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Proceedings of the

IICST 2020

**INNOVATIONS IN INFORMATION AND
COMMUNICATION SCIENCE TECHNOLOGY**

FIFTH INTERNATIONAL WORKSHOP

March 9 2020, Brawijaya University, Malang, Indonesia

(Canceled by authorities due to SARS-CoV-2)

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PREFACE

Science- and knowledge-intensive design and development, multinational projects, and ever increasing reliance on information and communication technologies are indispensable characteristics of today's engineering practice. To prepare professionals capable of dealing with the current and future challenges, higher education of engineering has to evolve in synchronicity with the industry but also to proactively adjust the curricula by building the education process around full-scale R&D projects. The Innovations in Information and Communication Science and Technology (IICST) workshop is a regular event that brings together young researchers working in projects run by universities and offers them an opportunity to discuss their studies at an international forum with prominent scholars and engineers.

The first three IICST events were held at Tomsk, Russia, in 2011, 2012, and 2013, while the fourth workshop took place in Warsaw, Poland in 2014. The number of IICST participants exceeded 300 over the four years, and about 140 papers presented at the conferences were published in internationally edited workshop proceedings. Following a period of structural and educational reforms at the founding institutions, TUSUR University and Ritsumeikan University, it was decided to resume the workshop in Spring of 2020, and to organize it at Brawijaya University in Malang, Indonesia, on March 9, 2020. Robotics, artificial intelligence, advanced computer graphics, human interface, and social informatics were defined as the main themes for the 5th International Workshop, IICST 2020.

Each work submitted for presentation at IICST 2020 was reviewed by at least two members of the International Program Committee for originality and general understandability; the overall acceptance rate for these post proceedings was 44% (17 out of 39 conference papers accepted for presentation). All the review and organizational processes were successfully completed in a timely manner. Unfortunately, the IICST 2020 had to be canceled less than a week before its date due to the rapidly worsening COVID-19 global pandemic. To recognize the work undertaken by the authors, and to fulfill, at least partially, the original goals of the carefully planned and prepared but canceled event, the IICST 2020 team has decided to publish all accepted papers in the workshop proceedings. We anticipate that the published work will widely circulate among the present and former IICST participants but also among specialists in the related fields. It is our hope that through such sharing, the authors will not only contribute to the various fields of study represented here but will also receive feedback from the readers interested in those fields.

We would like to thank the authors, the reviewers, and the editors for their hard work. We hope that, in spite of the cancellation of IICST 2020, the 5th Workshop preparations and publications will help advance and move forward many research projects, including those presented in this volume.

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June 2020

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