

Project Innovations in Distributed Computing and Internet Technology

Proceedings of 10th PIC 2021
(A sister concern activity of 17th ICDCIT 2021)
Bhubaneswar, India, January 7-10, 2021

Edited by

Ajay Kumar Jena
Krishna Chakravarty
Kunal Anand
Jagannath Singh
Biswajit Sahoo

2021



**KALINGA INSTITUTE
OF INDUSTRIAL TECHNOLOGY**
Deemed to be University U/S 3 of the UOE Act, 1986

PROJECT INNOVATIONS IN DISTRIBUTED
COMPUTING AND INTERNET TECHNOLOGY
Proceedings of 10th PIC 2021 (A sister concern activity of 17th ICDCIT)
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Kalinga Institute of Industrial Technology, Bhubaneswar, India

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MESSAGE

It is a matter of great pleasure that the KIIT School of Computer Engineering, KIIT Deemed to be University is bringing out a book containing the collection of accepted projects of 10th Project Innovations Contest (PIC-2021), a sister concern activity of the International Conference on Distributed Computing and Internet Technology (ICDCIT-2021). Started in the year 2012, the Project Innovations Contest is a commendable initiative to motivate young engineers, particularly the student community, to develop projects with innovative ideas. It reflects KIIT's commitment towards academic and research excellence.

It is satisfying that as many as 22 projects, covering a wide range of fields such as algorithms design, circuit design, IoT applications, website design, data science, machine learning, mobile app development, image processing, NLP, etc., find a place in the book. I am confident that these projects developed by young researchers and innovators will be useful in generating solutions to real life problems. I congratulate all the contributors of this significant platform for sharing their innovative ideas, theories and technological talent to strengthen the various areas of Computer Engineering; and compliment the entire team of the School, reviewers and other stakeholders of this important academic event for their commendable endeavour.



(Achyuta Samanta)
Founder, KIIT and KISS





KALINGA INSTITUTE of INDUSTRIAL TECHNOLOGY (KIIT)

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(Established U/S 3 of UGC Act, 1956)

BHUBANESWAR, ODISHA, INDIA

28/12 /2020

KIIT/VC/99/Messages/2020-21



Prof. Hrushikesh Mohanty
Vice-Chancellor

MESSAGE

Innovation has become a mantra for development. ICDCIT, ten years back, has discovered the young minds as the harbinger who can usher a new world with new things to mitigate the new challenges humanity faces. Particularly this year in the midst of pandemic, hosting PIC-21 is itself an innovation that the students have exhibited with indomitable spirit. The spirit of innovation has triumphed in PIC-21 and I hope the spirit grows exponentially in the coming years.

I congratulate the participating students and also express my deep appreciations to the Chairs and Committee members of PIC for showing their immense professionalism in difficult pandemic time by bringing out this compendium on exhibited projects. Wish the online exhibition a grand success!

Hrushikesh Mohanty



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BHUBANESWAR, ODISHA, INDIA



Prof. Sasmita Samanta

Pro Vice Chancellor

MESSAGE

I am extremely delighted that Kalinga Institute of Industrial Technology Deemed to be University, Bhubaneswar is organising 10th Project Innovation Contest 2020, in conjunction with 17th International Conference on Distributed Computing and Internet Technology (ICDCIT-2021) from 7th – 10th January 2021.

Project Innovation Contest is a significant opportunity for participants to get updated on the newest developments and innovations. It aims in providing a platform to the participants from academic to meet and share cutting-edge developments in the field of technical research.

I appreciate the painstaking work of the whole organizing committee and the reviewers, as well as extend my warm wishes to the participants and hope it will be a stimulating experience for them.

Pro Vice Chancellor



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(Established U/S 3 of UGC Act, 1956)

BHUBANESWAR, ODISHA, INDIA



Dr. Jnyana Ranjan Mohanty

Registrar

KIIT Deemed to be University

MESSAGE

I am pleased to note that the School of Computer Engineering, KIIT Deemed to be University is organizing the 10th Project Innovation Contest (10th PIC-2021) which will be held in conjunction with ICDCIT-2021. The objective of PIC is to motivate the young engineers and students community to exhibit their talent in solving real life problems and develop projects with innovative ideas which should support as an add-on to the human life style and/or help to protect the environment. Kalinga Institute of Industrial Technology (KIIT) Deemed to be University has always played a vital role as a promoter in organizing various value added activities of curricular program and co-curricular programs, workshop, tech-fest, seminars and expert lectures and continues to develop research and teaching collaborations with the latest trends and technology in order to provide a platform to students and faculty members. It is a matter of joy for us to welcome the participants to the events.

