issue of the "International Journal of Uncertainty, Fuzziness, and Knowledge-Based Systems". More information about the symposium, including online proceedings and pictures of the event, can be found at <http://fuzzy.cs.uni-magdeburg.de/fscs2006/index.htm>.

Eyke Hüllermeier, FSCS 2006 co-organizer.

ESTYLF 2006 (<http://www.estylf2006.org/>)

The 13th edition of the biennial Spanish Conference on Fuzzy Logic and Technologies (XIII Congreso Español sobre Tecnologías y Lógica Fuzzy ESTYLF 2006) was held at the University of Castilla-La Mancha in Ciudad Real, Spain, on September 20-22, 2006 in the framework of the Department of Information Technologies and Systems. The conference was supported by EUSFLAT.



Jose A. Olivas, ESTYLF 2006 chair.

The first plenary talk "Fuzzy logic in the Semantic Web" was given by Prof. Elie Sanchez (University of Marseille, France) and the second one "Fuzzy approaches to Information Retrieval: State of the art and research trends" was given by Gabriella Pasi (Università degli Studi di Milano Bicocca, Italy). There was 60 communications and two special sessions: Decision Making: Modelling and Aggregation of Fuzzy Preferences, organized by Enrique Herrera-Viedma and Francisco Herrera, and Soft Computing for information retrieval and Web Mining by Enrique Herrera-Viedma, María J. Martín-Bautista, José A. Olivas and Alejandro Sobrino.

Besides, an acknowledgment for "25 years in Fuzzy Logic" was given to Professors Trillas, Delgado, Vila, Lamata, Verdegay, Jacas, Esteva and Mayor (picture order).

ICAISC 2006 (<http://icaisc.pcz.pl/>)

The eighth edition of the biennial conference on Artificial Intelligence and Soft Computing, ICAISC'2006, was held in Zakopane, Poland in June 25-29, 2006. The Conference was organized by the Polish Neural Network Society and endorsed by EUSFLAT. The aim of this conference was to build a bridge between traditional artificial intelligence techniques and recently developed soft computing techniques and bring together scientists representing both areas. The Conference has attracted a total of 400 submissions from 41 countries and after the review process, 128 papers has been accepted for publication in the Springer LNAI 4029 volume. During the conference there were eight invited talks delivered by top world scientists.

Leszek Rutkowski, General chairman.

EFS 2006 (<http://www.efs06.org/>)

The 2006 International Symposium on Evolving Fuzzy Systems took place in Lake District, UK, on 7-9 September 2006. The symposium had a good balance between industrial and academic participants (e.g. General Electric, USA, Ford Motor Co., USA, Nokia-UK, CEPESA, Spain). Keynote speeches were given by Profs. R. Yager, N. Kasabov and D. Filev, and P. Bonissone.

The conference proceedings were published by IEEE (IEEE Catalog Number 06EX1440, ISBN 0-7803-9718-5). They collect 55 papers selected from the 72 submissions (from 26 countries). See http://www.infolab21.lancs.ac.uk/latest_news/?article_id=292 for more details.

Upcoming EUSFLAT Conference:

- 5th Conference of the European Society for Fuzzy Logic and Technology (EUSFLAT 2007), Ostrava, Czech Republic, September 11-14, 2007. **Submission deadline: 12 January 2007.**
<http://www.eusflat2007.cz>

Upcoming EUSFLAT-Endorsed Events:

- 28th Linz Seminar on Fuzzy Set Theory (LINZ2007), Linz, Austria, February 6-10, 2007.
<http://www.fill.jku.at/research/linz2007/>
- 12th IFSA World Congress (IFSA 2007), Cancun, Mexico, June 18-21, 2007.
<http://www.hafsamx.org/ifsa2007/>
- EUROFUSE Workshop "New Trends in Fuzzy Preference Modelling", Jaén, Spain, April 11-13, 2007. **Submission deadline: 18 December 2006.**
<http://eurofuse07.ujaen.es/index.php>
- 4th International Summer School on Aggregation Operators (AGOP 2007), Ghent, Belgium, July 9-14, 2007. **Submission deadline: 15 March 2007.**
<http://www.agop2007.ugent.be/>
- Modeling Decisions for Artificial Intelligence (MDAI 2007), Kitakyushu, Japan, August 16-18, 2007. **Submission deadline: 1 February 2007.**
<http://www.mdai.cat/mdai2007/>
- French Days on Fuzzy Logic and Applications (LFA 2007), Nîmes, France, November 22-23, 2007. **Submission deadline: 30 March 2007.**
<http://www.lfa2007.ema.fr/>

Other Events:

- 20th Int. Joint Conference on Artificial Intelligence (IJCAI-07), Hyderabad, India, January 6-12, 2007.
<http://www.ijcai-07.org/>
- Special Track on Information Access and Retrieval at the ACM Symposium on Applied Computing (ACM SAC-IAR at SAC 2007), Seoul, Korea, March 11-15, 2007.
<http://www.cis.strath.ac.uk/SAC2007/>
- 2nd International Work-Conference on the Interplay between Natural and Artificial Computation (IWINAC 2007), La Manga, Murcia, Spain, June 18-21, 2007. **Submission deadline: 15 February 2007.**
<http://www.iwinac.uned.es/>
- IEEE International Conference on Fuzzy Systems, London, UK, July 23-26, 2007. **Submission deadline: 31 January 2007.**
<http://www.fuzzieee07.org>

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