

Hector Florez
Marcelo Leon (Eds.)

Communications in Computer and Information Science

1874


Applied Informatics

6th International Conference, ICAI 2023
Guayaquil, Ecuador, October 26–28, 2023
Proceedings


 Springer


ICA I

Editorial Board Members

Joaquim Filipe , *Polytechnic Institute of Setúbal, Setúbal, Portugal*

Ashish Ghosh , *Indian Statistical Institute, Kolkata, India*

Raquel Oliveira Prates , *Federal University of Minas Gerais (UFMG),
Belo Horizonte, Brazil*

Lizhu Zhou, *Tsinghua University, Beijing, China*

Rationale

The CCIS series is devoted to the publication of proceedings of computer science conferences. Its aim is to efficiently disseminate original research results in informatics in printed and electronic form. While the focus is on publication of peer-reviewed full papers presenting mature work, inclusion of reviewed short papers reporting on work in progress is welcome, too. Besides globally relevant meetings with internationally representative program committees guaranteeing a strict peer-reviewing and paper selection process, conferences run by societies or of high regional or national relevance are also considered for publication.

Topics

The topical scope of CCIS spans the entire spectrum of informatics ranging from foundational topics in the theory of computing to information and communications science and technology and a broad variety of interdisciplinary application fields.

Information for Volume Editors and Authors

Publication in CCIS is free of charge. No royalties are paid, however, we offer registered conference participants temporary free access to the online version of the conference proceedings on SpringerLink (<http://link.springer.com>) by means of an http referrer from the conference website and/or a number of complimentary printed copies, as specified in the official acceptance email of the event.

CCIS proceedings can be published in time for distribution at conferences or as post-proceedings, and delivered in the form of printed books and/or electronically as USBs and/or e-content licenses for accessing proceedings at SpringerLink. Furthermore, CCIS proceedings are included in the CCIS electronic book series hosted in the SpringerLink digital library at <http://link.springer.com/bookseries/7899>. Conferences publishing in CCIS are allowed to use Online Conference Service (OCS) for managing the whole proceedings lifecycle (from submission and reviewing to preparing for publication) free of charge.

Publication process

The language of publication is exclusively English. Authors publishing in CCIS have to sign the Springer CCIS copyright transfer form, however, they are free to use their material published in CCIS for substantially changed, more elaborate subsequent publications elsewhere. For the preparation of the camera-ready papers/files, authors have to strictly adhere to the Springer CCIS Authors' Instructions and are strongly encouraged to use the CCIS LaTeX style files or templates.

Abstracting/Indexing

CCIS is abstracted/indexed in DBLP, Google Scholar, EI-Compendex, Mathematical Reviews, SCImago, Scopus. CCIS volumes are also submitted for the inclusion in ISI Proceedings.

How to start


To start the evaluation of your proposal for inclusion in the CCIS series, please send an e-mail to ccis@springer.com.


Hector Florez · Marcelo Leon
Editors

Applied Informatics

6th International Conference, ICAI 2023
Guayaquil, Ecuador, October 26–28, 2023
Proceedings

Editors

Hector Florez 
Universidad Distrital Francisco Jose de
Caldas
Bogota, Colombia

Marcelo Leon 
Universidad Ecotec
Guayaquil, Ecuador

ISSN 1865-0929 ISSN 1865-0937 (electronic)
Communications in Computer and Information Science
ISBN 978-3-031-46812-4 ISBN 978-3-031-46813-1 (eBook)
<https://doi.org/10.1007/978-3-031-46813-1>

© The Editor(s) (if applicable) and The Author(s), under exclusive license
to Springer Nature Switzerland AG 2024

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, expressed 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.

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

Paper in this product is recyclable.

Preface

The 6th International Conference on Applied Informatics (ICAI 2023) aimed to bring together researchers and practitioners working in different domains in the field of informatics in order to exchange their expertise and to discuss the perspectives of development and collaboration.

ICAI 2023 was held in blended mode at the Universidad Ecotec located in Guayaquil, Ecuador, during October 26–28, 2023. It was organized by the Information Technologies Innovation (ITI) research group that belongs to the Universidad Distrital Francisco Jose de Caldas. In addition, ICAI 2023 was proudly sponsored by Springer and Science Based Platforms.

