SMART INNOVATIONS AND CONSTRUCTIONS

(Third International Conference)

Parul University International Conference on Engineering & Technology (PiCET-2020) related to

Smart Engineering

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Department of Electronics & Microelectronics

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The editors extend their sincere gratitude to all the researchers and authorities of their respective colleges for the encouragement and support extended to PiCET-2020. We also express our thanks to the editorial team of the publisher, ManTech Publications, for their professional way of dealing with this proceeding.

The editorial team is grateful to the management of Parul University for providing a platform where deliberation on technological development transpired. Further, we are thankful to Heads of various Departments of Faculty of Engineering and Technology and each and every individuals who has contributed for the success of PiCET-2020.



On behalf of the Conference Committee, I take this opportunity to welcomeyou all to the3rd International conference PiCET:"Parul University International Conference on Engineering and Technology: Smart Engineering" Jointly organized by Faculty of Engineering & Technology, Parul University, and Department of Electronics & Microelectronics UMONS, Faculty of Engineering, Belgium on 6th & 7th November 2020 at Parul University.

PiCET-2020 has an objective of creating an international forum for academicians, researchers and scientists across the globe to discuss contemporary research status and advanced techniques to address the challenges related to "Smart Engineering. We,invite each and every participant to explore the challenging areas in the field of Smart Computing. Without research it would be very difficult to survive in the upcoming era where technology is changing rapidly.

The members of the various committees and advisory board members have striven hard for many months to make this conference a reality. The conference was morally and financially supported by Management of Parul University. On behalf of PiCET 2020 team, I wish to thank all the people without whose support it would not have been possible to provide this platform to the participants.

Finally,I would like to express my sincere thanks and gratefulness to all the participants, delegates and guests and wish them all a very pleasant, knowledgeable and memorable stay at Parul University.

Dr. Arvind R. Yadav

Chair- PiCET-2020



It gives me immense pleasure to extend a warm welcome to you all to this3rd International conference PiCET: "Parul University International Conference on Engineering and Technology: Smart Engineering" Jointly organized by Faculty of Engineering & Technology, Parul University, and Department of Electronics & Microelectronics UMONS, Faculty of Engineering, Belgiumon 6^{th} &7^{th} November 2020 at Parul University. With the theme of "Smart Engineering", PiCET-2020is intended to provide an international and multidisciplinary platform to the participants and experts to explore and exchange their valuable knowledge, ideas and thoughts in the challenging field of smart engineering and technology in the present era of rapid industrialization and globalization. I hope that everyone takes the opportunity to engage with others to discuss their ideas for research and practice during their time at the conference.

I would particularly like to extend my sincere thanks and gratitude to all the participants, experts, guests, and members of organizing committee for their valuable efforts to make this conference a huge success.

Dr. Vishal Kumar Sandhwar

Co-Chair- PiCET-2020



I am delighted to learn that Faculty of Engineering & Technology of Parul University is going to organize its 3rdInternational Conference viz., “PiCET-Parul University International Conference on Engineering & Technology” on the theme of “Smart Engineering” in collaboration with Department of Electronics & Microelectronics UMONS, Faculty of Engineering, Belgium on 6th&7thNovember, 2020 at Parul University. It is indeed a moment of great pride that this international conference will bring together academicians, scientists, researchers, entrepreneurs from different walks of life on a single platform to present their innovative ideas concerning different spheres of engineering & technology such as Civil, Mechanical, Electrical, Electronics & Communications, Computer Science Engineering, Information Technology, Chemical Engineering etc., and also to showcase their research work done in their respective fields of specializations. 21st Century is indeed the Age of Innovations and innovations presented by the researchers such as Smart Phones, Cloud Computing, Tablets etc., have not only made our lives easier but also have empowered the human beings in reaping economical benefits derived from use of such technologies.

I believe today’s youth should be encouraged to develop interest in research from the early age as science, through its innovations, is the only antidote to wipe out the wide-spread maladies of poverty, unemployment, malnutrition, starvation etc...If we equip the youth with acquisition of scientific knowledge and requisite skills, these demographic dividends will definitely make remarkable progress in lifting the underprivileged section of our society from the jaws of poverty, illiteracy and starvation. We, at Parul University, are committed to equip our students with the requisite skills to undertake research during their studies so as to enable them to contribute their skills and knowledge towards Nation Development.

I hope all the participants in this International Conference will benefit immensely from the deliberations conducted in this international conference and interactions with the renowned speakers/ researchers will also open up new avenues of learning in the area of “Smart Engineering” for all the participants.

I wish “PiCET-Parul University International Conference on Engineering & Technology” all success!!!!

Dr. Devanshu Patel

President, Parul University



On behalf of the Faculty of Engineering and Technology, Parul University, I really feel honoredto welcome you all in the Parul University International Conference on Engineering and Technology: SMART ENGINEERING (PiCET 2020). The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied for the technological benefits of humankind. It is envisaged that PiCET 2020will provide a platform to gather and disseminate the latest knowledge in various arenasof engineering and technology. Academicians, Scientist, Researchers and practitioners of engineering will be able to share and discuss new findings and applications of engineering. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular it is expected that focus will be given to “Smart Engineering”.I hope that this International and multidisciplinary conference will provide our participants a truly transformative experience through a variety of knowledge and perspectives. I wish all the participants a prolific interaction with experts and a pleasant stay at Parul University.

Finally I would like to congratulate the organizing committee for their tremendous efforts in organizing the conference. I wish a grand success for this conference.

