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Volume 201

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Editors

Proceedings of Seventh International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2012)

Volume 1

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Preface

Human beings have always been fascinated by nature and especially by biological diversity and their evolutionary process. This has resulted into inspirations drawn from natural or biological systems, and phenomenon, for problem solving and has seen an emergence of a new paradigm of computation known as Natural Computing with Bio-inspired Computing as its subset. The widely popular methods, e.g., evolutionary computation, swarm intelligence, artificial neural networks, artificial immune systems, are just some examples in the area. Such approaches are of much use when we need an imprecise, inaccurate but feasible solution in a reasonable time as many real-world problems are too complex to be dealt using traditional methods of finding exact solutions in a reasonable time. Therefore, bio-inspired approaches are gaining popularity as the size and complexity of the real-world problems require the development of methods which can give the solution within a reasonable amount of time rather than an ability to guarantee the exact solution. Bio-inspired Computing can provide such a rich tool-chest of approaches as it tends to be, just like its natural system counterpart, decentralized, adaptive and environmentally aware, and as a result have survivability, scalability and flexibility features necessary to deal with complex and intractable situations.

Bio-Inspired Computing: Theories and Applications (BIC-TA) is one of the flagship conferences on Bio-Computing bringing together the world's leading scientists from different branches of Natural Computing. Since 2006 the conferences have taken place at Wuhan (2006), Zhengzhou (2007), Adelaide (2008), Beijing (2009), Liverpool and Changsha (2010), Penang (2011). BIC-TA has attracted wide ranging interest amongst researchers with different backgrounds resulting in a seventh edition in 2012 at Gwalior. It is our privilege to have been part of this seventh edition of the BIC-TA series which is being hosted for the first time in India.

This volume in the AISC series contains papers presented at the Seventh International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2012) held during December 14–16, 2012 at ABV-Indian Institute of Information Technology and Management Gwalior (ABV-IIITM Gwalior), Madhya Pradesh, India. The BIC-TA 2012 provides a unique forum to researchers and practitioners working in the ever growing area of bio-inspired computing methods and their applications to solve various real-world problems.

BIC-TA 2012 attracted attention of researchers from all over the globe and we received 188 papers related to various aspects of bio-inspired computing with umpteen applications, theories, and techniques. After a thorough peer-review process a total of 91 thought-provoking research papers are selected for publication in the Proceedings, which is in two volumes (Volume 1 and 2). This thus corresponds to an acceptance rate of 48% and is intended to maintain a high standard in the conference proceedings. We hope that the papers contained in this proceeding will serve the purpose of inspiring more and more researchers to work in the area of bio-inspired computing and its application.

The editors would like to express their sincere gratitude to the authors, plenary speakers, invited speakers, reviewers, and members of international advisory committee, programme committee and local organizing committee. It would not have been possible to come out with the high quality and standard of the conference as well as this edited Proceeding without their active

participation and whole hearted support. It would not be fair on our part if we forget to mention special thanks to the ABV – Indian Institute of Information Technology and Management Gwalior (ABV-IIITM Gwalior) and its Director Prof. S. G. Deshmukh for providing us all the possible help and support including excellent infrastructure of the Institute to make this conference a big success. We express our gratitude to the Department of Mathematics and Computer Science, Liverpool Hope University, Liverpool, UK headed by Prof. Atulya K. Nagar for providing us much valued and needed support and guidance. Finally, we would like to thank all the volunteers; their untiring efforts in meeting the deadlines and managerial skills in managing the resources effectively and efficiently which has ensured a smooth running of the conference.

It is envisaged that the BIC-TA conference series will continue to grow and include relevant future research and development challenges in this exciting field of Computing.

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About Editors

Dr. Jagdish Chand Bansal is an Assistant Professor with the South Asian University New Delhi, India. Holding an excellent academic record, he is a budding researcher in the field of Swarm Intelligence at the International Level.

Dr. Pramod Kumar Singh is an Associate Professor with the ABV-Indian Institute of Information Technology and Management, Gwalior, India. He is an active researcher and has earned a reputation in the areas of Nature-Inspired Computing, Multi-/Many-Objective Optimization, and Data Mining.

Dr. Kusum Deep is a Professor with the Department of Mathematics, Indian Institute of Technology Roorkee, Roorkee, India. Over the last 25 years, her research is increasingly well-cited making her a central International figure in the area of Bio-Inspired Optimization Techniques, Genetic Algorithms and Particle Swarm Optimization.

Dr. Millie Pant is an Associate Professor with the Department of Applied Science and Engineering, Indian Institute of Technology, Roorkee, Roorkee, India. At this age, she has earned a remarkable International reputation in the area of Genetic Algorithms, Differential Algorithms and Swarm Intelligence.

Prof. Atulya K. Nagar is the Professor and Head of Department of Mathematics and Computer Science at Liverpool Hope University, Liverpool, UK. Prof. Nagar is an internationally recognized scholar working at the cutting edge of theoretical computer science, natural computing, applied mathematical analysis, operations research, and systems engineering and his work is underpinned by strong complexity-theoretic foundations.

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