ICAI 2023 received 132 submissions on informatics topics. Accepted papers covered Artificial Intelligence, Data Analysis, Decision Systems, Enterprise Information Systems Applications, Geoinformatics, Health Care Information Systems, Interdisciplinary Information Studies, Learning Management Systems, and Virtual and Augmented Reality. Authors of accepted submissions came from the following countries: Argentina, Colombia, Ecuador, Greece, India, Luxembourg, Morocco, Nigeria, Norway, Poland, Russia, Spain, United Arab Emirates, the UK, and the USA.

All submissions were reviewed through a double-blind peer-review process. Each paper was reviewed by at least three experts. To achieve this, ICAI 2022 was supported by 58 program committee members. PC members come from the following countries: Argentina, Canada, Chile, China, Colombia, Ecuador, India, Indonesia, Luxembourg, Morocco, Nigeria, Spain, and the USA. Based on the double-blind review process, 30 full papers were accepted to be included in this volume of Communications in Computer and Information Sciences (CCIS) proceedings published by Springer.

We would like to thank the staff of Springer for their helpful advice, guidance, and support in publishing the proceedings.

We trust that the ICAI 2023 proceedings open to you new vistas of discovery and knowledge.

October 2023

Hector Florez
Marcelo Leon

Organization

General Chairs

Hector Florez	Universidad Distrital Francisco José de Caldas, Colombia
Marcelo León	Universidad Ecotec, Ecuador

Steering Committee

Jaime Chavariaga	Universidad de los Andes, Colombia
Cesar Diaz	OCOX AI, Colombia
Hector Florez	Universidad Distrital Francisco José de Caldas, Colombia
Ixent Galpin	Universidad de Bogotá Jorge Tadeo Lozano, Colombia
Olmer García	Universidad de Bogotá Jorge Tadeo Lozano, Colombia
Christian Grévisse	Université du Luxembourg, Luxembourg
Sanjay Misra	Institute For Energy Technology, Norway
Ma Florencia Pollo-Cattaneo	Universidad Tecnológica Nacional Facultad Regional Buenos Aires, Argentina
Fernando Yepes-Calderon	Children's Hospital Los Angeles, USA

Organizing Committee

Marcelo León	Universidad Ecotec, Ecuador
Hegira Ramirez	Universidad Ecotec, Ecuador

Workshops Committee

Hector Florez	Universidad Distrital Francisco José de Caldas, Colombia
Ixent Galpin	Universidad de Bogotá Jorge Tadeo Lozano, Colombia
Christian Grévisse	Université du Luxembourg, Luxembourg

Program Committee Chairs

Hector Florez	Universidad Distrital Francisco José de Caldas, Colombia
Marcelo León	Universidad Ecotec, Ecuador

Program Committee

Fernanda Almeida	Universidade Federal do ABC, Brazil
Cecilia Avila	Fundación Universitaria Konrad Lorenz, Colombia
Joseph Bamidele Awotunde	University of Ilorin, Nigeria
Jorge Bacca-Acosta	Fundación Universitaria Konrad Lorenz, Colombia
Alejandra Baena	Universidad Antonio Nariño, Colombia
Carlos Balsa	Instituto Politécnico de Bragança, Portugal
Simone Belli	Universidad Complutense de Madrid, Spain
Hüseyin Bicen	Yakin Dogu Üniversitesi, Cyprus
Alexander Bock	Universität Duisburg Essen, Germany
Paola Britos	Universidad Nacional de Río Negro, Argentina
Robert Buchmann	Universitatea Babeş-Bolyai, Romania
Raymundo Buenrostro	Universidad de Colima, Mexico
Patricia Cano-Olivos	Universidad Popular Autónoma del Estado de Puebla, Mexico
Carlos Casanova	Universidad Tecnológica Nacional, Argentina
Jaime Chavarriaga	Universidad de los Andes, Colombia
Victor Darriba	Universidade de Vigo, Spain
Cesar Diaz	OCOX AI, Colombia
Silvia Fajardo-Flores	Universidad de Colima, Mexico
Mauri Ferrandin	Universidade Federal de Santa Catarina, Brazil
Hector Florez	Universidad Distrital Francisco José de Caldas, Colombia
Ixent Galpin	Universidad de Bogotá Jorge Tadeo Lozano, Colombia
Raphael Gomes	Instituto Federal de Goiás, Brazil
Daniel Görlich	SRH Hochschule Heidelberg, Germany
Jānis Grabis	Rīgas Tehniskā Universitāte, Latvia
Christian Grévisse	Université du Luxembourg, Luxembourg
Guillermo Guarnizo	Universidad Santo Tomas, Colombia
Alejandro Hossian	Universidad Tecnológica Nacional, Argentina

