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HAFSA a new Institutional Member of IFSA

The Hispanic-American Fuzzy Systems Association (HAFSA) was officially constituted in 2004 and accepted as an institutional member of IFSA in March of this year. However, planning for HAFSA began informally well before this date, with meetings in which the importance of coordinating the research and applications of fuzzy sets in Hispanic–American countries was discussed.

HAFSA is a non-profit organization formed by professors, researchers, and students who have a real interest and work actively in the fuzzy systems and live in countries of the American continent in which Spanish is the main language. The scope of HAFSA also includes individuals from related computing disciplines such as neural networks, evolutionary computing, and soft computing in general.

The main goal of the association is to promote research and education in the area of fuzzy systems and oft computing. Another important goal is the promotion and exchange of new ideas, and building new collaborations among researchers of different institutions and countries.

Prof. Dr. Oscar Castillo
President

Prof. Dr. Patricia Melin
Vice President

The membership of the association consists of a President, a Vice-President, a Council, Regular members, and Student members. The council is constituted as follows: President, Vice-President, and five regular members that are elected by the members of the association. The President has to be a prominent Mexican or Hispanic-American researcher in the fuzzy systems area and well recognized by international fuzzy systems community. The President will have a term of three years and can be re-elected for another term by the council of the association. The members of the council have a term of three years and can be re-elected for this position one time. The founding council of this association is

Prof. Dr. Oscar Castillo, Mexico, President
Prof. Dr. Javier Ruiz del Solar, Chile
Prof. Dr. Carlos Andres Peña, Colombia and Switzerland
Prof. Dr. Eduardo Gomez Ramirez, Mexico
Prof. Dr. Patricia Melin, Mexico, Vice-President
Prof. Dr. Gerardo Gabriel Acosta Lazo, Argentina
Prof. Dr. Carlos A. Coello Coello, Mexico

Additionally, there are currently about 50 regular members of the association right, of which about 50% are from Mexico. But there are plans of expanding the membership from the other countries in Central and South America.

The geographic region covered by HAFSA extends from Mexico to South America and includes Mexico, Guatemala, Honduras, Nicaragua, San Salvador, Panama, Colombia, Venezuela, Ecuador, Peru, Bolivia, Chile, Argentina, Paraguay, Uruguay, Dominicana, and Cuba. In all of these countries there is some research work in fuzzy systems being carried out, but a lot has to be done in promoting this research area and related ones.

For this our first year of being formally accepted by IFSA as an institutional member, we plan to sponsor several activities including seminars, workshops, and our first conference (probably by the end of the year). We hope that all these activities will motivate research in fuzzy logic and soft computing in our region.

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Member's Lab.

The Institute for Advanced Management Systems Research

Abo Akademi University, situated in Abo/Turku in Finland, is the university serving the interests of the Swedish-speaking people of Finland. Abo Akademi University has reached an acknowledged position in the forefront of research in several areas, among those information systems and mobile commerce. Cooperation with other universities both in Finland and in many other countries worldwide forms an important part of the research carried out and ties with the Finnish industry are considered crucial. Effective networking is a crucial strategic choice for relatively small universities in small countries to reach and to contribute to the forming of critical mass in selected research areas.

The Institute for Advanced Management Systems Research (IAMSR) is a research institute with more than 60 researchers and supporting staff and is running an international doctoral program focused on advanced management systems research. The institute currently has 28 doctoral students from 8 countries. IAMSR is carrying out its research programs in co-operation with major Finnish companies and in international networks funded by the EU IST (European Union Information Society Technologies) and ESPRIT (European Programme for Research and Development in Information Technologies) programs. Presently IAMSR is also involved in several major national research programs financed by the National Technology Agency of Finland (TEKES) and the Academy of Finland. The research programs are the main funding sources for IAMSR, which is an independent research institute in the Abo Akademi University. IAMSR was a member of the ERUDIT (an ESPRIT network of excellence) and is a member of the EUNITE (an IST network of excellence on smart adaptive systems) as well as in the Berkeley Initiative in Soft Computing with more than 5000 networked researchers worldwide.

As part of the research programs IAMSR is carrying out theory-driven and applied research in approximate reasoning and fuzzy logic, self-organizing maps and neural nets in text mining, interdependent multiple criteria optimisation, software agents, mobile and electronic commerce methods and technology, industry foresight methods, scenario technologies, knowledge based support systems, and hyperknowledge.

IAMSR has pursued several different strains of research in fuzzy sets and fuzzy logic in the last 5 years. Extensive work was put into developing a new class of real options models in which the original Black-Scholes theory was extended with the use of fuzzy numbers and into solving the bullwhip problems of logistical networks with fuzzy numbers and approximate reasoning schemes. The results are implemented as new policy models for a number of corporate partners for which the typical platforms have been optimisation models and information systems with intelligent features.

The work with actual problems in close interaction with managers, who are responsible for handling and solving the problems, is quite rewarding as it forces the research teams to actually tackle many of the issues in fuzzy sets research we normal avoid by making good assumptions and smart focusing of the problem areas. One of the rewards is that the problem solving work also drives research into the foundations of fuzzy set theory, fuzzy logic, fuzzy number theory, etc. IAMSR researchers have developed methods for the possibilistic mean and variance (a simpler form of mean and variance for fuzzy numbers), the connection between falling integrals and falling shadows (showing that probability theory and possibility theory can be combined), fuzzy multiple criteria optimisation with interdependent criteria, multi-objective optimisation with linguistic variables, possibilistic correlation and a new form for the extension principle. These results have been (or are being) published in the Fuzzy Sets and Systems and at a number of conferences, and summaries of the research have been published in two textbooks (cf. below) and are forthcoming in three doctoral theses that will be defended in 2004-5.

