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Editors

Soft Computing for Problem Solving 2019

Proceedings of SocProS 2019, Volume 2

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Preface

We are delighted that the 9th International Conference on Soft Computing for Problem Solving, SocProS 2019, took place at Liverpool Hope University, UK, during 02–04 September 2019. This was a particularly important event as it coincided with the 175th anniversary of the foundation of Liverpool Hope University (LHU). The SocProS conference series has a glorious history; the earlier editions of the conference have been organised in various prestigious institutions of India. For the very first time, this event in the series of the conference was hosted outside of India at Liverpool in the UK. This is significant because along with IIT Roorkee and South Asian University in India, LHU has been one of the key institutions that initiated this prestigious meeting. Continuing the trend, once again the 9th edition of this conference touched many milestones in terms of quality research papers and fruitful discussions. The theme of SocProS 2019 was "*Unlocking the Power and Impact of Artificial Intelligence*".

This proceedings as an outcome of the 9th meeting of the SocProS community includes a collection of selected high-quality articles on various topics related to soft computing and artificial intelligence and their applications. The book is being prepared in two volumes to cover the recent advances and challenges in the themes of machine learning, neural networks, scientific computing, and intelligent systems and includes several chapters addressing the problems arising in real-life applications comprising that of image classification, deep learning, fuzzy systems, flow shop scheduling, support vector machines, mobile robot path planning, P-systems, machine learning, and spiking neural networks, to name a few contributions. We have also tried to capture the impact aspects of research in this area, particularly impact beyond the academic world. We have made further efforts in this direction to embed impact as part of our conference series, and going forward we very much hope that, as was agreed at the conference, we will continue to mainstream impact in our work and intensify our efforts to reach out to non-academic beneficiaries and users to realise the impact from our research.

Highlighting theoretical perspectives and empirical research, it is hoped that this edited volume will prove to be a comprehensive reference source for researchers, practitioners, students, and professionals interested in the current advancements and

efficient use of soft computing as well as in making the impact happen. We express our heartfelt gratitude to all the authors, reviewers, and Springer personnel for their motivation and patience.

Liverpool, UK
September 2019

Atulya K. Nagar
Kusum Deep
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Atulya K. Nagar holds the Foundation Chair as Professor of Mathematical Sciences, and is the Pro-Vice-Chancellor for Research and Dean of the Faculty of Science at Liverpool Hope University, United Kingdom. He is also the Head of the School of Mathematics, Computer Science and Engineering, which he established at the University. He is an internationally respected scholar working at the cutting edge of theoretical computer science, applied mathematical analysis, operations research, and systems engineering. He received a prestigious Commonwealth Fellowship to pursue his doctorate (DPhil) in Applied Nonlinear Mathematics, which he earned from the University of York (UK) in 1996. He holds a BSc (Hons), an MSc and MPhil (with distinction) in Mathematical Physics from the MDS University of Ajmer, India. His research expertise spans both applied mathematics and computational methods for nonlinear, complex, and intractable problems arising in science, engineering and industry.

Prof. Kusum Deep is a Professor at the Department of Mathematics, Indian Institute of Technology Roorkee. Her research interests include numerical optimization, nature inspired optimization, computational intelligence, genetic algorithms, parallel genetic algorithms, and parallel particle swarm optimization.

Dr. Jagdish Chand Bansal is an Assistant Professor at the South Asian University, New Delhi, India and visiting research fellow at Liverpool Hope University, UK. He has an excellent academic record and is a leading researcher in the field of swarm intelligence. He has published numerous research papers in respected international and national journals.

Dr. Kedar Nath Das is an Assistant Professor at the Department of Mathematics, National Institute of Technology, Silchar, Assam, India. Over the past 10 years, he has made substantial contributions to research on soft computing, and has published several papers in prominent national and international journals. His chief area of interest is evolutionary and bio-inspired algorithms for optimization.