# Table of Contents

Scroll to the title and select a **Blue** link to open a paper. After viewing the paper, use the bookmarks to the left to return to the beginning of the Table of Contents.

---

## Theme: AI and Agents

### BIO - Bioinformatics Track

**Track Co-Chairs:** Paola Lecca, Free University of Bozen-Bolzano, Italy  
Dan Tulpan, University of Guelph, Canada  
Juan Manuel Corchado, University of Salamanca, Spain

| Track Editorial | ................................................................. 1 |
| Formal Analysis of the Biological Circuits using Higher-order-logic Theorem Proving | ................................................................. 3 |
| *Sa'ed Abed, Kuwait University, Kuwait*  
*Adnan Rashid, National University of Sciences and Technology, Pakistan*  
*Osman Hasan, National University of Sciences and Technology, Pakistan* |
| De Novo Drug Design using Self Attention Mechanism | ................................................................. 8 |
| *Vedang Mandhana, Pune Institute of Computer Technology, India*  
*Rutuja Taware, Pune Institute of Computer Technology, India* |

### Poster Papers

| Survey of Public Assay Data: Opportunities and Challenges to Understanding Antimicrobial Resistance | ................................................................. 13 |
| *Akshay Agarwal, IBM Research, USA*  
*Gowri Nayar, IBM Research, USA*  
*James Kaufman, IBM Research, USA* |
| Classification of 3D Interpolated EEG Signals using Hybrid R-3DCNN | ................................................................. 17 |
| *Vedang Mandhana, Pune Institute of Computer Technology, India*  
*Rutuja Taware, Pune Institute of Computer Technology, India* |

### Student Research Abstract

| Student Research Abstract: Multimodal Deep Learning based Approach for Cells State Classification | ................................................................. 20 |
| *Paula Raissa Silva, University of Porto, Portugal* |
Theme: Software Design and Development

BPMM - Business Process Management & Modeling Track

Track Co-Chairs: Marco Brambilla, Politecnico di Milano, Italy
Davide Rossi, University of Bologna, Italy

Track Editorial ................................................................. 24

Process Discovery using In-database Minimum Self Distance Abstractions ......................... 26
Alifah Syamsiyah, Eindhoven University of Technology, The Netherlands
Sander J.J. Leemans, Queensland University of Technology, Australia

Event-Log Abstraction using Batch Session Identification and Clustering .......................... 36
Massimiliano de Leoni, University of Padua, Italy
Safa Dündar, Micro Focus, The Netherlands

Resource-Centric Process Mining: Clustering using Local Process Models ....................... 45
Landelin Delcoucq, University of Mons, Belgium
Fabian Lecron, University of Mons, Belgium
Philippe Fortemps, University of Mons, Belgium
Wil.M.P van der Aalst, RWTH Aachen, Germany

Comparing BPMN to BPMN + DMN for IoT Process Modelling: A Case-Based Inquiry ........ 53
Faruk Hasić, KU Leuven, Belgium
Estefanía Serral, KU Leuven, Belgium
Monique Snoeck, KU Leuven, Belgium

Enhancing Business Processes with Trustworthiness using Blockchain: A Goal-Oriented Approach ...... 61
Haan Johng, University of Texas at Dallas, USA
Doohwan Kim, Chungbuk National University, South Korea
Grace Park, State Farm, USA
Jang-Eui Hong, Chungbuk National University, South Korea
Tom Hill, Fellows Consulting Group, LLC, USA
Lawrence Chung, University of Texas at Dallas, USA

Improving Mobile Business Process Monitoring with Enhanced NFV MANO: A Method to Elicit Connectivity Requirements from Process Models ......................................................... 69
Giovanni Meroni, Politecnico di Milano, Italy
Marouan Mizmizi, Politecnico di Milano, Italy
Pierluigi Plebani, Politecnico di Milano, Italy
Luca Reggiani, Politecnico di Milano, Italy

