

## Preface

I take this opportunity to welcome you all to the Proceedings of the 11<sup>th</sup> INDIACom; 2017 04<sup>th</sup> International Conference on “Computing for Sustainable Global Development”; INDIACom – 2017; the eleventh edition of the annual series; being organized during 01<sup>st</sup> – 03<sup>rd</sup> March, 2017.

Throughout the world, nations have started recognizing that IT is now acting as a catalyst in speeding up the economic activities in efficient governance, citizens’ empowerment and in improving the quality of human life. Recent developments in IT have touched almost every conceivable area of human life. Emergence of Information and Communication Technologies (ICT) on the national agenda, witnesses the impact of IT on good governance, sustainable development, globalization of economy and social empowerment. In light of this, the theme, Computing for Sustainable Global Development, is very much relevant and timely, even now.

The objective was to bring the eminent academicians, scientists, researchers, industrialists, technocrats, government representatives, social visionaries and experts from all strata of society, under one roof, to explore the new horizons of innovative technologies to identify opportunities and define the path forward. This new path should eliminate isolation, discourage redundant efforts and promote scientific progress aimed to accelerate India’s overall growth to prominence on the International front and contribute effectively to realize and achieve the India 2020 mission of being a Developed Nation. The conference will feature regular paper presentation sessions, invited talks, key note addresses, panel discussions and poster exhibitions.

Encouraged by the resounding success of past ten editions of INDIACom(s) since its inception in 2007 with INDIACom – 2007; INDIACom - 2017 was announced as the 11<sup>th</sup> edition of the annual series at international level under technical sponsorship of IEEE Delhi Section with permission to publish and index all accepted papers, which will be presented during the conference, in IEEE Xplore. It attracted researchers and practitioners from academia, industry and government agencies, in order to exchange ideas and share their valuable experiences. Over 2600 papers written by over 5,500 authors, from all over of the world, were received; till the last date; thereby making the job of the Technical Programme Committee (TPC) extremely difficult. After a series of tough review exercises by a team of over 750 experts, 885 papers, authored by over 2100 authors from different parts of the country and abroad, were recommended to be accepted for presentation in INDIACom – 2017 during the three days under nine parallel tracks. Out of these 885 papers, a chosen set of 91 papers were further recommended, by the Editorial Board, for publication in the hard copy of the Pre-Conference Proceedings. These papers represent wide variety of research topics in all the emerging areas besides traditional and core computational areas. Some of the application oriented papers may not be very rich in technical content, but provide extensive information about the new areas where computing can really be useful for the overall prosperity of the mankind, which in turn might facilitate the overall growth in the country. I am sure, these contributions will definitely enrich our knowledge and motivate many of us to take up these challenging application areas and contribute effectively for the Sustainable Global Development.

At this point of time, I would like to thank our Hon' ble Founder – Bharati Vidyapeeth, Dr. Patangraoji Kadam, who is always a constant source of inspiration for the young generation, for having given me this noble opportunity at Bharati Vidyapeeth, New Delhi. I would also like to thank Hon' ble Prof. (Dr.) Shivajiraoji Kadam, Vice Chancellor, Bharati Vidyapeeth Deemed University, Pune, and Hon' ble Dr. Vishwajit Kadam, Secretary, Bharati Vidyapeeth, Pune, for giving me all encouragements, support and a path aimed to quality and excellence, comparable to the best in the world.