I take this opportunity to convey my warm greetings to the organizers and participants and congratulate the team for their excellent endeavour.

Registrar



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Deemed to be UNIVERSITY

(Established U/S 3 of UGC Act, 1956)

BHUBANESWAR, ODISHA, INDIA



Prof. Biswajit Sahoo

Director, School of Computer Engineering

KIIT Deemed to be University

MESSAGE

I am extremely delighted to know that the School of Computer Engineering, Kalinga Institute of Industrial Technology, Deemed to be University, Bhubaneswar is organizing 10th Project Innovations Contest, PIC-2021, as a sister concern event of 17th International Conference on Distributed Computing and Internet Technology, ICDCIT 2021.

ICDCIT, since its inception in 2004, has been providing an opportunity for the meeting of International Researchers, Engineers, Scientists, and specialists in the various research and development fields of Computer Engineering and Information Technology. The conference offers a premise for global experts to gather and interact intensively on the challenging topics that human mankind faces.

PIC has been an excellent platform for the budding younger minds to showcase their problem solving skills by making innovating attempts to solve the real life problems across different areas. This edition of PIC becomes even more important as it is being conducted under the shadows of pandemic, but the untiring spirit of the participants and organizers only proves that no obstacle can stop the innovative ideas getting converted into solutions.

I feel privileged to congratulate the participating students, committee members, and organizers of this event for making this wonderful event into reality. My best wishes for the grand success of the event.

Director



About KIIT

KIIT is a multi-disciplinary University respected worldwide due to its rich educational culture of excellence. The growth from a non-descript Industrial Training Institute to a multi-disciplinary world class University spreading over 25 sq. kms. of prime land in 23 lush green sprawling campuses having 13 million square feet built-up area in the shortest span of time speaks about KIIT's phenomenal growth, excellence and a tremendous will power, determination of its visionary founder Dr. Achyuta Samanta. In the Globalized academic atmosphere, KIIT continues to make its presence felt in the international arena through its collaboration with more than 167 Universities across the world. There are 28 constituent schools accredited by the NAAC and other International Accreditation bodies. The Ministry of Human Resource Development, Govt. of India has issued Letter of Intent (LoI) for 'Institution of Eminence' (IoE) tag to KIIT Deemed to be University. No wonder that the Government of India accorded 'A' Category status to the university considering its unique character. KIIT is also accredited by NBA in 'Tier-1' (Washington Accord) for engineering stream and by Institution of Engineering and Technology (IET), U.K. Academic excellence, innovative research, impressive infrastructure are not the sole reasons for the distinct identity of KIIT. It is perhaps the only University that synergizes academics and human values, the need for which has only been realized now in Madrid and Stockholm conventions on Higher Education, while the same has been practiced in KIIT since its inception.

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About KISS

The humane face of KIIT is best illustrated through its protégé Kalinga Institute of Social Sciences (KISS) which has been transforming the lives of thousands of poor, voiceless indigenous children by giving them their legitimate space through education. Empowerment, eradication of poverty and sustainable development no longer remain as mere slogans, for KISS has shown the way how it takes care of 25,000 poorest of the poor tribal children through provisions of food, accommodation, health care and education from KG to PG free of charge without any substantial help from any quarter. The United Nations has granted the Special Consultative Status to KISS. It is also associated with the United Nations Department of Public Information (UNDPI). Kalinga Institute of Social Sciences (KISS), Bhubaneswar has been placed amongst the best 223 NGOs of the world and has created three Guinness World Records (GWR) i.e. the Largest Human Sentence (We Urge for World Peace), the Longest Human Chain (High-Fives) and the largest Laughter Yoga Class.

Untiring saga of struggle, sacrifice, determination and dedication of just one person Achyuta Samanta, inspires everyone to bring KIIT and KISS, where these are now. It is indeed a testimony to his never ending spirit to achieve the unachievable and to reach the unreached.