Poster Papers

A Subprocess Discovery Framework for Process Model Modularization and Abstraction ........ 77
Sergio Angelastro, Università di Bari, Italy
Stefano Ferilli, Università di Bari, Italy
Theme: Software Design and Development
CASoM - Code Analysis and Software Mining Track
Track Co-Chairs: Tomas Cerny, Baylor University, USA
Premek Brada, University of West Bohemia, Czechia
Miroslav Bures, Czech Technical University in Prague, Czechia

Track Editorial .......................................................................................................................................................... 80

Logging Statements’ Prediction based on Source Code Clones ................................................................. 82
Sina Gholamian, University of Waterloo, Canada
Paul A.S. Ward, University of Waterloo, Canada

Identification of Data Propagation Paths for Efficient Dynamic Information Flow Tracking ................. 92
Sanoo Mallissery, National Chiao Tung University, Taiwan
Yu-Sung Wu, National Chiao Tung University, Taiwan
Chih-Hao Hsieh, National Chiao Tung University, Taiwan
Chun-An Bau, National Chiao Tung University, Taiwan

Comparing Identifiers and Comments in Engineered and Non-Engineered Code: A Large-Scale
Empirical Study ............................................................................................................................................... 100
Otávio Augusto Lazzarini Lemos, Universidade Federal de São Paulo, Brazil
Marcelo Suzuki, Universidade Federal de São Paulo, Brazil
Adriano Carvalho de Paula, Universidade Federal de São Paulo, Brazil
Claire Le Goes, Carnegie Mellon University, USA

Is there a Correlation between Code Comments and Issues? - An Exploratory Study ......................... 110
Vishal Misra, Indian Institute of Technology Tirupati, India
Sai Krupa Reddy Jakku, Indian Institute of Technology Tirupati, India
Sridhar Chimalakonda, Indian Institute of Technology Tirupati, India

Poster Papers
Towards Summarizing Program Statements in Source Code Search ......................................................... 118
Victor J. Marin, Rochester Institute of Technology, USA
Iti Bansal, Rochester Institute of Technology, USA
Carlos R. Rivero, Rochester Institute of Technology, USA

Comparing Maintainability Index, SIG Method, and SQALE for Technical Debt Identification ............. 121
Peter Strečanský, Masaryk University, Czechia
Stanislav Chren, Masaryk University, Czechia
Bruno Rossi, Masaryk University, Czechia

Evaluating Techniques for Method-Exact Energy Measurements: Towards a Framework for
Platform-Independent Code-Level Energy Measurements .............................................................................. 125
Felix Rieger, Philipps-Universität Marburg, Germany
Christoph Bockisch, Philipps-Universität Marburg, Germany

Semantic Code Clone Detection for Enterprise Applications ....................................................................... 129
Jan Svacina, Baylor University, USA
Jonathan Simmons, Baylor University, USA
Tomas Cerny, Baylor University, USA
**Theme: Distributed Systems**

**CC - Cloud Computing Track**

**Track Co-Chairs:** S.D Madhu Kumar, NIT Calicut, India  
Priya Chandran, NIT Calicut, India

**Track Editorial**

**Using Application Knowledge to Reduce Cold Starts in FaaS Services** ........................................ 134
David Bermbach, Technische Universität Berlin, Germany  
Ahmet-Serdar Karakaya, Technische Universität Berlin, Germany  
Simon Buchholz, Technische Universität Berlin, Germany

**King Louie: Reproducible Availability Benchmarking of Cloud-hosted DBMS** ...................................... 144
Daniel Seybold, Ulm University, Germany  
Stefan Wesner, Ulm University, Germany  
Jörg Domaschka, Ulm University, Germany

**On Making Xen Detect Hypercalls and Memory Accesses for Simulating Virtualization-Enabled Processors** ................................................................. 154
Swapneel C. Mhatre, National Institute of Technology Calicut, India  
Priya Chandran, National Institute of Technology Calicut, India

**Feasibility of Container Orchestration for Adaptive Performance Isolation in Multi-tenant SaaS Applications** .............................................................................. 162
Eddy Truyen, KU Leuven, Belgium  
André Jacobs, KU Leuven, Belgium  
Stef Verreydt, KU Leuven, Belgium  
Emad Heydari Beni, KU Leuven, Belgium  
Bert Lagaisse, KU Leuven, Belgium  
Wouter Joosen, KU Leuven, Belgium