We are grateful to a number of people without whom we would not have been able to successfully organize this mega event. I am personally thankful to Professor Mohammad Yamin, Adjunct, Research School of Computer Science, The Australian National University, Canberra (Australia) and his team of experts, including Dr. Abdullah Basahel at King Abdulaziz University, Jeddah (KSA) for having collaborated with us and organized their sought after 3<sup>rd</sup> International Workshop on Information Engineering and Management (IWIEM – 2017) with INDIACom-2017 at Delhi, consecutively 2<sup>nd</sup> time, which adds value to the conference. On behalf of the Organizing Committee, I thank to my esteemed authors for having shown confidence in us and considered INDIACom – 2017, a platform to showcase and share their original research work. I wish to express my gratitude to my focused and dedicated team of Chairs, Co-chairs, members of the International Advisory Committee, Technical Programme Committee (TPC), Local Organizing Committee, Web Administration and Content Development Committee, members of the Executive Committee of IEEE Delhi Section, members of IEEE Delhi Section Standing Committee on Technical and Professional Activities, members of IEEE Oversight Committee for this conference, members of the National Executive Committee of CSI, members of the Executive Committee of IETE Delhi Centre, members of Executive Committee of IET (UK), Delhi Local Networks, members of the Management Committee of ISTE Delhi Section, officials of GGSIP University, New Delhi, my team of teaching and non-teaching staff members and finally my students for being a great source of strength to me in making this event successful. I consider myself fortunate to have such a dedicated and ever supporting team. A very special thanks to Dr. Anupam Baliyan, Mrs. Shalini Singh Jaspal, Dr. Shivendra Goel, Dr. Vishal Jain, Dr. Ritika Wason and Mr. Manish Kumar for having worked relentlessly to make this conference successful and also easing out the compilation process of this huge and voluminous Proceedings. The automated Conference Management System (CMS), which certainly has proved to be a successful interface for this conference, year after year, is also an outcome of the hard work of our own team of students supervised by the Faculty Incharge; Mrs. Shalini Singh Jaspal.

I will fail in my duty, if I do not thank the Conveners - cum – Session Chairmen of all the Special Sessions, who undertook the challenge and worked so hard along with their team members that over 1000 papers were received for Special Sessions alone, thereby making it a milestone conference of the country, in which over 100 organizations, from across the country and abroad, were the co-organizers. My heartfelt appreciation to each one of you, for coming forward, so actively, taking ownership and together making this conference a great success. With these great associations and extended ownership, I am confident that, in the years to come, future editions of INDIACom will achieve a much greater and unparalleled heights.

I am personally thankful to Prof. Subrata Mukhopadhyay, Chairman, IEEE Delhi Section Standing Committee on Technical and Professional Activities; Prof. A. K. Saini, Conference Chair; Shri R. K. Vyas, National Hony. Treasurer, CSI, Mr. Shiv Kumar RVP (R-1), CSI, Prof. D. K. Lobiyal, JNU, New Delhi, for having offered their technical support and helped me at all the difficult and critical times in the process of making this Conference a great success.

We also take this opportunity to thank various organizations which have sponsored and collaborated with us in organizing this conference and meeting the financial constraints, especially to GGSIP University, New Delhi, SERB, Department of Science and Technology, Ministry of Science and Technology, Government of India, Council of Scientific and Industrial Research (CSIR), New Delhi, All India Council for Technical Education (AICTE), New Delhi, Institutions of Electronics and Telecommunication Engineers (IETE), Delhi Centre, IET (UK), Delhi Local Networks and Jagdishprasad Jhabarmal Tibrewala University, Jhunjhunu, Rajasthan. I am also thankful to my printer Mr. Naresh, for patiently incorporating all the changes, as suggested from time to time, irrespective of the frequency and the repeated efforts.

Those who have organized conferences of this magnitude, edited and compiled such voluminous Pre-Conference Proceedings, know the amount of time and effort that goes into such a project. Any one who is related to the editor can tell you at whose expense that time was spent. Mere thanks to Roohi, Faisal and Nargis seem small as compared to the tremendous support and indulgence they gave and tolerated me all along, while I devoted my time in planning the Conference, editing and compiling the Proceedings.

Finally, I am thankful to one and all, who have contributed directly or indirectly in making this conference successful.

Tremendous amount of efforts put in to compile this huge and voluminous Proceedings will be successful only if these papers could motivate some of us in taking up the major computing challenges for a huge country like India, in the coming years.

Last but not the least, I take this opportunity to give the credit of successfully bringing out this Proceedings to my team, one and all, and personally own the responsibility of all the errors, deficiencies and shortcomings. As the available time was very short, in spite of our best efforts to produce a quality publication with a consistent format, errors may remain. My apologies to our readers and contributors for that and request them to kindly send / e-mail their criticism and suggestions, which will be vital for the improvement of the post conference further edited version of the Proceedings.

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