Sociedade Brasileira de Computação (SBC) - CNPJ: 29.532.264/0001-78

Maceió - Alagoas

XIX Simpósio Brasileiro de Sistemas de Informação

Sistemas de Informação Verdes para a Sustentabilidade Ambiental

Proceedings of the 19th Brazilian Symposium on Information Systems

"Green Information Systems for Environmental Sustainability"

General Chairs
Mônica Ximenes C. da Cunha (IFAL)
Marcílio F. de Souza Júnior (UFRPE)

Research in Information Systems Track Chairs
Johnny C. Marques (ITA)
Tadeu M. de Classe (UNIRIO)

Proceedings Chair
Rafael D. Araújo (UFU)

INSTITUTO FEDERAL Alagoas
SBC Sociedade Brasileira de Computação

Simpósio Brasileiro de Sistemas de Informação
www.sbsi2023.ifal.edu.br @sbsibrasil

The Association for Computing Machinery
1601 Broadway, 10th Floor
New York, New York 10019, USA

ACM ISBN: 979-8-4007-0759-9

ACM COPYRIGHT NOTICE. Copyright © 2023 by the Association for Computing Machinery, Inc. Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Publications Dept., ACM, Inc., fax +1 (212) 869-0481, or permissions@acm.org.

For other copying of articles that carry a code at the bottom of the first or last page, copying is permitted provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, +1-978-750-8400, +1-978-750-4470 (fax).

Promotion

Organization

Institutional Support

Sponsors

Editors

Rafael D. Araújo
Johnny C. Marques
Tadeu M. de Classe
Mônica Ximenes C. da Cunha
Marcílio F. de Souza Júnior

Technical Committee

General Coordinators
Mônica Ximenes (IFAL)
Marcílio F. de Souza Júnior (UFRPE)

Research in Information Systems Track Chairs
Johnny C. Marques (ITA)
Tadeu M. de Classe (UNIRIO)

Proceedings Chair
Rafael D. Araújo (UFU)

Thesis and Dissertation Contest (CTDSI) and Undergraduate Projects on Information Systems Contest (CTCCSI) Chairs
Celia Ghedini Ralha (UnB)
Vera Maria Benjamin Werneck (UERJ)

Industry and Innovation in Information System Track Chairs
George Valença (UFRPE)
Nádia Puchalski Kozievitch (UTFPR)

Emerging Themes, Ideas and Results in Information Systems Track Chairs
Daniela Barreiro Claro (UFBA)
Maria Claudia Emer (UTFPR)

Tutorial Short Courses Track Chairs
Williamson Silva (UNIPAMPA)
Ivo Calado (IFAL)

Information Systems Education Panel Chair
Rita Berardi (UTFPR)
Rafael D. Araújo (UFU)

SBC Information Systems Special Committee (CE-SI)

Coordinator

Awdren de Lima Fontão (UFMS)

Vice-coordinator

Rodrigo Pereira dos Santos (UNIRIO)

SBC Information Systems Special Committee

Awdren de Lima Fontão (UFMS)
Flávio Eduardo Aoki Horita (UFABC & Climatempo)
Johnny Cardoso Marques (ITA)
José Maria Nazar David (UFJF)
Lívia Castro Degrossi (FGV)
Mônica Ximenes Carneiro da Cunha (IFAL)
Renata Mendes de Araujo (UPM & EACH-USP)
Rodrigo Pereira dos Santos (UNIRIO)
Scheila de Ávila e Silva (UCS)
Tadeu Moreira de Classe (UNIRIO)
Valdemar Vicente Graciano Neto (UFG)
Williamson Alison Freitas Silva (UNIPAMPA)

SBSI Steering Committee

Valdemar Vicente Graciano Neto (UFG) - coordinator
Rafael Dias Araújo (UFU) - coordinator
Johnny Cardoso Marques (ITA)
Mônica Ximenes Carneiro da Cunha (IFAL)
Rita Cristina Galarraga Berardi (UTFPR)
Tadeu Moreira de Classe (UNIRIO)
Williamson Alison Freitas Silva (UNIPAMPA)