Gilles Hubert	Institut de Recherche en Informatique de Toulouse, France
Manfred Jeusfeld	Högskolan i Skövde, Sweden
Rodrigo Kato	Universidade Federal de Minas Gerais, Brazil
Marcelo Leon	Universidad Ecotec, Ecuador
Keletso Letsholo	Higher Colleges of Technology, UAE
Isabel Lopes	Instituto Politécnico de Bragança, Portugal
Orlando Lopez-Cruz	Universidad El Bosque, Colombia
Hugo Peixoto	Universidade do Minho, Portugal
Diego Peluffo-Ordóñez	Mohammed VI Polytechnic University, Morocco
Tamara Piñero	Hospital Italiano de Buenos Aires, Argentina
Adam Piórkowski	AGH University of Science and Technology, Poland
Florencia Pollo-Cattaneo	Universidad Tecnológica Nacional, Argentina
Filipe Portela	Universidade do Minho, Portugal
Pablo Pytel	Universidad Tecnológica Nacional, Argentina
Juan Camilo Ramírez	Universidad Antonio Nariño, Colombia
Vladimir Robles-Bykbaev	Universidad Politécnica Salesiana, Ecuador
José Rufino	Instituto Politécnico de Bragança, Portugal
Alber Sanchez	Instituto Nacional de Pesquisas Espaciais, Brazil
Sweta Singh	Savitribai Phule Pune University, India
German Vega	Centre National de la Recherche Scientifique, France
Manuel Vilares	Universidade de Vigo, Spain
Fernando Yepes-Calderon	Children's Hospital Los Angeles, USA

Contents

Artificial Intelligence

A Feature Selection Method Based on Rough Set Attribute Reduction and Classical Filter-Based Feature Selection for Categorical Data Classification	3
<i>Oluwafemi Oriola, Eduan Kotzé, and Ojonoka Atawodi</i>	
Enhancing Face Anti-spoofing Systems Through Synthetic Image Generation	16
<i>César Vega and Ruben Manrique</i>	
Mapping Brand Territories Using ChatGPT	31
<i>Luisa Fernanda Rodriguez-Sarmiento, Ixent Galpin, and Vladimir Sanchez-Riaño</i>	
Predictive Modeling for Detection of Depression Using Machine Learning	47
<i>Martín Di Felice, Ariel Deroche, Ilan Trupkin, Parag Chatterjee, and María F. Pollo-Cattaneo</i>	
Stock Price Prediction: Impact of Volatility on Model Accuracy	58
<i>Juan Parada-Rodriguez and Ixent Galpin</i>	

Data Analysis

Automated Diagnosis of Prostate Cancer Using Artificial Intelligence. A Systematic Literature Review	77
<i>Salvador Soto, María F. Pollo-Cattaneo, and Fernando Yepes-Calderon</i>	
From Naive Interest to Shortage During COVID-19: A Google Trends and News Analysis	93
<i>Alix E. Rojas, Lilia C. Rojas-Pérez, and Camilo Mejía-Moncayo</i>	
Measuring the Impact of Digital Government Service: A Scientometric Analysis for 2023	107
<i>Narendra Naft Gumilang, Achmad Nurmandi, Muhammad Younus, and Aulia Nur Kasiwi</i>	

Using Polarization and Alignment to Identify Quick-Approval Law Propositions: An Open Linked Data Application 122
Francisco Cifuentes-Silva, José Emilio Labra Gayo, Hernán Astudillo, and Felipe Rivera-Polo

Utilizing Chatbots as Predictive Tools for Anxiety and Depression: A Bibliometric Review 138
María de Lourdes Díaz Carrillo, Manuel Osmany Ramírez Pérez, and Gustavo Adolfo Lemos Chang

