We Change the Limits of the Possible

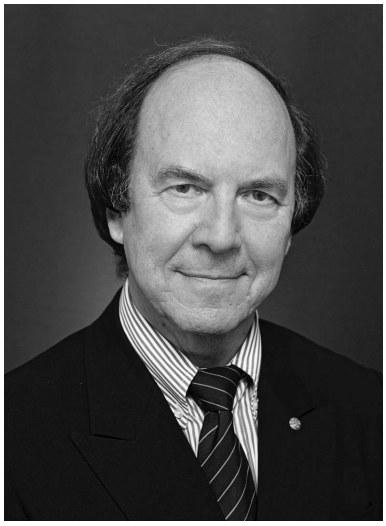
a conversation with Christer Carlsson

Professor Christer Carlsson is Director of the Institute of Advanced Management Systems Research, and a professor of management science at Abo Akademi University in Abo, Finland. He is also a Fellow of the International Fuzzy Systems Association, an Honorary Member of the Austrian Society for Cybernetics and an Honorary Chairman of the Finnish Operations Research Society. In 1997 Professor Carlsson is awarded E J Nyström Prize for scientific excellence by Societas Scientarium Fennica. He is in the Steering Group of the European Centre for Soft Computing in Oviedo, Spain and in the Steering Group of the BISC program at UC Berkeley.

Christer Carlsson got his DSc (BA) from Abo Akademi University in 1977, and 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 his specific research areas: knowledge based and intelligent systems, decision support systems and soft computing, and has carried out theoretical research work also in multiple criteria optimisation and decision making, fuzzy sets and fuzzy logic, and cybernetics and systems research. Some recent research programs, which include extensive industrial cooperation, include *Smarter* (reducing fragmentation of working time with modern information technology), *SmartBulls*, *SoftLogs* (eliminating demand fluctuations in the supply chain with fuzzy logic), *Waeno* (improving the productivity of capital in giga-investments using fuzzy real options), *MetalIT* (knowledge management and foresight in the metal industry), *OptionsPort* (optimal R&D portfolios where R&D projects are fuzzy real options), *Imagine21* (foresight of new telecom services using agent technology), *Chimer* (mobile platforms for sharing the cultural heritage among European school children), *AssessGrid* (risk assessment and management for grid computing) and *Enabling Technologies for Mobile Services* (mobile technology based products and services with enabling technologies; a national Finnish research program with an international partner network in France, Germany, Austria, UK, Hong Kong, Singapore and the USA). He is on the editorial board of several journals including the *Electronic Commerce Research and Applications, Fuzzy Sets and Systems, ITOR, Cybernetics and Systems, Scandinavian Journal of Management, Belgian Journal of Operational Research, Intelligent Systems in Accounting, Finance* and *Business and Group Decision and Negotiation*. He is the author of 4 books and more than 240 papers, as well as an editor or co-editor of 5 special issues of international journals and 12 books.

JAMRIS: What are you working on now?

Christer Carlsson - My research group numbers 25-40 researchers representing 8 different countries - doctor students, post-docs and people doing project research. Project that we are working on at the moment is one of the EU fund projects to greed computing, founded by Finnish Technology Research Funding Agency, and we have also some small regional European Union Funded projects. Typical what we are doing at the moment is Grid computing, risk analysis - methods, models, soft-ware - full automatic technique for risk management.



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The applications are going to be open source software. We are going to have it in 2008-2009. The main problem is, that the data, which is available, is incomplete and it seems not be a good standard. The other thing we are doing at the moment are real options, but applied not to financial assets but to real assets - like money markets, buildings, power plants, paper-mills, and so on. The future value of these assets can be calculated in the same fashion as people can calculate the option prices.