Scientific Committee

Alessandra Dutra	Pontifícia Universidade Católica do Rio Grande do Sul
Alexandre L'Erario	Universidade Tecnológica Federal do Paraná
Alexis Huf	Universidade Federal de Santa Catarina
Aline Vasconcelos	Instituto Federal de Educação, Ciência e Tecnologia Fluminense
Ana Patricia Mascarenhas	Universidade do Estado da Bahia
Ana Paula Bacelo	Pontifícia Universidade Católica do Rio Grande do Sul
Ana Regina Rocha	Universidade Federal do Rio de Janeiro
Anderson Marcolino	Universidade Federal do Paraná
Andre Freire	Universidade Federal de Lavras
Andre Menolli	Universidade Estadual do Norte do Paraná
Anna Beatriz Marques	Universidade Federal do Ceará
Antonio Resende	Universidade Federal de Lavras
Ariel Teles	Instituto Federal do Maranhão
Awdren Fontão	Universidade Federal do Mato Grosso do Sul
Bernardo Estácio	Moia Disruptive Ideas
Bruna Diirr	Universidade Federal do Estado do Rio de Janeiro
Bruno Souza	Universidade Federal do Rio de Janeiro
Carina Alves	Universidade Federal de Pernambuco
Carla Bezerra	Universidade Federal do Ceará
Carlos Santos Pires	Universidade Federal de Campina Grande
Carlos Alberto Costa	Universidade de Caxias do Sul
Carlos Eduardo de Barros Paes	Pontifícia Universidade Católica de São Paulo
Celia Ralha	Universidade de Brasília
Cesar Marcondes	Instituto Tecnológico da Aeronáutica
Claudia Cappelli	Universidade Estadual do Rio de Janeiro
Claudio de Farias	Universidade Federal do Rio de Janeiro
Daniel Notari	Universidade de Caxias do Sul
Daniela América	Grupo Boticário
Daniela Barreiro Claro	Universidade Federal da Bahia
Daniela Cunha	Universidade Presbiteriana Mackenzie
Davi Viana	Universidade Federal do Maranhão
Dennis Lopes	Universidade de São Paulo
Dimas Cassimiro Nascimento	Universidade Federal do Agreste de Pernambuco
Edna Canedo	Universidade de Brasília
Edson OliveiraJr	Universidade Estadual de Maringá
Eduardo Gomes de Oliveira	Colégio Pedro II
Eldânae Nogueira Teixeira	Universidade Federal do Rio de Janeiro
Emanuel Coutinho	Universidade Federal do Ceará
Erickson Lima Barbosa da Silva	Universidade de São Paulo
Ernesto Veiga	Universidade Federal de Goiás
Evellin Cardoso	Universidade Federal de Goiás
Fabiano Dorça	Universidade Federal de Uberlândia
Fabio Rocha	Universidade Tiradentes
Fábio Basso	Universidade Federal do Pampa
Fernanda Campos	Universidade Federal de Juiz de Fora
Flavia Santoro	Universidade do Estado do Rio de Janeiro
Flavio Horita	Universidade Federal do ABC
Frank Siqueira	Universidade Federal de Santa Catarina
Geicianfran da Silva Lima Roque	Universidade Federal de Pernambuco
George Valença	Universidade Federal Rural de Pernambuco
Geraldo Xexéo	Universidade Federal do Rio de Janeiro
Gian Berkenbrock	Universidade Federal de Santa Catarina
Gildarcio Gonçalves	Instituto Tecnológico de Aeronáutica
Giseli Lopes	Universidade Federal do Rio de Janeiro
Gleison Santos	Universidade Federal do Estado do Rio de Janeiro
Heder Bernardino	Universidade Federal de Juiz de Fora
Heitor Costa	Universidade Federal de Lavras
Henrique Sousa	Universidade Federal do Estado do Rio de Janeiro
Hudson Borges	Universidade Federal do Mato Grosso do Sul
Isabela Drummond	Universidade Federal de Itajubá
Ivan Machado	Universidade Federal da Bahia
Jacilane Rabelo	Universidade Federal do Ceará
Jéssyka Vilela	Universidade Federal de Pernambuco

