

# **Advances in Intelligent Systems and Computing**

Volume 518

## **Series editor**

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The series “Advances in Intelligent Systems and Computing” contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

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# Progress in Intelligent Computing Techniques: Theory, Practice, and Applications

Proceedings of ICACNI 2016, Volume 1

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# Foreword

## Message from the Honorary General Chair Prof. Mike Hinchey

Welcome to the 4th International Conference on Advanced Computing, Networking and Informatics. The conference is hosted at the Centre for Computer Vision and Pattern Recognition, NIT Rourkela, Odisha, India. For this fourth event, held September 22–24, 2016, the theme is Computer Vision and Pattern Recognition.

Following the great success of the last three years, we are very glad to recognize the co-organization of the Center for Computer Vision and Pattern Recognition, at National Institute of Technology Rourkela, India; the Faculty of Engineering and Technology, Liverpool John Moores University, UK; the College of Engineering, Mathematics and Physical Sciences, University of Exeter, UK; and the Faculty of Science, Liverpool Hope University, UK.

Having selected 114 articles from more than 500 submissions, we are glad to have the proceedings of the conference published in the *Advances in Intelligent Systems and Computing* series of Springer.

I am very pleased to have published the special issues of papers from ICACNI in *Innovations in Systems and Software Engineering: A NASA Journal*, published by Springer and of which I am editor-in-chief, in each of the preceding years, and all of which were truly excellent and well received by our subscribers.

The accepted papers this year will be considered again for this journal and for several other special issues.

I would like to acknowledge the special contribution of Prof. Sunil Kumar Sarangi, Former Director of NIT Rourkela, as the chief patron for this conference.

The conference is technically co-sponsored by the following professional organizations/laboratories:

1. Joint Control Systems Society and Instrumentation and Measurement Society Chapter, IEEE Kolkata Section
2. IEEE Communications Society Calcutta Chapter
3. Aerospace Electronics and Systems Division, CSIR National Aerospace Laboratories, Govt. of India

4. Dependable Computing and Networking Laboratory, Iowa State University, USA
5. Multimedia Content Security Innovative Research Group, Henan University of Science and Technology, China
6. Poznan University of Technology Vision Laboratory, Poland

We are grateful to all of them for their co-sponsorship and support. The diversity of countries involved indicates the broad support that ICACNI 2016 has received. A number of important awards will be distributed at this year's event, including Best Paper Awards from ACM Kolkata Chapter, a Best Student Paper Award from IEEE ComSoc Kolkata Chapter, a Student Travel Award from INNS, and a Distinguished Women Researcher Award.

I would like to thank all of the authors, contributors, reviewers, and PC members for their hard work. I would especially like to thank our esteemed keynote speakers and tutorial presenters. They are all highly accomplished researchers and practitioners, and we are very grateful for their time and participation.

But the success of this event is truly down to the local organizers, local supporters, and various chairs who have done so much work to make this a great event. We hope you will gain much from ICACNI 2016 and will plan to submit to and participate in ICACNI 2017.

Best wishes,



Professor Mike Hinchey

ICACNI 2016 Honorary General Chair  
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# Preface

It is indeed a pleasure to receive overwhelming response from academicians and researchers of premier institutes and organizations of the country and abroad for participating in the 4th International Conference on Advanced Computing, Networking, and Informatics (ICACNI 2016), which makes our endeavor successful. The conference organized by Centre for Computer Vision and Pattern Recognition, National Institute of Technology Rourkela, India, during September 22–24, 2016, certainly marks a success toward bringing researchers, academicians, and practitioners in the same platform. We have received more than 550 articles and very stringently have selected through peer review 114 best articles for presentation and publication. We could not accommodate many promising works as we tried to ensure the highest quality. We are thankful to have the advice of dedicated academicians and experts from industry and the eminent academicians involved in providing technical co-sponsorship to organize the conference in good shape. We thank all people participating and submitting their works and having continued interest in our conference for the fourth year. The articles presented in the two volumes of the proceedings discuss the cutting-edge technologies and recent advances in the domain of the conference. The extended versions of selected works would be re-reviewed for publication in reputed journals.

We conclude with our heartiest thanks to everyone associated with the conference and seeking their support to organize the 5th ICACNI 2017 at National Institute of Technology Goa during June 01–03, 2017.

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