Dr. Unnati A. Joshi

DEAN, Faculty of Engineering & Technology, Parul University



It gives me immense pleasure to know that Faculty of Engineering & Technology in Parul University has organized an International Conference viz, PiCET-2020to be held on November 06-07, 2020 in the University Campus. I have always believed that regular conduct of such conferences by academia goes a long way in establishing close linkage between research scholars, academicians, industry professionals and help them exchange ideas pertaining to latest advancements in science and technology. A prestigious platform such as this also motivates teachers and research scholars to present their research work. The theme of the conference is "Smart Engineering"

In this age of information technology, the term " Smart" has achieved a lot of significance e.g. Smart Computers, Smart Phones, Smart Cities, Smart Villages, Smart Structures etc. All these latest innovations have brought significant change in the functioning of our day to day activities and their contribution towards easing our way of life is commendable. It is the vision of the Government of India to establish 200 smart cities across India with state-of-the-art infrastructure and enhanced educational, healthcare and sanitation facilities. It is envisioned that these smart cities will offer better infrastructural facilities, ease of life and better living conditions to the residents. In order to achieve this, engineers and architects shall come up with innovative structural designs which are not only eye catching and strong but also take up less space. Such innovative ideas shall also be economical. I believe this international conference is a great platform for all engineers, architects, research scholars, academicians and industry professionals to deliberate upon innovative solutions for the problems faced by people pertaining to requisite infrastructure for building Smart Cities. I am confident that deliberations at this international conference will also be adopted by the government and the concerned agencies in implementing concepts of Smart Structures.

I wish this international conference a huge success.

(Dr. M. N. Patel)

Provost



On behalf of the Organizing Committee, I warmly welcome your participation in the 3rd International Conference "PiCET:Parul University International Conference on Engineering & Technology" on the theme of "Smart Engineering" in collaboration with Department of Electronics & Microelectronics UMONS, Faculty of Engineering, Belgium on November 6th&7th, 2020 at Parul University, Limda,Waghodia, Vadodara.

PiCET-2020 is intended to provide a platform to Research Scholars, Academicians, Industrialists and knowledge greedy peoples for exchanging their ideas, thoughts & achievements in the field of Engineering.

The members of the various committees have striven hard for many months to make this conference a reality. The conference was morally and financially supported by the management of Parul University. I wish to thank them all on behalf of PiCET-2020. Without their support, it would not have been possible to provide this platform to the participants.

Finally, I would like to express my sincere thanks and gratefulness to all the participants, delegates and guests and wish them all a very pleasant, knowledgeable and memorable stay at ParulUniversity, Vadodara, Gujarat, India.

Dr. Vilin Parekh

Principal, PIET, Parul University



I take this opportunity to welcome you all to the 3rdInternational Conference (PiCET-2020) on Smart Engineering being organized during06-07thNovember 2020, jointly organized by Parul University in association with Department of Electronics & Microelectronics UMONS, Faculty of Engineering, Belgium.

Smart engineering practices is supposed to help us engineer reliable, smart, connected products and systems that enable innovation in the face of complexity in all sectors of life. These technologies will be bringing new and exciting possibilities into our lives, everything from changing how we commute to illuminating the way the world around us operates. The intention of this conference was to bring the eminent academicians, scientists, researchers, technocrats, 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. The conference will feature regular paper presentation sessions ,invited talks and key note addresses by eminent people in specific sectors.

It is believed that the research & review papers included in these Proceedings will form a solid background for constructive discussions during the Conference. For those who, unfortunately, cannot attend this Conference, it is anticipated that these Proceedings will offer valuable reference material and a basis of information on academic accomplishment and current debate in engineering and technology.

In conclusion, on behalf of PiCET-2020 members, associates and supporters, and indeed myself, I wish to express my gratitude to the contributors of this set of Proceedings for their willingness to share their ideas and research work with other international colleagues, and to the referees, who have dedicated their precious time and effort to reviewing these papers.

I would like to appreciate all the members involved, directly or indirectly, in the PiCET 2020 for their hard work to make this event successful.

I wish a great success to this conference.

Dr. Bhavesh Mewada

Principal, PIT, Parul University

PREFACE

At the outset, the Parul University International Conference on Engineering and Technology (PiCET-2020): Smart Engineering was to organized by the Faculty of Engineering & Technology, Parul University, Vadodara, India, during 6th and 7th November 2020. This conference has been jointly organized with Department of Electronics & Microelectronics UMONS, Faculty of Engineering, Belgium. However, due to a global pandemic COVID-19, the conference was organized in an online mode and attracted researchers from Gujarat and across India. The editors are thankful to all the contributors for submitting the papers of high standard and making PiCET-2020 a huge success. Out of total 199 valid Submissions only 80 were selected for publication in two different volumes, i.e., an acceptance rate of nearly 40%. This volume, i.e., Smart Innovations and Constructions, is one of the two volumes published by ManTech Publications Private Limited (OPC). It contains 40 high-quality papers which provide an overview of recent developments in Mechanical, Aeronautical, Mechatronics & Allied branches and Civil Engineering & Allied branches.

We thank all the organizing committee members, technical program committee members, reviewers, and student coordinators for their valuable support and volunteer work. We also appreciate the role of session chairs/co-chairs. We also thank the ManTech Publications Private Limited (OPC) for their help and quick responses during the preparation of the volume. The editors hope that this volume will provide the readers, relevant information on the latest trends in control system area.

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