Jefferson Elbert Simões	Universidade Federal do Estado do Rio de Janeiro
João Luiz Bernardes Júnior	Universidade de São Paulo
Johnny Marques	Instituto Tecnológico de Aeronáutica
Jorge Barbosa	Universidade Federal do Vale dos Sinos
José Maria David	Universidade Federal de Juiz de Fora
Juliano Lopes de Oliveira	Universidade Federal de Goiás
Julio Dos Reis	Instituto de Computação da Universidade Estadual de Campinas
Karla Fook	Instituto Tecnológico de Aeronáutica
Kate Revoredo	Humboldt-Universität zu Berlin
Kleinner Farias	Universidade Federal do Vale dos Sinos
Leonardo Guerreiro Azevedo	IBM Research - Brasil
Leticia Peres	UFPR - Universidade Federal do Parana
Lina Garcés	Universidade Federal de Itajubá
Livia Degrossi	Fundação Getulio Vargas
Lucas Bueno Ruas Oliveira	Instituto Federal de São Paulo
Luciana Berretta	Universidade Federal de Goiás
Luis de Lima	Universidade Federal do Paraná
Luiz Henrique Zambom Santana	Universidade Federal de Santa Catarina
Marcílio Souza-Júnior	Universidade Federal Rural de Pernambuco
Marcelo Eler	Universidade de São Paulo
Marcelo YamagutiPontifícia	Universidade Católica do Rio Grande do Sul
Marcelo Iury S . Oliveira	Universidade Federal Rural de Pernambuco
Maria Istela Cagnin	Universidade Federal de Mato Grosso do Sul
Maxwell Guimarães de Oliveira	Universidade Federal de Campina Grande
Mônica Cunha	Instituto Federal de Alagoas
Melise Paula	Universidade Federal de Itajubá
Melquizedequi Cabral dos Santos	Instituto Federal do Sertão Pernambucano
Michele Brandão	Instituto Federal de Minas Gerais
Monica Anastassiu	Universidade Federal do Estado do Rio de Janeiro
Morganna Diniz	Universidade Federal do Estado do Rio de Janeiro
Neilson Ramalho	Universidade de São Paulo
Orlando Coelho	Universidade Presbiteriana Mackenzie
Paula Olivio	Instituto Tecnológico de Aeronáutica
Paulo Parreira Júnior	Universidade Federal de Lavras
Paulo Sérgio Santos	Universidade Federal do Estado do Rio de Janeiro
Pedro Nuno Moura	Universidade Federal do Estado do Rio de Janeiro
Rafael Araújo	Universidade Federal de Uberlândia
Rafael Escalfoni	Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Raimundo Moura	Universidade Federal do Piauí
Raquel Pillat	Universidade Federal do Rio de Janeiro
Raul Wazlawick	Universidade Federal de Santa Catarina
Renata Araujo	Universidade Presbiteriana Mackenzie
Renato Bulcão-Neto	Universidade Federal de Goiás
Renato Novais	Instituto Federal de Educação, Ciência e Tecnologia da Bahia
Ricardo Choren	Instituto Militar de Engenharia
Ricardo Theis Geraldi	Universidade Tecnológica Federal do Paraná
Rita Suzana Pitangueira Maciel	Universidade Federal da Bahia
Robson Fidalgo	Universidade Federal de Pernambuco
Rodrigo Monteiro	Universidade Federal Fluminense
Rodrigo Santos	Universidade Federal do Estado do Rio de Janeiro
Rogério de Carvalho	Instituto Federal Fluminense
Ronaldo Mello	Universidade Federal de Santa Catarina
Ronney Moreira de Castro	Universidade Federal de Juiz de Fora
Sandro Silva	Universidade Federal do Estado do Rio de Janeiro
Sandro Ronaldo Bezerra Oliveira	Universidade Federal do Pará
Sarasuaty Yelisetty	EMBRAER
Saulo Villela	Universidade Federal de Juiz de Fora
Scheila de Avila e Silva	Universidade de Caxias do Sul
Sean Siqueira	Universidade Federal do Estado do Rio de Janeiro
Sergio Carvalho	Universidade Federal de Goiás
Sergio Manuel Serra da Cruz	Universidade Federal Rural do Rio de Janeiro
Simone Souza	Universidade de São Paulo
Sofia Paiva	Universidade Federal de Goiás
Tadeu Classe	Universidade Federal do Estado do Rio de Janeiro
Taisa Goncalves	CY Cergy Paris Université
Talita Slavov	Universidade Federal de São Paulo
Toacy Oliveira	Universidade Federal do Rio de Janeiro