Decision Systems

A Bio-Inspired-Based Salp Swarm Algorithm Enabled with Deep Learning for Alzheimer’s Classification 157
Joseph Bamidele Awotunde, Sunday Adeola Ajagbe, and Hector Florez

A Scientometric Analysis of Virtual Tourism Technology Use in the Tourism Industry 171
Sri Sulastri, Achmad Nurmandi, and Aulia Nur Kasiwi

A Tool to Predict Payment Default in Financial Institutions 186
D. Rivero, L. Guerra, W. Narváez, and S. Arcinegas

Prediction Value of a Real Estate in the City of Quito Post Pandemic 197
Wladimir Vilca, Joe Carrion-Jumbo, Diego Riofrío-Luzcando, and César Guevara

Simulation Model to Assess Household Water Saving Devices in Bogota City 213
Andrés Chavarro, Mónica Castañeda, Sebastian Zapata, and Isaac Dyrer

Towards Reliable App Marketplaces: Machine Learning-Based Detection of Fraudulent Reviews 229
Angel Fiallos and Erika Anton

Enterprise Information Systems Applications

Challenges to Use Role Playing in Software Engineering Education: A Rapid Review 245
Mauricio Hidalgo, Hernán Astudillo, and Laura M. Castro

Team Productivity Factors in Agile Software Development: An Exploratory Survey with Practitioners 261
Marcela Guerrero-Calvache and Giovanni Hernández

Work-Life Interference on Employee Well-Being and Productivity. A Proof-of-Concept for Rapid and Continuous Population Analysis Using Evalú@	277
<i>Fernando Yepes-Calderon and Paulo Andrés Vélez Ángel</i>	

Geoinformatics

Comparative Analysis of Spatial and Environmental Data in Informal Settlements, from Point Clouds and RPAS Images	293
<i>Carlos Alberto Diaz Riveros, Andrés Cuesta Veleño, Julieta Frediani, Rocio Rodriguez Tarducci, and Daniela Cortizo</i>	
Prospects of UAVs in Agricultural Mapping	309
<i>Paulo Escandón-Panchana, Gricelda Herrera-Franco, Sandra Martínez Cuevas, and Fernando Morante-Carballo</i>	

Health Care Information Systems

Gross Motor Skills Development in Children with and Without Disabilities: A Therapist's Support System Based on Deep Learning and Adaboost Classifiers	325
<i>Adolfo Jara-Gavilanes and Vladimir Robles-Bykbaev</i>	
TP53 Genetic Testing and Personalized Nutrition Service	338
<i>Jitao Yang</i>	

Interdisciplinary Information Studies

Changes in the Adaptive Capacity of Livelihood Vulnerability to Climate Change in Ecuador's Tropical Commodity Crops: Banana and Cocoa	353
<i>Elena Piedra-Bonilla and Yosuny Echeverría</i>	
Context and Characteristics of Software Related to Ecuadorian Scientific Production: A Bibliometric and Content Analysis Study	369
<i>Marcos Espinoza-Mina, Alejandra Colina Vargas, and Javier Berrezueta Varas</i>	
Exploring the Potential of Genetic Algorithms for Optimizing Academic Schedules at the School of Mechatronic Engineering: Preliminary Results	390
<i>Johan Alarcón, Samantha Buitrón, Alexis Carrillo, Mateo Chuquimarca, Alexis Ortiz, Robinson Guachi, D. H. Peluffo-Ordóñez, and Lorena Guachi-Guachi</i>	

Machine Masquerades a Poet: Using Unsupervised T5 Transformer
for Semantic Style Transformation in Poetry Generation 403
Agnij Moitra

Under the Spotlight! Facial Recognition Applications in Prison Security:
Bayesian Modeling and ISO27001 Standard Implementation 419
*Diego Donoso, Gino Cornejo, Carlos Calahorrano, Santiago Donoso,
and Erika Escobar*

Learning Management Systems

Comparative Quality Analysis of GPT-Based Multiple Choice Question
Generation 435
Christian Grévisse

Virtual and Augmented Reality

Design and Validation of a Virtual Reality Scenery for Learning
Radioactivity: HalDron Project 451
*Silvio Perez, Diana Olmedo, Fancois Baquero,
Veronica Martinez-Gallego, and Juan Lobos*

Author Index 467