**Poster Papers**

**Multi-objective Load Balancing in Distributed Computing Environment: An Evolutionary Computing Approach** ........................................................................... 170
Avadh Kishor, Indian Institute of Technology, India  
Rajdeep Niyogi, Indian Institute of Technology, India

**Towards a Formal Model for Composable Container Systems** ........................................................................ 173
Fabio Burco, University of Udine, Italy  
Marino Miculan, University of Udine, Italy  
Marco Peressotti, University of Southern Denmark, Denmark

**Student Research Abstract**

**Student Research Abstract: Cloud Computing is a Cost Saver only if…: Towards a Model for Cloud Cost Estimation** ........................................................................... 176
Rasha Makhlouf, Brandenburg University of Technology, Germany
**Theme: AI and Agents**

**CIVIA - Computational Intelligence and Video & Image Analysis Track**

**Track Co-Chairs:**
- Agostinho Rosa, University of Lisbon, Portugal
- Yin-Fu Huang, National Yunlin University of Science and Technology, Taiwan
- Mohammed El Hassouni, Mohammed V University in Rabat, Morocco
- Rachid Jennane, University of Orleans, France

**Track Editorial** ............................................................ 180

**EvoU–Net: An Evolutionary Deep Fully Convolutional Neural Network for Medical Image Segmentation** ......................................................... 181
  - Tahereh Hassanzadeh, University of New South Wales, Australia
  - Daryl Essam, University of New South Wales, Australia
  - Ruhul Sarker, University of New South Wales, Australia

**M2P3: Multimodal Multi-Pedestrian Path Prediction by Self-Driving Cars with Egocentric Vision** .......... 190
  - Atanas Poibrenski, iMotion Germany GmbH, Germany
  - Matthias Klusch, German Research Center for Artificial Intelligence, Germany
  - Igor Vozniak, German Research Center for Artificial Intelligence, Germany
  - Christian Müller, German Research Center for Artificial Intelligence, Germany

**Poster Papers**

**FINE: Improving Time and Precision of Segmentation Techniques for Vertebral Compression Fractures in MRI** ................................................................. 198
  - Jonathan S. Ramos, University of São Paulo, Brazil
  - Mirela T. Cazzolato, University of São Paulo, Brazil
  - Marcello H. Nogueira-Barbosa, University of São Paulo, Brazil
  - Agma J.M. Traina, University of São Paulo, Brazil

**Theme: System Software and Security**

**CPS - Cyber-Physical Systems Track**

**Track Co-Chairs:**
- Song Han, University of Connecticut, USA
- Jingtong Hu, University of Pittsburgh, USA
- Jason Xue, City University of Hong Kong, Hong Kong

**Reinforcing the Energy Efficiency of Cyber-Physical Systems via Direct and Split Cache Consolidation on MLC STT-RAM** ............................................................ 202
  - Shuo-Han Chen, Academia Sinica, Taiwan
  - Yu-Pei Liang, National Tsing Hua University, Taiwan
  - Yuan-Hao Chang, Academia Sinica, Taiwan
  - Yun-Fei Liu, National Tsing Hua University, Taiwan
  - Chun-Feng Wu, Academia Sinica, Taiwan
  - Hsin-Wen Wei, Tamkang University, Taiwan
  - Wei-Kuan Shih, National Tsing Hua University, Taiwan

**An Analytics-Based Method for Performance Anomaly Classification in Cyber-Physical Systems** .......... 210
  - Hugo Meyer, University of Amsterdam, The Netherlands
  - Uraz Odyurt, University of Amsterdam, The Netherlands
  - Andy D. Pimentel, University of Amsterdam, The Netherlands
  - Evangelos Paradas, ASML Netherlands B.V., The Netherlands
  - Ignacio Gonzalez Alonso, ASML Netherlands B.V., The Netherlands
Inter-Task Cache Interference Aware Partitioned Real-Time Scheduling................................................ 218
Zhishan Guo, University of Central Florida, USA
Kecheng Yang, Texas State University, USA
Fan Yao, University of Central Florida, USA
Amro Awad, University of Central Florida, USA

