

# **Advances in Intelligent Systems and Computing**

Volume 724

## **Series editor**

Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland  
e-mail: [kacprzyk@ibspan.waw.pl](mailto:kacprzyk@ibspan.waw.pl)

### *About this Series*

The series “Advances in Intelligent Systems and Computing” contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

The publications within “Advances in Intelligent Systems and Computing” are primarily textbooks and proceedings of important conferences, symposia and congresses. They cover significant recent developments in the field, both of a foundational and applicable character. An important characteristic feature of the series is the short publication time and world-wide distribution. This permits a rapid and broad dissemination of research results.

### *Advisory Board*

#### Chairman

Nikhil R. Pal, Indian Statistical Institute, Kolkata, India

e-mail: nikhil@isical.ac.in

#### Members

Rafael Bello Perez, Universidad Central “Marta Abreu” de Las Villas, Santa Clara, Cuba

e-mail: rbellop@uclv.edu.cu

Emilio S. Corchado, University of Salamanca, Salamanca, Spain

e-mail: escorchado@usal.es

Hani Hagras, University of Essex, Colchester, UK

e-mail: hani@essex.ac.uk

László T. Kóczy, Széchenyi István University, Győr, Hungary

e-mail: koczy@sze.hu

Vladik Kreinovich, University of Texas at El Paso, El Paso, USA

e-mail: vladik@utep.edu

Chin-Teng Lin, National Chiao Tung University, Hsinchu, Taiwan

e-mail: ctlin@mail.nctu.edu.tw

Jie Lu, University of Technology, Sydney, Australia

e-mail: Jie.Lu@uts.edu.au

Patricia Melin, Tijuana Institute of Technology, Tijuana, Mexico

e-mail: epmelin@hafsamx.org

Nadia Nedjah, State University of Rio de Janeiro, Rio de Janeiro, Brazil

e-mail: nadia@eng.uerj.br

Ngoc Thanh Nguyen, Wroclaw University of Technology, Wroclaw, Poland

e-mail: Ngoc-Thanh.Nguyen@pwr.edu.pl

Jun Wang, The Chinese University of Hong Kong, Shatin, Hong Kong

e-mail: jwang@mae.cuhk.edu.hk

More information about this series at <http://www.springer.com/series/11156>

Tatiana Antipova · Álvaro Rocha  
Editors

# Information Technology Science

 Springer

*Editors*

Tatiana Antipova  
The Institute of Certified Specialists  
Perm  
Russia

Álvaro Rocha  
Universidade de Coimbra  
Coimbra  
Portugal

ISSN 2194-5357

ISSN 2194-5365 (electronic)

Advances in Intelligent Systems and Computing

ISBN 978-3-319-74979-2

ISBN 978-3-319-74980-8 (eBook)

<https://doi.org/10.1007/978-3-319-74980-8>

Library of Congress Control Number: 2017964591

© Springer International Publishing AG, part of Springer Nature 2018

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by the registered company Springer International Publishing AG part of Springer Nature  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland



# Preface

This book contains a selection of papers accepted for presentation and discussion at The 2017 International Conference on Information Technology Science (MosITS'17). This Conference had the support of the Institute of Certified Specialists, Russia, AISTI (Iberian Association for Information Systems and Technologies), and Springer. It took place at Izmailovo Convention Centre, Moscow, Russia, on December 01–03, 2017.

MosITS'17 is an international forum for researchers and practitioners to present and discuss the most recent innovations, trends, results, experiences, and concerns in the several perspectives of Information Technology Science.

The Scientific Committee of MosITS'17 was composed of a multidisciplinary group of 60 experts and those who are intimately concerned with Information Technology in Science. They have had the responsibility for evaluating, in a “double-blind review” process, the papers received for each of the main themes proposed for the Conference: Information Technology in Communication, Information Technology in Management Science, Information Technology in Public Administration, Information Technology in Economics, Information Technology in Business & Finance, Information Technology in History, Information Technology in Health & Rehabilitation, Information Technology in Education, Information Technology in Art.

MosITS'17 received about 40 contributions from 16 countries around the world. The papers accepted for presentation and discussion at the Conference are published by Springer (this book) and will be submitted for indexing by ISI, SCOPUS, among others.

We acknowledge all of those that contributed to the staging of MosITS'17 (authors, committees, workshop organizers, and sponsors). We deeply appreciate their involvement and support that was crucial for the success of MosITS'17.

November 2017

Tatiana Antipova  
Álvaro Rocha

# Organization

## Scientific Committee

Tatiana Antipova (Chair)	Institute of Certified Specialists, Russia
Álvaro Rocha (Co-chair)	University of Coimbra, Portugal
Alexandru Stancu	University of Geneva, Switzerland
Anatoli Bourmistrov	Nord University Business School, Norway
Andre Aquino	University of São Paulo, Brazil
António José Abreu Silva	ISCAP, Portugal
Elena Dybtsyna	Nord University Business School, Norway
Filipe Alexandre Almeida	Municipality of Penacova, Portugal
Ningre de Sá	
Giuseppe Grossi	Kristianstad University, Sweden
Indra Bastian	University Gadjah Mada, Yogyakarta, Indonesia
Isabel Pedrosa	University of Coimbra, Portugal
Joao Vidal de Carvalho	Polytechnic Institute of Porto, Portugal
Karl Gratzner	Sodertorn University, Sweden
Linda Kidwell	Nova Southeastern University, Fort Lauderdale, USA
Luca Bartocci	University of Perugia, Italy
Mikhail Kuter	Kuban State University, Russia
Nikolai Ustiuzhantsev	Perm State Medical University, Russia
Oleg Golosov	“Fors” Group of companies, Moscow, Russia
Seppo Sirkemaa	University of Turku, Finland
Simona Riurean	University of Petrosani, Romania
Suzanne Lowensohn	University of Vermont, Burlington, USA
Tjerk Budding	Vrije Universiteit Amsterdam, Amsterdam, Netherlands

