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Amelia Bădică · Bogdan Trawiński
Ngoc Thanh Nguyen
Editors

Recent Developments in Computational Collective Intelligence

Springer

Editors
Amelia Bădică
Faculty of Economics
and Business Administration
University of Craiova
Craiova
Romania

Ngoc Thanh Nguyen
Institute of Informatics
Wroclaw University of Technology
Wroclaw
Poland

Bogdan Trawiński
Institute of Informatics
Wroclaw University of Technology
Wroclaw
Poland

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Preface

Collective Intelligence represents the intelligence shared by a group of intelligent entities (natural or artificial) resulted from their mass interaction through various activities including collaboration, competition, opinion expressing, value exchange, message exchange, a.o. The term occurs in sociology, populations' biology, economy and political sciences. This interaction can involve for example consensus reaching, decision making, social choice or other means for quantifying mass activities. The rapid growth of the interconnectivity of a huge number of intelligent natural and artificial entities powered up by the most recent Internet and Web technologies (the Internet of Things, the Web of Services, the Web of Data, the Semantic Web, and the Social Web) will determine the ad-hoc formation of heterogeneous intelligent complex systems that massively combine natural and artificial intelligence resulting in new forms of Computational Collective Intelligence.

Computational Collective Intelligence is a rapidly growing field that is most often understood as an AI sub-field dealing with soft computing methods which enable making group decisions or processing knowledge among autonomous units acting in distributed environments. Web-based Systems, Social Networks and Multi-agent Systems very often need these tools for working out consistent knowledge states, resolving conflicts and making decisions.

The papers included in this volume cover a selection of topics of the rapidly advancing domain of Collective Computational Intelligence: formal computational models of markets and social systems, emergent behaviors, autonomous agents, planning, agent-oriented programming, character recognition, intelligent transport, neural network applications, optimization, grey theory, natural language processing, group decision support, and rule systems.

The book consists of 19 extended and revised chapters based on original works presented during a poster session organized within the 5th International Conference on Computational Collective Intelligence that was held between 11 and 13 of September 2013 in Craiova, Romania. The book is divided into three parts. The first part is titled "Agents and Multi-Agent Systems" and consists of 8 chapters that concentrate on many problems related to agent and multi-agent systems, including: formal models, agent autonomy, emergent properties, agent programming, agent-based simulation and

planning. The second part of the book is titled "Intelligent Computational Methods" and consists of 6 chapters. The authors present applications of various intelligent computational methods like neural networks, mathematical optimization and multistage decision processes in areas like cooperation, character recognition, wireless networks, transport, and metal structures. The third part of the book is titled "Language and Knowledge Processing Systems", and consists of 5 papers devoted to processing methods for knowledge and language information in various applications, including: language identification, corpus comparison, opinion classification, group decision making, and rule bases.

The editors hope that this book can be useful for graduate and PhD students in computer science as well as for mature academics, researchers and practitioners interested in the methods and applications of collective computational intelligence in order to create new intelligent systems.

We wish to express our great attitude to Prof. Janusz Kacprzyk, the editor of this series, and to Dr. Thomas Ditzinger from Springer for their interest and support for our project.

The last but not least we wish to express our great attitude to all authors who contributed to the content of this volume.

Amelia Bădică
Bogdan Trawiński
Ngoc Thanh Nguyen

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