

# **19th International Conference on Software Technologies (ICSOFT 2024)**

Dijon, France  
8-10 July 2024

## **Editors:**

**Hans-Georg Fill**  
**Francisco José Domínguez Mayo**  
**Marten van Sinderen**  
**Leszek Maciaszek**

ISBN: 979-8-3313-0550-5

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2024) by SCITEPRESS – Science and Technology Publications, Lda.  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact SCITEPRESS – Science and Technology Publications, Lda.  
at the address below.

SCITEPRESS – Science and Technology Publications, Lda.  
Avenida de S. Francisco Xavier, Lote 7 Cv. C,  
2900-616 Setúbal, Portugal

Phone: +351 265 520 185

Fax: +351 265520 186

[info@scitepress.org](mailto:info@scitepress.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# CONTENTS

---

## INVITED SPEAKERS

### KEYNOTE SPEAKERS

Software Development... for all? <i>Juan de Lara</i>	5
It's not Just a Game. It's a Game Changer <i>Johanna Pirker</i>	7
Past, Present, Future, and Far Future of AI <i>Jürgen Schmidhuber</i>	9

## SOFTWARE ENGINEERING AND SYSTEMS DEVELOPMENT

### FULL PAPERS

A Literature Survey on Pitfalls of Open-Source Dependency Management in Enterprise <i>Andrey Kharitonov, Amro Abdalla, Abdulrahman Nahhas, Daniel Gunnar Staegemann, Christian Haertel, Christian Daase and Klaus Turowski</i>	15
Feature Extraction, Learning and Selection in Support of Patch Correctness Assessment <i>Viktor Csuvik, Dániel Horváth and László Vidács</i>	23
AsmDocGen: Generating Functional Natural Language Descriptions for Assembly Code <i>Jesia Quader Yuki, Mohammadhossein Amouei, Benjamin C. M. Fung, Philippe Charland and Andrew Walenstein</i>	35
Towards an Approach for Integrating Risk Management Practices into Agile Contexts <i>Fernando Vedoïn Garcia, Jean Carlo Rossa Hauck, Fernanda Narloch Rizzo Hahn and Raul Sidnei Wazlawick</i>	46
The Game of One More Idea: Gamification of Managerial Group Decision-Making in Software Engineering <i>Hannes Salin</i>	59
Detecting and Resolving Bad Organisational Smells for Microservices <i>Michele Agostini, Jacopo Soldani and Antonio Brogi</i>	67
Smart Widening for the Polyhedral Analysis <i>Yassamine Seladji</i>	79

## SHORT PAPERS

An Evaluation of Risk Management Standards and Frameworks for Assuring Data Security of Medical Device Software AI Models <i>Buddhika Jayaneththi, Fergal Mc Caffery and Gilbert Regan</i>	91
Automated Generation of Web Application Front-end Components from User Interface Mockups <i>Oksana Nikiforova, Kristaps Babris and Farshad Mahmoudifar</i>	100
An Empirical Examination of the Technical Aspects of Data Sovereignty <i>Julia Pampus and Maritta Heisel</i>	112
Six-Layer Industrial Architecture Applied to Predictive Maintenance <i>Fernanda Pereira Guidotti, Jesimar da Silva Arantes, Márcio da Silva Arantes, Albeiro Espinosa Bedoya and Claudio Fabiano Motta Toledo</i>	123
The End of Mobile Software Engineering (As We Know It) <i>Robin Nunkesser</i>	131
Towards an Ethereum Smart Contract Fuzz Testing Tool <i>Mariam Lahami, Moez Krichen, Mohamed Ali Mnassar, Racem Mrabet and Mohamed Ben Rhouma</i>	137
Asserting Frame Properties <i>Yoonsik Cheon, Bozhen Liu and Carlos Rubio-Medrano</i>	145
Overcoming Obstacles in Model-Driven Engineering: Lessons from the Software Industry <i>Sayeda Rahnuma Akthar, Muhammad Rezaul Islam, Marzan Binte Hasan, Mahpara Sayema Siddiqua, Shadat Irtisamul Haque, Jamil Ahmad Saad, Farzana Sadia and Mahady Hasan</i>	153
A Measures-Driven Decision Support System for Managing Requirement Change in Scrum: An Empirical Evaluation <i>Hela Hakim, Asma Sellami and Hanène Ben-Abdallah</i>	161
Towards Building a Reputation-Based Microservices Trust Model Using Similarity Domains <i>Zhongyi Lu, Declan T. Delaney, Tong Li and David Lillis</i>	169
Synthesizers: A Meta-Framework for Generating and Evaluating High-Fidelity Tabular Synthetic Data <i>Peter Schneider-Kamp, Anton D. Lautrup and Tobias Hyrup</i>	177
Design of Adaptable and Secure Connectors for Software Architectures <i>Juan Marcelo Gutierrez Carballo, Michael Shin and Hassan Gomaa</i>	185
A Reference Architecture for Dynamic IoT Environments Using Collaborative Computing Paradigms (CCP-IoT-RA) <i>Prashant G. Joshi and Bharat M. Deshpande</i>	193