Student Research Abstract

Student Research Abstract: ReLUSyn: Synthesizing Stealthy Attacks for Deep Neural Network-Based Safety-Critical Cyber-Physical Systems ............................................................... 227
Aarti Kashyap, University of British Columbia, Canada

Theme: Distributed Systems

DADS - Dependable, Adaptive, and Secure Distributed Systems Track
Track Co-Chairs: Karl M. Goeschka, UAS Technikum Vienna, Austria
Rui Oliveira, Universidade do Minho, Portugal
Peter Pietzuch, Imperial College London, UK
Giovanni Russello, University of Auckland, New Zealand

Track Editorial ................................................................................................................................................. 230

Benchmarking Microservice Performance: A Pattern-based Approach ............................................. 232
Martin Grambow, Technische Universität Berlin, Germany
Lukas Meusel, Technische Universität Berlin, Germany
Erik Wittern, IBM, Hybrid Cloud Integration, USA
David Bermbach, Technische Universität Berlin, Germany

QoE-Aware Auto-Scaling of Heterogeneous Containerized Services (and its application to Health Services) ............................................................................................................................ 242
Guilherme Santos, Altran Technologies SA, Portugal
Hervé Paulino, Universidade Nova de Lisboa, Portugal
Tomé Verdasca, Serviços Partilhados do Ministério da Saúde, Portugal

Privacy Preserving Cooperative Computation for Personalized Web Search Applications .............. 250
Nesrine Kaaniche, University of Sheffield, UK
Souha Masmoudi, Telecom SudParis, Institut Polytechnique de Paris, France
Souha Znina, Telecom SudParis, Institut Polytechnique de Paris, France
Maryline Laurent, Telecom SudParis, Institut Polytechnique de Paris, France
Levent Demir, Qwant Research, France

Black-box Inter-application Traffic Monitoring for Adaptive Container Placement ......................... 259
Francisco Neves, University of Minho, Portugal
Ricardo Vilaça, University of Minho, Portugal
José Pereira, University of Minho, Portugal

Poster Papers

Towards a Replication Service for Data-Intensive Fog Applications .............................................. 267
Jonathan Hasenburg, Technische Universität Berlin, Germany
Martin Grambow, Technische Universität Berlin, Germany
David Bermbach, Technische Universität Berlin, Germany
ALISI: A Lightweight Identification System based on Iroha ................................................................. 271
Giuseppe Bernieri, University of Padua, Italy
Mauro Conti, University of Padua, Italy
Matteo Sovilla, University of Padua, Italy
Federico Turrin, University of Padua, Italy

Spatial Bloom Filter in Named Data Networking: A Memory Efficient Solution ............................. 274
Filippo Berto, University of Padua, Italy
Luca Calderoni, University of Bologna, Italy
Mauro Conti, University of Padua, Italy
Eleonora Losiouk, University of Padua, Italy

Theme: Distributed Systems
DAPP - Decentralized Applications with Blockchain, DLT and Crypto-Currencies Track
Track Chair: Jean-Marc Seigneur, University of Geneva/Reputaction, Switzerland/France

Track Editorial ................................................................................................................................................. 278

Blockchain Real Estate Relational Value Survey ......................................................................................... 279
Jean-Marc Seigneur, University of Geneva, Switzerland
Sophie Pusterla, Reputaction, France
Xavier Socquet-Clerc, Reputaction, France

Design and Implementation of Cast-as-Intended Verifiability for a Blockchain-based Voting System .... 286
Christian Killer, University of Zürich, Switzerland
Bruno Rodrigues, University of Zürich, Switzerland
Raphael Matile, University of Zürich, Switzerland
Eder Scheid, University of Zürich, Switzerland
Burkhard Stiller, University of Zürich, Switzerland

Volatility Effect on the Adoption and Valuation of Tokenomics ................................................................. 294
Jollen Chen, The Flowchain Foundation, Singapore
Dung-Cheng Lin, National Taiwan University, Taiwan
Chuan-Hsiang Han, National Tsing-Hua University, Taiwan