Kalinga Institute of Social Sciences (KISS) has been declared a Deemed University (U/S 3 of UGC Act, 1956) by the Ministry of HRD, Govt. Of India on August 25, 2017. With this, it has become the first tribal university in India and in the entire world.

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About Art of Giving

Art of Giving is all about creating an unconditional and sustainable abundance of love, peace and happiness and contentment for others through gestures of kindness and generosity. It was founded by Shri Achyuta Samanta on 17 May 2013. The key to peace and happiness lies in unlocking the Art of Giving in each individual. It is a not-for-profit initiative for spreading, supporting and promoting the practice of the art of giving around the world.

VISION: To bring together the sense of peace and happiness among people of all ages, especially children and youth through genuine acts of giving back to the society by the practice of empathy and compassion to the distressed without any discrimination.

MISSION: To make people aware and spread the philosophy of the Art of Giving across all sections of human society worldwide through activities of sharing love, care, compassion, wisdom, knowledge, skills and talents.

MAN BEHIND THE PHILOSOPHY

Shri Achyuta Samanta, A noted educationist, and philanthropist is the founder of two world-class institutions. Kalinga Institute of Industrial Technology KIIT that provides technical education to 27000 students across India and overseas and Kalinga Institute of Social Sciences KISS, which is a home to 37000 poor indigenous tribal children who are provided with free education from kindergarten to post graduation besides free lodging, boarding, healthcare, vocational and life skill empowerment.

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About School of Computer Engineering

The School of Computer Engineering aims to impart cutting-edge skills through research and development, industrial consultancy, in frontier areas of Computer and Information Technology and teaching. The state-of-the-art facilities of the School include adequate number of air conditioned classrooms, laboratories, conference hall, reading rooms and round the clock Library with Journals, e-resources and around 15000 books. The well qualified faculty members of the School endeavor to impart understanding of fundamental concepts, with a view to laying a strong foundation to help assimilate continual changes in the dynamic field; train in current technologies to be employable in the industry; train to connect theory with application; develop analytical; problem solving and product design skills; motivate to take up careers in research and development as well as in academics and develop entrepreneurship abilities with a view to becoming self-reliant.

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PREFACE

10th Project Innovation Contest is a sister concern event of 17th International Conference on Distributed Computing and Internet Technology to be held on 7-10 January 2021 at Kalinga Institute of Industrial Technology, Deemed to be University, Bhubaneswar, Odisha, India. Since 2004, ICDCIT conference series is a global platform for Computer Science researchers to exchange research results and innovative ideas on the foundations of distributed computing, internet technologies, and societal applications. Project Innovation Contest started as a satellite event to ICDCIT conference series with the first edition in 2012 inaugurated by Prof. R. K. Shyamasunder, TIFR. This year the 10th Project Innovation Contest 2021 will be publishing the work of student researchers in its 3rd proceedings titled Project Innovations in Distributed Computing and Internet Technology in the form of a book.

The call for submissions for the 10th Project Innovations Contest included the major areas of innovations in Internet of Things, Software Models, Embedded Systems, Android Apps, VLSI, High Performance Computing, Web Applications, Networking, Image Processing, Information Security, Cloud Computing, Big Data Analytics and Power Management.

This proceeding focuses on innovative research projects in the field of Distributed Computing and Internet Technology presented during the 10th Project Innovation Contest-2021. The selected research projects enrolled in this book are relevant to the current trends of distributed computing and its application to real-world problems. Undergraduate and postgraduate students have demonstrated the working of their proposed technique using models/prototypes. The projects presented would have an effective way to connect the academia and the industry with practical problems and their realistic solutions. This book will be helpful for the researchers, students, and developers who are seeking for new and relevant research problems in the field of distributed computing and its applications.

In response to the call for submission to the 10th Project Innovation Contest, a total of 55 projects were received from different parts of India. The total project selected was 22 after going through a double-blind review process and has been included in the proceeding. On behalf of the editorial team, we would like to thank all the programme committee members and student coordinators who served in various aspects for the 10th Project Innovation Contest-2021. Special gratitude to the authorities of Kalinga Institute of Industrial Technology, Deemed to be University for their continuous support and encouragement.

Editorial Team

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