

Call for book chapters

Fuzzy Cognitive maps for Applied Sciences and Engineering – From fundamentals to extensions and learning algorithms

To be published in the “Intelligent Systems Reference Library”, book series, Springer (2013) - <http://www.springer.com/series/8578>

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Introduction

The book is dedicated to provide readers with deep insights on fundamentals, modelling methodologies, extensions and learning methodologies for FCMs, with algorithms, codes, software tools and applications of fuzzy cognitive maps in applied sciences and engineering. This will help the academics, new generation researchers, applied researchers to use the FCM methodology, the several extensions of FCMs, the FCM learning algorithms and the available software tools for decision making and support.

Description

Fuzzy cognitive maps (FCMs) are nonlinear feedback dynamical systems for modeling causal knowledge. They combine aspects of fuzzy logic, neural networks, semantic networks, expert systems, and nonlinear dynamical systems. That rich structure endows FCMs with their own complexity and lets them apply to a wide range of problems in engineering and in the soft and hard sciences.

FCMs were introduced by Bart Kosko in 1986 and since then FCMs have gained considerable research interest and are widely used to analyze causal complex systems. FCMs have been applied in diverse application domains, such as computer science, engineering, environmental sciences, behavioral sciences, medicine, business, information systems and information technology. From an Artificial Intelligence perspective, FCMs are dynamic networks with learning capabilities, whereas more and more data is available to model the problem, the system becomes better at adapting itself and reaching a solution. They gained momentum due to their dynamic characteristics and learning capabilities. These capabilities make them essential for modeling, analysis and decision making tasks as they improve the performance of these tasks. In addition, several FCM extensions have been proposed during the last decade. Each one of them improves the conventional FCM, as initially suggested by Kosko (1986), in different ways.

Objectives of the book

This book tries to present emerging trends and advances in FCMs in a concrete and integrated manner focusing on FCM fundamentals, extensions and learning algorithms for applied sciences and engineering.

New features of this book are:

- New book to systematically and comprehensively present the fundamentals of FCM methodology, the extensions of FCMs with their theories and the learning algorithms of FCMs,
- Provides readers with deep insights on FCM extensions and learning algorithms, codes, software tools and applications of FCMs in applied sciences and engineering
- Presents different case studies of learning algorithms successfully applied to real world problems.

The number of published papers (in the last 10 years) was extremely high and in the last two years was exceptionally high showing that there is a strong interest in FCMs by contemporary researchers.

Target Audience

The audience of this book is both the academic and applied research community that has an interest in using FCMs, either as a theoretical framework or as a methodology and tool for applied research, engineering, industrial applications, environmental management, medical decision support etc. Also,

students and new generation researchers can be helped and addressed through mathematical and computational modeling, learning algorithms.

Topics

Chapters should be written in American or British English and in a manner readable for both specialists and non-specialists. Recommended topic areas include, but are not limited to:

Theoretical Aspects on FCMs

Modeling Issues

FCMs of Approximate Reasoning

Knowledge representation and reasoning

Extensions of FCMs

- Rule-based FCMs
- Intuitionistic FCMs
- Fuzzy Grey CMs
- Fuzzy Cognitive Networks
- Temporal FCMs
- Case-based FCMs
- Automata-based FCMs
- Hybrid FCM-based approaches
- Dynamic Cognitive Network
- Multi-agent systems
- Other extensions

Learning Algorithms

- Unsupervised learning
- Supervised learning
- Evolutionary learning
- Hybrid algorithms
- Particle Swarm Optimization
- Prediction algorithms
- Classification algorithms
- Other algorithms

Application domains:

- Engineering
- Economic / financial crisis
- Business management
- Software systems
- Telecommunications
- Production systems
- Environment
- Agriculture
- Energy Policy
- Health Informatics
- Decision Support Systems
- Pattern Recognition
- Data mining
- Banking and Management
- Computer Vision
- Information Technology
- Ambient Intelligence
- Affective Computing
- Control Systems
- Stakeholders analysis
- Policy Making

Submission information

Academics, researchers and practitioners are invited to submit by 18 April 2012, a 2-page manuscript proposal detailing the background, motivations and structure of their proposed chapter. Authors of accepted proposals will be notified by 25 April 2012. For chapter preparation, authors must submit Word or LaTeX files and follow the instructions listed on

<http://www.springer.com/series/8578?detailsPage=editorialBoard>

Full chapters will be due on 10 July 2012 and should be of around 5,000 words in length and/or 12 pages long. All chapters will be reviewed on a double-blind basis. The book is to be published in the "*Intelligent Systems Reference Library*" book series, Springer. This publication is anticipated to be released in early 2013.

Important dates

2-page Proposal Submission Deadline:	20 April 2012
Notification of Proposal Acceptance:	25 April 2012
Full Chapter Submission (in Word or PDF):	10 July 2012
Notification of Full Chapter Acceptance:	9 September 2012
Revised Chapter Submission:	30 October 2012
Final Notification of Acceptance:	15 December 2012

Submission of manuscripts

Inquiries (e-mail) and submissions can be forwarded electronically to:

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