Valdemar Vicente Graciano Neto	Universidade Federal de Goiás
Vanessa Nunes	Universidade Federal Fluminense
Vaninha Vieira	Universidade Federal da Bahia
Vera Werneck	Universidade do Estado do Rio de Janeiro
Victor Stroele	Universidade Federal de Juiz de Fora
Vinícius Sebba Patto	Universidade Federal de Goiás
Wylliams Santos	Universidade de Pernambuco

Foreword: Special Committee of Information Systems (CESI) of the Brazilian Computing Society (SBC)

Dear attendees of the XIX Brazilian Symposium on Information Systems (SBSI 2023),

On behalf of the Special Commission of Information Systems (CESI) of the Brazilian Computer Society (SBC), we would like to welcome another edition of our annual symposium. CESI brings together IS researchers and professionals and manages this area in Brazil in the context of SBC. Its work consists of articulating policies for the dissemination, strengthening, consolidation and improvement of the quality of education, research, innovation and performance in IS in Brazil, promoting and proposing important activities for the development and consolidation of this area in our country. SBSI is one of CESI's main actions. For this reason, we are happy that authors submit their work, that evaluators strive to give the best possible feedback on their reviews and that coordinators are able to hold memorable moments so that the community can be strengthened, attract more participants, and consolidate in the country. As such, CESI calls on the IS community to be increasingly active and SBSI participants to get involved and bring new researchers to the event, making the community stronger and solidifying their research.

SBSI is the most important forum on IS in Brazil and annually brings together researchers from all over the country. This year, SBSI takes place in Maceió, State of Alagoas, under the general coordination of professors Mônica Ximenes and Marcílio de Souza Júnior, from the Federal Institute of Alagoas (IFAL) and Federal Rural University of Pernambuco (UFRPE), respectively. After several months of intense work and unparalleled dedication by the professors and their local organization team, we made available to the IS community a rich, diversified, comprehensive, and solid program, communicating the latest research results in the IS area in Brazil. The event has grown considerably in recent years. This achievement is a reflection of the consolidation of the area, which has only been possible due to the growing support of the entire IS community. SBSI 2023 is composed of several parallel events, which include technical sessions, lectures, panels, master classes, and five tracks: Research in Information Systems Track; Industry and Innovation in Information System Track; Emerging Themes, Ideas and Results in Information Systems Track; Thesis and Dissertation Contest (CTDSI) and Undergraduate Projects on Information Systems Contest (CTCCSI); and Short Courses Track. All works accepted to SBSI tracks other than Research in Information Systems Track are published in the SBSI Companion Proceedings and also made available to the community and works accepted to SBSI Short Courses Track are published as a book.

The Program Committee, coordinated by Professor Johnny Marques (ITA) and Tadeu Classe (UNIRIO), worked hard and expertly so that the most mature and highest quality works could be brought to the Brazilian IS community. Such rigorous selection work yielded full confidence in the quality of the papers presented at this symposium in 2023. In addition, the partnership with the ACM Digital Library continues this year. This is a differential of SBSI in relation to several other SBC events, given the relevance of this association in the global context. Such partnerships enormously intensify the impact of the work carried out by the program committee and by the authors of the papers, enhancing the scope and reach of the production of SBSI, which is also indexed and accessible worldwide by the DBLP database. In time, it is important to emphasize

that the proceedings of SBSI and its tracks are also being indexed and made available at the SBC Open Lib - SOL.

Finally, we thank all the participants, collaborators, coordinators, sponsors, supporters, and organizers who made the event possible once again, especially in yet another difficult and challenging period for humanity.

We wish you all a great SBSI 2023!

Kind regards,
Awdren Fontão (UFMS) - CESI/SBC Coordinator - 2022-2023
Rodrigo Santos (UNIRIO) - CESI/SBC Vice-Coordinator – 2022-2023

Awdren de Lima Fontão is a Professor at Faculty of Computing (FACOM) at Federal University of Mato Grosso do Sul (UFMS). He received his Ph.D. degree from the Institute of Computing (ICOMP) from the Federal University of Amazonas (UFAM). He has a large experience in Software Engineering projects in industry where worked in research institutes as Nokia, Microsoft and Samsung. Head of Software Engineering Lab at UFMS. He is also member and coordinates extension and research projects with private companies and public government. Experienced in the field of Computer Science, with an emphasis on Information Systems, Software Engineering, especially, in Software Ecosystems, Developer Relations and Software Engineering applied to Artificial Intelligence. He is a member of the Brazilian Computer Society and Special Committee on Information Systems (CESI). He has been part of the organization team of scientific events such as CBSoft, SBQS, SBSI, ICGSE/ICSSP, WASHES@CSBC. He also serves as a reviewer for academic venues, such as JSS, iSYS, IJBIS, ASE, JSERD.