KYChain: User-Controlled KYC Data Sharing and Certification .............................................................. 301
Constantin Cătălin Drăgan, University of Surrey, UK
Mark Manulis, University of Surrey, UK

Toward Scalable Blockchains with Transaction Aggregation ................................................................. 308
Sina Rafati Niya, University of Zürich, Switzerland
Fabio Maddaloni, University of Zürich, Switzerland
Thomas Bocek, University of Applied Sciences Rapperswil, Switzerland
Burkhard Stiller, University of Zürich, Switzerland

PrivateEx: Privacy Preserving Exchange of Crypto-assets on Blockchain .............................................. 316
Lei Xu, University of Texas Rio Grande Valley, USA
Lin Chen, Texas Tech University, USA
Zhimin Gao, Auburn University at Montgomery, USA
Keshav Kasichainula, University of Houston, USA
Miguel Fernandez, University of Texas Rio Grande Valley, USA
Bogdan Carbunar, Florida International University, USA
Weidong Shi, University of Houston, USA
Authenticated and Auditable Data Sharing via Smart Contract .......................................................... 324
Vincent Reniers, KU Leuven, Belgium
Yuan Gao, KU Leuven, Belgium
Ren Zhang, Nervos and KU Leuven, Belgium
Paolo Viviani, University of Torino, Italy
Akash Madhusudan, KU Leuven, Belgium
Bert Lagaisse, KU Leuven, Belgium
Svetla Nikova, KU Leuven, Belgium
Dimitri Van Landuyt, KU Leuven, Belgium
Riccardo Lombardi, Noesis Solutions NV, Italy
Bart Preneel, KU Leuven, Belgium
Wouter Joosen, KU Leuven, Belgium

TRIDEnT: Towards a Decentralized Threat Indicator Marketplace .................................................. 332
Nikolaos Alexopoulos, Technische Universität Darmstadt, Germany
Emmanouil Vasilomanolakis, Aalborg University, Denmark
Stephane Le Roux, LSV, ENS Paris-Saclay & CNRS, Université Paris-Saclay, France
Steven Rowe, Technische Universität Darmstadt, Germany
Max Mühlhäuser, Technische Universität Darmstadt, Germany

Poster Papers

Self-Sovereign Identity on Public Blockchains and the GDPR ............................................................... 342
Galia Kondova, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Jörn Erbguth, University of Geneva, Switzerland

Truver - A Blockchain for Verifying Credentials .................................................................................. 346
Ahmed Taha, STRD, Germany
Ahmed Zakaria, STRD, Germany

An n/2 Byzantine Node Tolerate Blockchain Sharding Approach ....................................................... 349
Yibin Xu, Cardiff University, UK
Yangyu Huang, Guilin University of Electronic Technology, China

Student Research Abstract

Etherolic: A Practical Security Analyzer for Smart Contracts ............................................................... 353
Mohammadreza Ashouri, University of Potsdam, Germany

Student Research Abstract: A Blockchain-Based Protocol for Message Exchange in a ICS Network .... 357
Ricardo Brandão, Military Institute of Engineering, Brazil

Theme: Information Systems

DASH - Data-Driven Analysis for Software and Hardware Co-Dependability Track
Track Chair: Jong-Hyouk Lee, Sangmyung University, South Korea

ARTAS: Automatic Research Trend Analysis System for Information Security ................................. 361
Seungsoo Park, Hannam University, South Korea
Manhee Lee, Hannam University, South Korea

A Format-preserving encryption FF1, FF3-1 using Lightweight Block Ciphers LEA and, SPECK .......... 369
Wonyoung Jang, Soonchunhyang University, South Korea
Sun-Young Lee, Soonchunhyang University, South Korea
ACIDroid: A Practical App Cache Integrity Protection System on Android Runtime .............................................. 376
Jusop Choi, Sungkyunkwan University, South Korea
Soolin Kim, Sungkyunkwan University, South Korea
Junsung Cho, Sungkyunkwan University, South Korea
Kuyju Kim, Sungkyunkwan University, South Korea
Seok Hong, Samsung Research, South Korea
Hyounghick Kim, Sungkyunkwan University, South Korea

