
Editorial

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Biographical notes: Sundarapandian Vaidyanathan is a Professor and Dean at the Research and Development Centre, Vel Tech University, Chennai, India. He earned his DSc in Electrical and Systems Engineering from the Washington University, St. Louis, USA in 1996. His current research focuses on chaos theory, control systems, mathematical modelling and computational science. He has published over 450 Scopus-indexed research publications. He is the Editor-in-Chief of *International Journal of Nonlinear Dynamics and Control* (Inderscience, UK). He is also an Associate Editor in many international journals. He has delivered plenary lectures on control systems and chaos theory in many international conferences around the world. He has also conducted several workshops on computational science, chaos theory and control systems using MATLAB and SCILAB.

Computational intelligence (CI) usually refers to the ability of a computer to learn a specific task from data or experimental observation. The principal constituents of CI are fuzzy logic, evolutionary computation, machine learning, and probabilistic reasoning (PR).

The development of CI systems was inspired by observable and imitable aspects of intelligent activity of human being and nature. The essence of the systems based on CI is to process and interpret data of various natures so that CI is strictly connected with the increase of available data as well as capabilities of their processing, mutually supportive factors. Without them, the development of this field would be almost impossible, and its application practically marginal. That is why these techniques have especially developed in recent years.

Developed theories of CI have been quickly applied in many fields of engineering, data analysis, forecasting, biomedicine and others. They are used in images and sounds processing and identifying, signals processing, multidimensional data visualisation, steering of objects, analysis of lexicographic data, requesting systems in banking, diagnostic systems, expert systems and many other practical implementations.

In this special issue of the *International Journal of Intelligent Engineering Informatics (IJIEI)*, we are delighted to select six research articles reporting on recent advances and applications in CI.

It is hoped that this special issue will provide a useful reference for the recent technologies in CI. The contents of the selected six articles are described briefly as follows:

The paper titled 'Performance evaluation of conventional and fuzzy control systems for speed control of a DC motor using positive output Luo converter' by Mohamed Boutouba, Abdelghani El Ougli and Belkassem Tidhaf proposes a speed

control of a DC motor for a photovoltaic (PV) system using fuzzy logic technique as a controller with a DC-DC converter type positive output Luo converter. In this work a PI fuzzy logic controller is proposed to get better pursuit, response and speed accuracy which represents important parameters to control on some industrial applications. Different system blocks are developed on MATLAB/SIMULINK as environment. Simulation results, using comparison between a conventional proportional-integral-derivative (PID) controller and the PI-fuzzy logic controller, demonstrate the good behaviour of the proposed system.

The paper titled 'Design of an adaptive sliding mode controller for efficiency improvement of the MPPT for PV water pumping' by Sabah Miqui, Abdelghani El Ougli and Belkassem Tidhaf deals with the modelling and simulation of a PV water pump along with a new maximum power point tracker (MPPT) control to ensure the operation of the PV system at a maximum power for various climatic conditions. Specifically, a robust tracking controller is proposed using an adaptive sliding mode control (ASMC). The new system includes a PV panel, DC/DC boost converter, a DC motor, a centrifuge water pump and an MPPT controller that generates the duty cycle to the boost converter. The proposed controller is compared to a sliding mode control (SMC) and a classic perturb and observe (P&O) algorithm. The system is simulated in MATLAB/SIMULINK and the results show the good functioning and the improvement of the performance of the PV system using the proposed controller.

The paper titled 'Evolutionary-based method for risk stratification of diabetic patients' by Viorica Rozina Chifu, Emil Stefan Chifu, Cristina Bianca Pop, Ioan Salomie and Madalina Lupu addresses the problem of optimality in the e-health domain by proposing an evolutionary-inspired method for clustering patients according to the risk of having diabetes. This method clusters patients based on their similarity with respect to the following features: age, sex, race category, body mass index, whether the patient has or has not hypertension, and the presence or absence of first-degree relatives with diabetes. The proposed method has been tested on the NHANES III dataset.

The paper titled 'Speed control of a doubly-fed induction machine based on fuzzy adaptive' by Abderazak Saidi and Farid Naceri proposes an adaptive fuzzy control based on the theory of Lyapunov proposed in order to solve the problems of determination of the gains of the PI-fuzzy whose aim to ensure the stability of the control and to increase the robustness regardless of the parametric variation. The simulation results obtained by using MATLAB environment show that the fuzzy adaptive control is more robust, also it has superior dynamics performances. The results and test of robustness are presented in detail to observe that adaptive fuzzy regulator leads to better performance (continuation and robustness) than the other controllers treated because of its robustness, its speed (time of response) and stability of coping mechanism that allow it to give gains correct and to avoid the problem of the test-error method.

The paper titled 'Whale optimisation algorithm-based controller design for reverse osmosis desalination plants' by Natwar Singh Rathore and V.P. Singh contributes whale optimisation algorithm (WOA)-based controllers for reverse osmosis (RO) desalination plants. Two PID controllers are designed for flux and conductivity of RO plant model. The tuning of these controllers is carried out with a newly proposed algorithm, i.e., WOA. The minimisation of integral-of-squared-error (ISE) is considered as performance index for design of objective function in the problem. The performance of proposed controllers is compared with other optimisation algorithms-based controllers. Simulation results exhibit the supremacy of WOA-based controllers over the other controllers. The

proposed controllers are found best for RO desalination plants in terms of control of RO unit model.

The paper titled 'POFGURST: an expert intelligent system for mechanised oil palm fruit evaluating framework' by Gaurang S. Patkar, G.S.G.N. Anjaneyulu and P.V.S.S.R. Chandra Mouli deals with the subject of palm natural product evaluating and disease expectation utilising the essential rough set approach. Specifically, we acquaint new technique with diminish the dubious data and produce the right standards considering the information gathered. This strategy is executed using POFGURST an intelligent software on a microcomputer by which the agriculturist (chief) can enter data accessible to settle on choice by a few measures for conclusion. POFGURST underpins perusing and preprocessing of palm oil natural product information, reduct calculation and lead amalgamation, approval and investigation of created principles. The software also provides a feature that allows user to understand the results more precisely.

The guest editor would like to thank all the authors for submitting their manuscripts in this special issue. We would want to acknowledge the reviewers for their contributions in reviewing the papers and providing constructive comments to the authors. Finally, the guest editor would like to specially thank the Editor-in-Chief of *International Journal Intelligent Engineering Informatics (IJIEI)*, Professor Ahmad Taher Azar (Benha University, Egypt) for his great help and support in organising and coordinating the publication of this special issue.