# Contents

## Information Technology in Health and Rehabilitation

<b>eHealth Infrastructures and Security in Portuguese Hospitals: Benchmarking with European Hospitals</b> . . . . .	3
João Vidal Carvalho, Álvaro Rocha, and António Abreu	
<b>A Neural Network Based Expert System for the Diagnosis of Diabetes Mellitus</b> . . . . .	14
Oluwatosin Mayowa Alade, Olaperi Yeside Sowunmi, Sanjay Misra, Rytis Maskeliūnas, and Robertas Damaševičius	
<b>Developing a Calorie Counter Fitness App for Smartphones</b> . . . . .	23
Adewole Adewumi, Godwin Olatunde, Sanjay Misra, Rytis Maskeliūnas, and Robertas Damaševičius	

## Information Technology in Education

<b>Triple-Loop Learning Based on PDSA Cycle: The Case of Blogs for Students-at-Risk</b> . . . . .	37
Ahmad F. Sad, Andreea Ionica, Monica Leba, and Simona Riurean	
<b>Environmental Monitoring Systems in Schools' Proximity Areas</b> . . . . .	47
Simona Riurean, Sebastian Rosca, Cosmin Rus, Monica Leba, and Andreea Ionica	
<b>Designing a Public Sector Accounting Exercise Sheet by a Cultural Approach</b> . . . . .	56
Indra Bastian	

## Information Technology in Art

<b>Exploring Open Innovation Technologies in Creative Industries: Systematic Review and Future Research Agenda</b> . . . . .	71
Narmina Rahimli and Eric W. K. See-to	

<b>Information Technology in Management Science</b>	
<b>The Concept of Management Accounting Based on the Information Technologies Application</b> . . . . .	89
Nadezhda Rozhkova, Uliana Blinova, and Darya Rozhkova	
<b>Management of Financial Bubbles as Control Technology of Digital Economy</b> . . . . .	96
Gennady Ross and Vladimir Liechtenstein	
<b>Informational Technologies for the Efficiency of Public Debt Management in Russia</b> . . . . .	104
Svetlana Tsvirko	
<b>Streamline Management of Arctic Shelf Industry</b> . . . . .	114
Tatiana Antipova	
<b>Information Technology in Public Administration</b>	
<b>Digital View on the Financial Statements' Consolidation in Russian Public Sector</b> . . . . .	125
Tatiana Antipova	
<b>How to Be Open About Spending: Innovating in Public Sector Reporting in the Information Age</b> . . . . .	137
A. S. C. Faber and G. T. Budding	
<b>Concepts of State and Accounting: A Framework to Interpret the Italian Governmental Accounting Reforms</b> . . . . .	148
Luca Bartocci and Damiana Lucentini	
<b>Governmental Auditing Systems in Indonesia and Russia</b> . . . . .	159
Tatiana Antipova	
<b>Information Technology in Business and Finance</b>	
<b>The Virtual Reconstruction of the Earliest Double-Entry Accounting Ledger</b> . . . . .	169
Mikhail Kuter, Marina Gurskaya, Angelina Andreenkova, and Artem Musaelyan	
<b>The Analysis of the Final “Debtors” Section Page Preparation in the Trial Balance of Giovanni Farolfi’s Company Branch Office</b> . . . .	185
Marina Gurskaya, Mikhail Kuter, and Angelina Andreenkova	
<b>The Early Cash Account Books</b> . . . . .	195
Dmitriy Aleinikov, Mikhail Kuter, and Artem Musaelyan	



**The Impact of Financial Crisis on the Role of Public Sector Accountants** . . . . . 208  
 Tatiana Antipova

**The Determination of Profit in Medieval Times** . . . . . 215  
 Alan Sangster, Mikhail Kuter, Marina Gurskaya,  
 and Angelina Andreenkova

**Information Technology in Communication**

**Generation Y: The Competitiveness of the Tourism Sector Based on Digital Technology** . . . . . 227  
 Pedro Liberato, Dália Liberato, António Abreu, Elisa Alén-González,  
 and Álvaro Rocha

**Information Systems Infrastructure – Importance of Robustness** . . . . . 241  
 Seppo Sirkemaa

**Standards and Information Systems Management – The Key to Success** . . . . . 245  
 Seppo Sirkemaa

**Implementation of MANETs Routing Protocols in WLANs Environment: Issues and Prospects** . . . . . 252  
 Abraham Ayegba Alfa, Sanjay Misra, Adewole Adewumi,  
 Fati Oiza Salami, Rytis Maskeliūnas, and Robertas Damaševičius

**Author Index** . . . . . 261