Rodrigo Pereira dos Santos is an Assistant Professor at the Department of Applied Informatics at the Federal University of the State of Rio de Janeiro (UNIRIO, Brazil). Ph.D. in Computer Science and Systems Engineering from the Federal University of Rio de Janeiro (COPPE/UFRJ, Brazil). He was Academic Visitor at University College London (2014-2015) and a Postdoctoral Researcher at COPPE/UFRJ (2017). Head of the Complex Systems Engineering Laboratory (Lab ESC), leading a team of 20 students with more than 30 partners all over the world. His research interests are Complex Systems Engineering (especially software ecosystems and systems-of-systems) and Software Engineering Education. In the Brazilian Computer Society (SBC), he was/is a Coordinator of the Special Commission of Information Systems (CE-SI, 2019-2023), a member of the Special Commission of Software Engineering (CE-ES, 2021-2022), a member of the Special Commission of Games and Entertainment Computing (CE-Jogos, 2020-2024), and member of the Interest Group of Computer Science Education (GIEC, 2020-2023). He was Editor-in-Chief of iSys: Brazilian Journal of Information Systems (2017-2021). He is a member of the Education Evaluating Commission at the Brazilian Ministry of Education. He worked on several projects related to software process improvement and reuse management in large companies at Coppetec Foundation (2008-2017).

Foreword: Program Committee

Information Systems (IS) crosscut several areas of interest, supporting strategic decisions and enabling humans to deal with information in different moments and scenarios. In addition to enhancing and leveraging businesses, ISs are able to anticipate and provide subsidies to deal with unexpected situations and promote more efficient and transformative management in the most diverse areas, such as health, education, logistics, agribusiness, finance, public management, among others.

The IS research area understands computing as a means for solving problems in the real world, society, and organizations. In that sense, the Brazilian Symposium on Information Systems (SBSI) is the annual event of the IS community of the Brazilian Computer Society (SBC) for the exchange of academic, scientific and professional knowledge and experiences, presentation of scientific papers, discussion of contemporary issues in the IS area and alignment of the community's strategies and actions, bringing students, researchers, professionals, and entrepreneurs closer to the community interested in IS.

In the 19th edition, SBSI 2023 takes place in Maceió/Alagoas, under the coordination of the Federal Institute of Education, Science and Technology of Alagoas (IFAL) and will have as its theme “Green Information Systems for Environmental Sustainability”. The theme refers to the challenges and reflections arising from contemporary environmental issues required by society, demanding that organizations seek to minimize the impacts on the environment caused by the operation of their business process. Thus, the discipline of Green Information Systems investigates the use of software, procedures and technological infrastructure to achieve environmental objectives through the use of computational resources in an environmentally responsible way.

This year, we received 161 submissions of scientific papers for discussion at the event. Submitted papers received 3-5 reviews from 137 program committee members and 17 external reviewers. In the end, 59 papers were accepted for presentation and debate during the SBSI, with an acceptance rate of 36.64%. Authors come from 45 different institutions in 17 Brazilian states and four other countries (Portugal, France, Great Britain and Algeria).

Along with the communications of scientific papers, the event has a robust program and a very high academic-scientific level, in the form of lectures and masterclasses. We will receive two international speakers: Prof. Ph.D. Savvas Papagiannidis (Newcastle University), with the lecture entitled “Can smart homes be green homes?”. In the national scenario, we have Prof. Dr. Sandro César Silveira Jucá (IFCE), with the lecture entitled: “Online tools and free educational products applied to Green IoT, and renewable energy monitoring”. Aiming to consolidate theoretical and practical bases for research and technological development in IS in Brazil and with related to the theme of the symposium, we will have two masterclasses: "Green IT in IS Researches" taught by Prof. Dr. Ana Paula Ferreira Alves (IFRS) and Prof. Dr. Guilherme Lerch Lunardi (FURG).