Theme: Information Systems

DBDM - Databases and Big Data Management Track

Track Co-Chairs: Ramzi A. Haraty, Lebanese American University, Lebanon
Apostolos N. Papadopoulos, Aristotle University, Greece
Junping Sun, Nova Southeastern University, USA

Track Editorial .......................................................................................................................................................... 384

An Analysis of Mapping Strategies for Storing RDF Data into NoSQL Databases ................................. 386
Luiz Henrique Zambom Santana, Universidade Federal de Santa Catarina, Brazil
Ronaldo dos Santos Mello, Universidade Federal de Santa Catarina, Brazil

DEMETER: Hardware-assisted Database Checkpointing .............................................................................. 394
Hyeonseok Oh, Hanyang University, South Korea
Hyeongwon Jang, Hanyang University, South Korea
Jaeeun Kim, Hanyang University, South Korea
Jongbin Kim, Hanyang University, South Korea
Hyuck Han, Dongduk Women's University, South Korea
Sooyong Kang, Hanyang University, South Korea
Hyungsoo Jung, Hanyang University, South Korea

Enhancing Recursive Graph Querying on RDBMS with Data Clustering Approaches .......................... 404
Lucas C. Scabora, Universidade de São Paulo, Brazil
Gabriel Spadon, Universidade de São Paulo, Brazil
Paulo H. Oliveira, Universidade de São Paulo, Brazil
Jose F. Rodrigues Jr., Universidade de São Paulo, Brazil
Caetano Traina Jr., Universidade de São Paulo, Brazil

Schema-agnostic Blocking for Streaming Data .............................................................................................. 412
Tiago Brasilheiro Araújo, Federal University of Campina Grande, Brazil
Kostas Stefanidis, Tampere University, Finland
Carlos Eduardo Santos Pires, Federal University of Campina Grande, Brazil
Jyrki Nummenmaa, Tampere University, Finland
Thiago Pereira da Nóbrega, Federal University of Campina Grande, Brazil

Memory Efficient Fork-based Checkpointing Mechanism for In-Memory Database Systems ............. 420
Jiwoong Park, Seoul National University, South Korea
Yunjae Lee, Seoul National University, South Korea
Heon Young Yeom, Seoul National University, South Korea
Yongseok Son, Chung-Ang University, South Korea
Theme: Information Systems

DM - Data Mining Track

Track Co-Chairs: Hasan Jamil, University of Idaho, USA
                 Rosa Meo, Università degli Studi di Torino, Italy

Track Editorial

Link Prediction via Community Detection in Bipartite Multi-Layer Graphs
Maksim Koptelov, Université de Caen Normandie, France
Albrecht Zimmermann, Université de Caen Normandie, France
Bruno Crémilleux, Université de Caen Normandie, France
Lina Soualmia, University of Rouen Normandy, France

Michael Mathioudakis, University of Helsinki, Finland
Carlos Castillo, Universitat Pompeu Fabra, Spain
Giorgio Barnabo, Sapienza University of Rome, Italy
Sergio Celis, Universidad de Chile, Chile

Understanding Emotions in SNS Images from Posters' Perspectives
Junho Song, Hanyang University, South Korea
Kyungskik Han, Ajou University, South Korea
Dongwon Lee, Pennsylvania State University, USA
Sang-Wook Kim, Hanyang University, South Korea

Predicting Disease Genes for Complex Diseases using Random Watcher-Walker
Lorenzo Madeddu, Sapienza University of Rome, Italy
Giovanni Stilo, University of L’Aquila, Italy
Paola Velardi, Sapienza University of Rome, Italy

Poster Papers

Applying Binary Decision Diagram to Extract Concepts from Triadic Formal Context
Julio Neves, Pontificia Universidade Catolica de Minas Gerais, Brazil
Kaio Ananias, Pontificia Universidade Catolica de Minas Gerais, Brazil
Cristiane Nobre, Pontificia Universidade Catolica de Minas Gerais, Brazil
Luis Zarate, Pontificia Universidade Catolica de Minas Gerais, Brazil
Mark Song, Pontificia Universidade Catolica de Minas Gerais, Brazil