## SOFTWARE SYSTEMS AND APPLICATIONS

### FULL PAPERS

- Improving Robustness of Satellite Image Processing Using Principal Component Analysis for Explainability 207  
*Ulrike Witteck, Jan Stambke, Denis Griefßbach and Paula Herber*
- Towards Accurate Cervical Cancer Detection: Leveraging Two-Stage CNNs for Pap Smear Analysis 219  
*Franklin Steven De la Cruz Paucar, Carlos Julio Macancela Bojorque, Iván Reyes-Chacón, Paulina Vizcaino-Imacaña and Manuel Eugenio Morocho-Cayamcela*
- A Webcam Artificial Intelligence-Based Gaze-Tracking Algorithm 228  
*Saul Figueroa, Israel Pineda, Paulina Vizcaíno, Iván Reyes-Chacón and Manuel Eugenio Morocho-Cayamcela*
- From IoT Servitization to IoT Assetization 236  
*Zakaria Maamar, Amel Benna, Vanilson Buregio and David Alves*
- Optimisation of Ceramic Kiln Loading Problem Using Multi-Objective Genetic Algorithm 248  
*Derya Deliktaş and Ayşe Kaygısız*
- Evaluating the Performance of LLM-Generated Code for ChatGPT-4 and AutoGen Along with Top-Rated Human Solutions 258  
*Ashraf Elnashar, Max Moundas, Douglas C. Schmidt, Jesse Spencer-Smith and Jules White*
- A Lightweight, Computation-Efficient CNN Framework for an Optimization-Driven Detection of Maize Crop Disease 271  
*Shahinza Manzoor, Muhammad Rizwan Mughal, Syed Ali Irtaza, Saif Ul Islam and Jalil Boudjadar*
- Design of a New Digital Cognitive Screening Tool on Tablet: AlzVR Project 283  
*Florian Maronnat, Guillaume Loup, Jonathan Degand, Frédéric Davesne and Samir Otmane*
- Enhancing User Experience in Games with Large Language Models 293  
*Ciprian Paduraru, Marina Cernat and Alin Stefanescu*
- SHORT PAPERS**
- Machine Learning for a Better Agriculture Calendar 307  
*Pascal Francois Faye, Jeanne Ana Awa Faye and Mariane Senghor*
- Determining the Progress of a Business Object Based on Its Object Instances: An Empirical Study 315  
*Lisa Arnold, Marius Breitmayer and Manfred Reichert*
- Product-Line Engineering for Smart Manufacturing: A Systematic Mapping Study on Security Concepts 323  
*Richard May, Alen John Alex, Rakky Suresh and Thomas Leich*
- Diagnosis Automation Using Similarity Analysis: Application to Industrial Systems 331  
*Ivan Orefice, Wissam Mallouli, Ana R. Cavalli, Filip Sebek and Alberto Lizarduy*
- Multimodal Approach Based on Autistic Child Behavior Analysis for Meltdown Crisis Detection 339  
*Marwa Masmoudi, Salma Kammoun Jarraya and Mohamed Hammami*
- Accurate Recommendation of EV Charging Stations Driven by Availability Status Prediction 351  
*Meriem Manai, Bassem Sellami and Sadok Ben Yahia*

