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ICAI Workshops (ICAIW 2019)


Joint Proceedings of the

- First International Workshop on Applied Informatics for Economics, Society and Development (AIESD 2019)
- Second International Workshop on Data Engineering and Analytics (WDEA 2019)
- First International Workshop on Education and Technology Synergies for Current and Future Societies (EduSynergies 2019)
- Third International Workshop on Information and Knowledge in Internet of Things (IKIT 2019)
- Second International Workshop on Intelligent Systems and Technologies for Interactive Human-Machine Relationships (ISTIHMR 2019)
- Second International Workshop on Smart and Sustainable Cities (WSSC 2019)
- First International Workshop on Video Games, Gamification and Educational Innovation (VGameEdu 2019)


co-located with Second International Conference on Applied Informatics (ICAI 2019)


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Preface

This volume contains the proceedings of the First International Workshop on Applied Informatics for Economics, Society and Development (AIESD 2019), Second International Workshop on Data Engineering and Analytics (WDEA 2019), First International Workshop on Education and Technology Synergies for Current and Future Societies (EduSynergies 2019), Third International Workshop on Information and Knowledge in Internet of Things (IKIT 2019), Second International Workshop on Intelligent Systems and Technologies for Interactive Human-Machine Relationships (ISTIHMR 2019), Second International Workshop on Smart Sustainable Cities (WSSC 2019), and First International Workshop on Video Games, Gamification and Educational Innovation (VGameEdu 2019) co-located with Second International Conference on Applied Informatics (ICAI 2019)¹ and held at the “Universidad Complutense de Madrid” located in Madrid Spain, from 6th to 9th November 2019.

- **First International Workshop on Applied Informatics for Economics, Society and Development (AIESD 2019).** This workshop of the Faculty of Economics of the National University of Loja (Ecuador) seeks to promote discussion and dissemination of current economics research, systems for territorial intelligence, e-participation, e-democracy and territorial economic development; with special emphasis on social and environmental development. The objective of this first edition of AIESD 2019 is to discuss aspects related to computer science applied in society. The idea is to learn the different techniques and tools that are used to study social phenomena, economic growth, the interaction between economic analysis and decision-making. The workshop seeks to promote an atmosphere of dialogue among the community of professionals working on issues related to technology and its application in the economy as well as society
- **Second International Workshop on Data Engineering and Analytics (WDEA 2019).** Data is everywhere. Data Analytics, Data Mining, Data Science or more generally the practice of identifying patterns or constructing mathematical models based on data is at the heart of most new business models or projects. This together with what has been termed as the Big Data phenomena, associated to data sets too big to be handled as usual, with non structured contents, data streams or all of these, has led to a whole new series of rapidly evolving tools, algorithms and methods which combine data engineering, computer science, statistics and mathematics. The aim of this Workshop is to present recent results in this area, discussing new methods or algorithms, or applications including Machine Learning, Databases, optimization or any type of algorithms which consider managing or obtaining value from data.

¹ <http://icai.itiid.org/>

- **First International Workshop on Education and Technology Synergies for Current and Future Societies (EduSynergies 2019).** A global sustainable information society needs, in the first place, the boosting of new behaviors adapted to the sustainability requirements at planetary scale, from the community level up to the global level. The traditional educational settings are not enough to cope with the multidimensional challenges we are facing nowadays. At the same time, the information technologies offer a panoply of learning pathways we should explore to deploy the education we need to build up a global sustainable future. During last two decades we have been able to see how digital transformation has change our societies as well as our educational systems. Learning and teaching methods have evolved in combination with new technologies. The expectations of students from all educational levels, subjects of study and age grow along with the increase of their own daily life technology use. Therefore, we propose a workshop where exchange knowledge about digital transformation in learning and education.
- **Third International Workshop on Information and Knowledge in Internet of Things (IKIT 2019).** Internet of Things (IoT) is currently one of the most challenging areas of the Internet, enabling ubiquitous computing between global networked machines and physical objects, providing a promising vision of the future integrating the real world of things with the virtual world of information. IoT is seen as a network of trillions of machines that communicate with each other, being a profound technological revolution, which is the current reality and the future of computing and communications, supported by a dynamics technological evolution in many fields, from wireless sensors, wireless sensor networks, to nanotechnology, and which rapidly gained global attention from academia, governments and industry. This workshop explores the information and knowledge in the IoT, in particularly investigate data management and processing, information extraction, technology, knowledge management, knowledge sharing, and the development of new intelligent services available anytime, anywhere, by anyone and anything.
- **Second International Workshop on Intelligent Systems and Technologies for Interactive Human-Machine Relationships (ISTIHMR 2019).** Intelligent Technologies for Interactive Human-Machine Relations will change our lives in the near future, creating new human-machine relationships that will lead to a new Intelligent Technologies society. ITIHMR is focusing on advanced technological innovations as well as on social aspects. We invite researchers and practitioners to report on up-to-date innovation and development, summarize the state of the art, ideas and advances in all aspects of Intelligent Systems and Technologies for Interactive Human-Machine Relationships.
- **Second International WorkShop on Smart and Sustainable Cities (WSSC 2019).** The International Telecommunication Union ITU define a smart sustainable city as : “An innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while

ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects”. The aim of this Workshop is to present recent results in this area, discussing new methods or algorithms, or applications in different areas including architecture, cultural, tourism, mobility, among others.

- **First International Workshop on Video Games, Gamification and Educational Innovation (VGameEdu 2019)** The subject is of great interest every time, that the introduction of video games in education has raised a series of possibilities but also problems and doubts about the true potentialities. This process integrated into the progressive digitalization of the classrooms has put on the table a series of problematizations about how and for what videogames can be used to teach. The concepts of gamification (or ludification) are increasingly common, especially in the fields of marketing, but starting to see their advantages also for The learning; and the bibliography on the subject is growing. Simply put the word gamification in the search engine, so that thousands of examples of the impact it is having on the education and other areas. Currently, the development of games applied to the teaching of all types of subjects, in formal and informal education, not only is it very useful for learning, but it is essential to attract the interest of the people of the XXI century to the knowledge of different issues.

The workshops received 89 submissions. All submitted papers underwent a double blind peer review process, where each paper was reviewed by at least three (3) experts. After a careful discussion, the diverse program committees decided to accept 30 research papers. This volume includes these papers. These papers are distributed as follows: AIESD 3 papers, WDEA 6 papers, EduSynergies 6 papers, IKIT 5 papers, ISTIHMR 5 papers, WSSC 0 papers, and VGameEdu 5 papers.

We thank the Program Committee members and all additional reviewers for their efforts. All the workshops took place at November 1st, 2018. In all of them, each paper presentation was immediately followed by comments from session chairs and a plenary discussion. We thank all session chairs for their careful preparations and for triggering the discussions.

November 2019

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