We would like to thank the Brazilian Computer Society, the general coordinators of SBSI 2023, and other coordinating colleagues of the events that make up the SBSI. We thank and congratulate the colleagues who made up the program committee and review body for their excellent contributions to the authors in their articles and discussions. To the researchers-authors of the papers submitted to the

event, we would like to thank you for your interest in the event and in the collective development of the Information Systems area in Brazil. Finally, our sincere thanks to the speakers, masterclass teachers, and participating community for the success of this seventeenth edition of SBSI. Let's all have an excellent event!

Kind Regards,
Johnny Marques (ITA) and Tadeu Classe (UNIRIO)
Technical Program Committee Chairs

Johnny Cardoso Marques has a degree in Electrical Engineering with an emphasis on Systems and Computing from the State University of Rio de Janeiro/UERJ (2002). Master by the postgraduate program in Aeronautical and Mechanical Engineering in Aerospace Systems and Mechatronics by the Aeronautics Institute of Technology/ITA (2004). Doctor in Electronic Engineering and Computer Science at ITA (2016). He is an Adjunct Professor in the Computer Science Division and chief of the Division of Research, Development, and Innovation at ITA. He is the author of several standards and publications in software engineering at the Associação Brasileira de Normas Técnicas (ABNT), Radio Technical Commission for Aeronautics (RTCA), and the Institute of Electrical and Electronics Engineers (IEEE). He is interested in Information Systems, Software Engineering, Software Quality, Software Processes, Critical Systems, Health Informatics, and Requirements Engineering. Finally, he also works in applying software engineering methodologies in the context of safety-critical systems for aerospace, medical and automotive devices. He is ITA's Institutional Representative at the Brazilian Computer Society (SBC) and an associate of the Brazilian Society of Health Informatics (SBIS).

Tadeu Moreira de Classe has a Bachelor in Information System from the Higher Education Center of Juiz de Fora (CEJ/JF - 2011). Master in Computer Science with an emphasis in Software Engineering and Data Base by the Federal University of Juiz de Fora (UFJF - 2014). Ph.D. in Informatics by the Federal University of the State of Rio de Janeiro (UNIRIO - 2019). He is an Adjunct Professor in the Applied Informatic Department and the Graduate Program on Informatics at the UNIRIO. Also, he is the head of the Research Group of Games to Complex Contexts (JoCCom). Tadeu is interested in Information Systems and Games. He works with design methodologies to create games and systems that try to improve human relations. He is a member of the Brazilian Computer Society (SBC), the Special Committee on Information Systems (CESI), and part of scientific committees in Brazilian events and journals such as SBSI, SBGames, SBSC, SBQS, CSBC, iSys, and others.

19th Brazilian Symposium on Information Systems (SBSI 2023)

Table of Contents

4Experts: A Task Recommendation Approach Using Machine Learning and Biometric Data 01-08

Automatic detection of people with reduced mobility using YOLOv5 and data reduction strategy 09-16

Machine Learning Applied to the Classification of Technical Inspection Recommendations Regarding the Trend to Increase Criticality 17-27

Characterizing Toolkits for Platform Independent Chatbot Development 28-36

Assis: Online Semi-Automatic Dialog Annotation Tool 37-44

Using Machine Learning to Classify Process Model Elements for Process Infrastructure Analysis 45-52

An Approach Based on Machine Learning for Predicting Software Design Problems..... 53-60

EPAComp: An Architectural Model for EPA Composition 61-69

PharmaBulaBot: A Chatbot to Answer Drug Questions Based on Information from Pharmaceutical Package Inserts 70-77

The Use of Users' Personal Data to Improve Online Retail Services: An Analysis from a Systematic Literature Review 78-85

Towards a blockchain-based API to ensure data interoperability and transparency in the registration and inspection processes of Brazilian water dams..... 86-93

INSIDE: an Ontology-based Data Integration System Applied to the Oil and Gas Sector 94-101

Inference of Properties of a Natural Gas Processing Plant Through the Application of Machine Learning to Time Series 102-111

Optimizing Wireline Formation Testing in Oil Wells: A Data Science approach. 112-119

