

# **COMPUTATIONAL INTELLIGENCE ALGORITHMS BASED COMPREHENSIVE HUMAN EXPERT AND DATA (HEAD)-DRIVEN MODELS MINING FOR COMPLICATED SYSTEMS CONTROL, OPTIMIZATION AND DESIGN**

*Abstract of plenary report<sup>1</sup>*

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**Abstract:** The development of modern society requires implementation of edge technological achievements in various areas, which could be performed by combining computational intelligence algorithms with human expert knowledge, leading to the possibility of data-driven modeling and design of complicated systems.

**Key words:** computational intelligence, data analysis, expert knowledge, modeling automation.

## **1. INTRODUCTION**

Humankind faces today serious challenges in the area of the holistic description of complex systems and processes that could give the possibility for intelligent decision support, information processing, and understanding natural phenomena and the human impact or the impact of nature and technology on the identification of society. The era of computers and digital devices generates new terms like pervasive computing, big data, digitalization and other terms of this kind which can approximately reflect ideas that should be taken into consideration in order to adequately respond to this challenge in the field of the impact of (computing) technology on society and implement adequate decision support models and tools. Contemporary science, namely computer science, system and algorithms engineering, decision theory and mathematics, has appropriate ideas and techniques to support humankind in its efforts in this area. However, there is

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<sup>1</sup> The full paper is published in a special issue SP2 (vol. 11), 2019 of the International Journal on Information Technologies and Security, ISSN 1313-8251 (<http://ijits-bg.com>), indexed by Web of Science

a growing gap between ideological concepts and their technological implementation, especially in the readiness to apply existing scientific ideas. The latter requires not only considering the specificity of the problem in hand when designing the necessary tools, but also a high level of adaptation possibilities during everyday use of these tools. Fine-tuning of intelligent technologies of information processing and decision support in various areas such as nature phenomena, life sciences, management analytics, personalized medicine, smart cities, smart grids and communication networks, smart targeting in education, risk analytics, human-machine interaction, social and technological security and safety, and autonomous robotics, requires the development of novel technological approaches and bringing them into the practice.

Recent results allow drawing ways of further improving the developed approaches to be determined, more specifically, the necessity to perform a thorough investigation of the ideas of self-adjustment, self-configuration and self-adaptation of the algorithms and expanding the area of their application for decision support in complicated systems management and control. Moreover, having such tools in hand we must investigate ways for their application in the comprehensive modelling of natural phenomena, complex processes and systems of systems in order to be able to generate holistic descriptions of the real world.

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