We have enabled to prove few years ago that it is possible to replace the stochastic elements for the Black-Scholes formula with fuzzy parameters. Therefore we introduced fuzzy parameters into Black-Scholes formula and then we proved that extended value can be convergent on a solution. Using this technique with Finnish co-operate partners we can calculate future value of paper plants. We are doing it for hydro power plants, R&D projects, financing solutions for municipal invest-ments. Time horizon is 20 to 25 years. So-called fuzzy Black-Scholes formulas prove to be very effective. Looking at the random events we want to capture we look at the future and then we capture some visions of this events in the future. These visions are translated into linguistic assessments, and linguistic assessments are translated into possibility theory. And that works. Simply and straightforward.

J: What is the greatest challenge for you?

CC - The real challenge always comes from working with real problems in the real world. It is really surprising to see that if you try to work with real problems using standard approaches it is simply easy that you find solutions, which are irrelevant. The reason that people have been not

working with real problems goes on the terms of the data, which is available in the real life. Sometimes it is too hard work. If you can recognise a problem as being a modification of mathematical model - because we are working in the industry we have to find something which works in the real life. And we have to do it properly. The theory has to be good. We have to prove that software is good. And we have to prove our users that these solutions make sense for them. After that we can start writing papers. That is fascinating. To be able to work with real problems.

J: You are an admirer of classical music. Have you even tried to combine your work with music or an other kind of art?

CC - I have never thought about that. Let mi give you an example: when you are thinking about knowledge mobilisation you always think about putting knowledge in mobile phones. Main reason why we are doing that is because knowledge management is a technology, which is about 10 years old. It is also a business which is worth 9 billions dollar per year. This business is slowly going to decline because it is not making any sense to the users. Knowledge management is not successful as a technology. What we are doing with knowledge mobilisation is that we are replacing basic technology road map for knowledge management. It is building on semantic web, on fuzzy ontologies and it is building on software development for including fuzzy ontology into the mobile technology platforms. It means that we are going to solutions, which are distributed ontologies. Distribution is done by multi agent systems. The multi agent systems work through SWAM intelligence. SWAM intelligence means that you do not have all coordination of the agents, by the agents coordinate by looking at each others. If you do it that way you have SWAMs moving back comfort to find different satisfying states. Then you are close to art. This is proving in several books that harmonic forms are created in this way. I am not seeing this yet, of course, but doing knowledge mobilisation with SWAM intelligence coordination of multi agents systems at the end would be harmonic essence of what show you inside. It might happen, but you may ask me about it in three years.

J: We are talking during the international world congress on fuzzy systems. How your inventions could change the world? What future do you predict for your research field?

CC - Knowledge mobilisation is a future per itself. It is a self-statement. If you look at the capability of mobile phones these days - here I have of course Nokia - we have here Menu system. You do not have to know all about this phenomenon to use it - to skip Internet, check localisation, and so on. You need to know only some things in the specific context. Mobile phone is going to be a platform to getting knowledge. Earlier knowledge was hardly available, now is becoming available for everyone. This technology really changes the world. We change the limits of the possible in our everyday routines. You can communicate in certain ways wherever you are, you can be accessed wherever you are if you like so. This is the main, epoch-making change. You have all worlds in a small phone - newspapers, Google maps, navigator, and others. This is now evolving to become supporting environment for us who are built the context image in we move everyday. This is agent-based, personalized application, which is picking all information I need. Wikipedia today is 1.3 million articles, Encyclopaedia Britannica is 200 000 articles.

J: Everyone can edit Wikipedia,

CC - Well, yes and now, because there is an Editorial Board of Wikipedia checking to be sure that everything that is published in Wikipedia is correct. Average of errors is 2-3 errors in each article. The same test was done for Encyclopaedia Britannica. Guess, how many errors in each article were found?

J: I have no idea...

CC - Between 2 and 3. The same level. Quality of Wikipedia is very good.

J: I still maintain that open access to edit of Wikipedia could be dangerous for its quality. Everything has the dark side.

CC - I do not believe in the dark side because everything we have invented in human history can also be misused. But the misuses have always been a very small minority. And we are not being able to stop development. Of course I am optimist - that why I working on developing of these technologies.

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