IAMSR welcomes interaction and cooperation with researchers and research groups in fuzzy sets, fuzzy logic and approximate reasoning. We can be reached through the following emails: christer.carlsson@abo.fi and robert.fuller@abo.fi.

Professor Christer Carlsson, Director of the IAMSR, and a professor of management science, is a member of the Steering Committee of EUNITE, an EU/IST Network of Excellence, and chairman of the UC Berkeley BISC-SIG on Soft Decision Analysis. Professor Carlsson was one of the early pioneers in European research on fuzzy sets: he was the second chairman (following Hans-Jürgen Zimmermann) of the EURO WG on Fuzzy Sets, he is one of the founders of IFSA and served on the first IFSA Council. Professor Carlsson has lectured extensively at various universities in Europe, in the U.S., in Asia and in Australia. Professor Carlsson has organised and managed several research programs in industry in knowledge based systems, decision support systems, fuzzy real options valuation and software agents, and has done research work also in multiple criteria optimisation and decision making, and fuzzy sets and fuzzy logic. He is on the editorial board of 11 journals (including the Fuzzy Sets and Systems) and is the author of over 240 published papers and books. His most recent books include Fuzzy Reasoning in Decision Making and Optimization (with Robert Fullér), Studies in Fuzziness and Soft Computing Series, Springer-Verlag, Berlin/Heidelberg, 2002, and Fuzzy Logic in Management (with Mario Fedrizzi, Robert Fullér), Kluwer, Dordrecht 2003.

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Who's Who under Forty

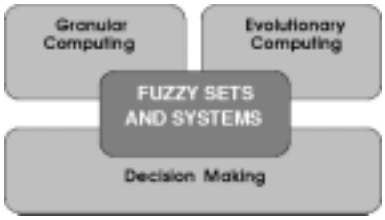
Fuzziness as a Key Element in Human-Centric Computing

Dr. Marek Reformat

Dr. Marek Reformat's research interests lie in the area of Soft Computing applied to data modeling and the design of systems emulating aspects of human character and behavior. In this context, fuzziness is a pivotal concept necessary for capturing relationships between data attributes, as well as for mimicking an individual's way of expressing and reasoning about opinions. Combined with other research activities, fuzziness creates a unique framework for development of intelligent and human-centric systems (see Figure).

Dr. Reformat's fascination with Soft Computing started during his Ph.D. studies. In his thesis he proposed a new methodology of control system design that relied on a combination of evolutionary-based optimization with advanced system simulators to provide realistic full-scale modeling abilities. This approach was used to design a control system with fuzzy-based switching between a number of PID controllers.

The development of fuzzy models is one of his present research activities. He has co-developed a novel model development process that addresses two fundamental requirements of fuzzy-based modeling: accuracy and transparency. This approach is based on a combination of evolutionary computing and gradient-based learning of fuzzy neural networks. Structural and parametric optimization of the models helps to achieve their overall accuracy, while the logic-oriented architecture of the fuzzy neural networks ensures the model transparency. The proposed methodology fully applies to highly dimensional modeling and remedies the problem of dimensionality associated with rule-based fuzzy models. These models are applied to various engineering problems including software maintenance and software quality.



Research activities leading to development of intelligent and human-centric systems.

In addition, Dr. Reformat's research embraces topics related to the application of fuzziness in decision making processes and the introduction of human aspects to software systems.

His research in the area of decision making has resulted in the construction of a fuzzy-based multi-model system. The multi-model structure is built using a number of traditional fuzzy-based models developed using different techniques applied to different subsets of data. Outputs of individual models are combined using techniques based on concepts of evidence theory, Bayesian networks, and fuzzy measures. So far, elements of evidence theory are applied to reason about the output of the multi-model system. This multi-model system provides users with quantitative results, as well as the knowledge needed to understand factors influencing relationships between modeled data. Ultimately, it will lead to multi-level models representing different aspects of the domain of interest and will be used for diagnostic and predictive purposes in adaptive and intelligent systems.

Dr. Reformat's work on the introduction of human aspects to software systems focuses on the design of an agent with a human component for Semantic Web, a new ontology-based approach of representing information on the web. In this new web environment, autonomous agents are involved in processes that evaluate responses coming from different service providers, and make decisions regarding selection of a single best service. Each agent representing a user in the Semantic Web "mimics" the user's decision-making process. In order to build such agents, Dr. Reformat uses fuzziness as a main component of the agent's "brain". Fuzzy predicates and if-then statements are used to express the user's preferences and acceptance levels. A prototype of a human-centric agent using fuzziness and fuzzy reasoning has been constructed. Further research in this area embraces the introduction of a "computing with words" paradigm and concept-based fuzzy sets to human-oriented software.

The overall research goal of Dr. Reformat is to make fuzziness a core element of human-centric computation. Fuzzy sets and systems migrating towards "computing with words" are seen as a bridge between the world of numbers, equations and logic, and the world of uncertainty and imprecise expression exhibited by humans. Imitating the human way of thinking is crucial for building systems that provide intelligent services to humans, and support human decisions and activities. He believes that systems and machines built with fuzziness are able to interface with a more "human like" manner, manifest "aspects of human behavior", and "blend in" to the human environment. In other words, Dr. Reformat believes that fuzzy-based systems are able to become ubiquitous.