A Score approach to identify the risk of students dropout: an experiment with Information Systems Course 120-127

Towards a Catalog of Heuristics for the Design of Systems-of-Systems 128-135

CARAMEL: Ecosystem for Big Social Data 136-142

I didn't find what I wanted - How do Developers Consume Information in Software Ecosystems Portals? 143-150

How to carry out a Brazilian research in computing considering ethical or moral aspects? 151-158

Machine-based stereotypes: How machine learning algorithms evaluate ethnicity from face data 159-166

Analysis of Political Sentiment Demonstrations on Twitter under COVID-19 Pandemic.. 167-173

Discovery of socio-technical requirements for the design of a digital educational game 174-180

Games With Training Purpose for Hazard Situations in the Industry - Systematic Mapping of the Literature 181-188

Game for Awareness of Entrepreneurs in the Protection of their Creations by Intellectual Property: An Experiment in Startup 189-196

Evaluating Students' Technology Acceptance of Use of Metaverse as an Educational Information System for Hybrid Education 197-205

Reliability Analysis with User Experience in Portal of Public Institution 206-212

Machine Learning Applied to Open Government Data for the Detection of Improprieties in the Application of Public Resources 213-220

Automatic Classification of Public Expenses in the Fight against COVID-19: A Case Study of TCE/PI 221-228

Description of dynamic images: a systematic mapping for the understanding and transparency of information that may be perceptible visually impaired citizens 229-236

Critical Success Factors for Open Government Data Management Information Systems in a Public Body in the State of São Paulo 237-244

Fog environment proposal to reduce energy consumption on public roads in smart cities 245-251

Graph Neural Networks Applied to Money Laundering Detection in Intelligent Information Systems 252-259

The use of wearables to prevent sexual violence: a systematic mapping study 260-267

Monitoring vehicle plate detection in Brazilian Universities 268-275

An Intelligent Report Generator For Chemical Documents 276-283

Computational system as support in the collection and management of environmental health surveillance data: an application in the municipality of Jaboatão dos Guararapes/PE, Brazil 284-291

Ontology-Based Reasoning to Classify Behaviors Associated with Chronic Disease Risk Factors 292-300

Comparison of Explainable Machine-Learning Models for Decision-Making in Health Intensive Care Using SHapley Additive exPlanations 301-308

Proposal and Preliminary Evaluation of a Learner Experience Evaluation Model in Information Systems 309-317

Proposal and Preliminary Evaluation of a Usability and UX Multi-Touch Evaluation Technology 318-325

Towards a Framework for Self-adaptive Systems Conceptual Modeling..... 326-332

Survey of Software Maintenance Metrics: A Systematic Literature Review..... 333-340

Tuhm: A Tool for Supporting Usability Tests on Mobile Applications 341-348

Perceptions of Practitioners on Security-Related Software Testing in a Mobile Software Development Company 349-356

Identifying and Measuring Technical Debt in Software Requirements: a supporting guide 357-364

An Empirical Evaluation of a Model for dealing with Epistemic Uncertainty in Agile Software Project Management 365-372

On Challenges and Opportunities of Using Continuous Experimentation in the Engineering of Contemporary Software Systems 373-380

Evaluating a Conceptual Model for Projects Observatories through a Survey ... 381-388

Low-code and No-code Technologies Adoption: A Gray Literature Review..... 389-396

Mock objects: a case study in industry..... 397-404

On the Prediction of Software Merge Conflicts: A Systematic Review and Meta-analysis 405-412

A Review on the Capacities of the ISO/IEC/IEEE 42020:2019 Standard for Architecture Elaboration of Software and Systems 413-419

18+ years of Brazilian Symposium on Information Systems: Results of a Scope Review 420-427

Surveying the Academic Literature on the Use of OKR (Objective and Key Results) 428-435

A systematic study on the impact of GDPR compliance on Organizations 436-443

Critical Success Factors of Agile Transformation Initiatives from a Project Management Perspective..... 444-451

Identifying Support for Knowledge-Intensive Processes in BPMN and its Extensions 452-459

Robotic Process Automation in Latin American Organizations: Survey and Evaluation of the Current State of Technology Adoption 460-468

Professional experience characterization on Information Systems teams collaboration 469-476