RLHR: A Framework for Driving Dynamically Adaptable Questionnaires and Profiling People Using Reinforcement Learning <i>Ciprian Paduraru, Catalina Camelia Patilea and Alin Stefanescu</i>	359
Optimizing Intensive Database Tasks Through Caching Proxy Mechanisms <i>Ionut, -Alex Moise and Alexandra Băicoianu</i>	367
A Systematic Mapping Study on Impact Analysis <i>Emanuele Gentili, Jonida Çarka and Davide Falessi</i>	375
HybridCRS-TMS: Integrating Collaborative Recommender System and TOPSIS for Optimal Transport Mode Selection <i>Mouna Rekik, Rima Grati, Ichrak Benmohamed and Khouloud Boukadi</i>	383
Integrating a LLaMa-based Chatbot with Augmented Retrieval Generation as a Complementary Educational Tool for High School and College Students <i>Darío S. Cabezas, Rigoberto Fonseca-Delgado, Iván Reyes-Chacón, Paulina Vizcaino-Imacaña and Manuel Eugenio Morocho-Cayamcela</i>	395
Artificial Intelligence-Based Detection and Prediction of Giant African Snail ( <i>Lissachatina Fulica</i> ) Infestation in the Galápagos Islands <i>Jonathan Loor, Ariana Jiménez, Juan David Moromenacho Aguirre, Grace Rodríguez, Iván Reyes, Paulina Vizcaino-Imacaña and Manuel Eugenio Morocho-Cayamcela</i>	403
Logging Hypercalls to Learn About the Behavior of Hyper-V <i>Lukas Beierlieb, Nicolas Bellmann, Lukas Iffländer and Samuel Kounev</i>	411
Adopting Delta Maintainability Model for Just in Time Bug Prediction <i>Lerina Aversano, Martina Iammarino, Antonella Madau, Debora Montano and Chiara Verdone</i>	419
Enhancing Holonic Architecture with Natural Language Processing for System of Systems <i>Muhammad Ashfaq, Ahmed R. Sadik, Tommi Mikkonen, Muhammad Waseem and Niko Mäkitalo</i>	427
Egyptian Hieroglyphs Localisation Through Object Detection <i>Lucia Lombardi, Francesco Mercaldo and Antonella Santone</i>	434
CyberGuardian: An Interactive Assistant for Cybersecurity Specialists Using Large Language Models <i>Ciprian Paduraru, Catalina Camelia Patilea and Alin Stefanescu</i>	442
A Decision-Making Approach Combining Process Mining, Data Mining and Business Intelligence <i>Olfa Haj Ayed and Sonia Ayachi Ghannouchi</i>	450
Cracking the Code: Web 3.0 Software Development Challenges and Guidelines <i>Surya Bahadur Kathayat</i>	458
Evaluating the Relative Importance of Product Line Features Using Centrality Metrics <i>Fathiya Mohammed, Mike Mannion, Hermann Kaindl and James Paterson</i>	469
Integrating SysML and Timed Reo for Modeling Interactions in Cyber-Physical Systems Components <i>Perla Tannoury and Ahmed Hammad</i>	477
From Low Fidelity to High Fidelity Prototypes: How to Integrate Two Eye Tracking Studies into an Iterative Design Process for a Better User Experience <i>Gilbert Drzyzga and Thorleif Harder</i>	485

Readability of Domain-Specific Languages: A Controlled Experiment Comparing (Declarative) Inference Rules with (Imperative) Java Source Code in Programming Language Design <i>Kai Klanten, Stefan Hanenberg, Stefan Gries and Volker Gruhn</i>	492
A Tool-Supported Approach for Modelling and Verifying MapReduce Workflow Using Event B and BPMN2.0 <i>Mayssa Bessifi, Ahlem Ben Younes and Leila Ben Ayed</i>	504
Multi-Criteria Decision-Making Approach for an Efficient Postproduction Test of Reconfigurable Hardware System <i>Asma Ben Ahmed, Fadwa Oukhay and Olfa Mosbahi</i>	511
Conceptual Model Detection in Business Web Applications Within the RPA Context <i>Dora Moraru, Adrian Sterca, Virginia Niculescu, Maria-Camelia Chisăliță-Crețu and Cristina-Claudia Osman</i>	519
<b>FOUNDATIONAL AND TRIGGER TECHNOLOGIES</b>	
<b>SHORT PAPERS</b>	
Smart Blockchain-Based Information Flow Control for SOA <i>Khaoula Braiki and Olfa Dallel</i>	531
Efficiently Computing Maximum Clique of Sparse Graphs with Many-Core Graphical Processing Units <i>Lorenzo Cardone, Salvatore Di Martino and Stefano Quer</i>	539
AUTHOR INDEX	547