Constraining Deep Representations with a Noise Module for Fair Classification
Mattia Cerrato, Università di Torino, Italy
Roberto Esposito, Università di Torino, Italy
Laura Li Puma, Intesa Sanpaolo Innovation Center, Italy

Characterization of Long-lived and Non-long lived Profiles through Biclustering
Marta D.M. Noronha, Pontifical University Catholic of Minas Gerais, Brazil
Marcos W. Rodrigues, Pontifical Catholic University of Minas Gerais, Brazil
Caio E. Ribeiro, University of Kent, UK
Cristiane N. Nobre, Pontifical Catholic University of Minas Gerais, Brazil
Mark A.J. Song, Pontifical Catholic University of Minas Gerais, Brazil
Luis E. Zárate, Pontifical Catholic University of Minas Gerais, Brazil
Student Research Abstract

Student Research Abstract: Coping for Missing Content and Missing Links in Document Network Embedding
Jean Dupuy, Université de Lyon, France

Theme: Information Systems

DS - Data Streams Track
Track Co-Chairs: Albert Bifet, LTCI, Telecom ParisTech, France
                André Carvalho, ICMC, USP, Brazil
                Carlos Ferreira, Polytechnic Institute of Porto, Portugal
                João Gama, University of Porto, Portugal

Track Editorial

Fraud Detection using Heavy Hitters: A Case Study
Bruno Veloso, INESC TEC, Portugal
Carlos Martins, WeDo Technologies, Portugal
Raphael Espanha, WeDo Technologies, Portugal
Raul Azevedo, WeDo Technologies, Portugal
João Gama, INESC TEC and University of Porto, Portugal

SOHUPDS: A Single-pass One-phase Algorithm for Mining High Utility Patterns over a Data Stream
Bijay Prasad Jaysawal, National Cheng Kung University, Taiwan
Jen-Wei Huang, National Cheng Kung University, Taiwan

Cost-sensitive Learning for Imbalanced Data Streams
Lucas Loezer, Pontifícia Universidade Católica do Paraná, Brazil
Fabricio Enembreck, Pontifícia Universidade Católica do Paraná, Brazil
Jean Paul Barddal, Pontifícia Universidade Católica do Paraná, Brazil
Alceu de Souza Britto Jr., Pontifícia Universidade Católica do Paraná, Brazil

Scale Invariant Learning from Trapezoidal Data Streams
Jeevithan Alagurajah, University of Louisiana at Lafayette, USA
Xu Yuan, University of Louisiana at Lafayette, USA
Xindong Wu, Mininglamp Technology, China

A Stream Reasoning Framework based on a Multi-Agents Model
Wafaa Mebrek, Télécom SudParis, France
Amel Bouzeghoub, Télécom SudParis, France

Theme: AI and Agents

EC - Applications of Evolutionary Computing Track
Track Co-Chairs: Federico Divina, Universidad Pablo de Olavide, Spain
                Miguel Garcia Torres, Universidad Pablo de Olavide, Spain

Proof Searching in HOL4 with Genetic Algorithm
M. Zohaib Nawaz, National University of Sciences and Technology, Pakistan
Osman Hasan, National University of Sciences and Technology, Pakistan
M. Saqib Nawaz, Herbin Institute of Technology (Shenzhen), Shenzhen, China
Philippe Fourrier-Viger, Herbin Institute of Technology (Shenzhen), Shenzhen, China
Meng Sun, Peking University, China
Leveraging Asynchronous Parallel Computing to Produce Simple Genetic Programming Computational Models ................................................................. 521
Aliyu Sani Sambo, Birmingham City University, UK
R. Muhammad Atif Azad, Birmingham City University, UK
Yevgeniya Kovalchuk, Birmingham City University, UK
Vivek Padmaanaabhan Indramohan, Birmingham City University, UK
Hanifa Shah, Birmingham City University, UK

Profiled Glucose Forecasting using Genetic Programming and Clustering ............................................... 529
Sergio Contador, Universidad Rey Juan Carlos, Spain
J. Manuel Velasco, Universidad Complutense de Madrid, Spain
Oscar Garnica, Universidad Complutense de Madrid, Spain
J. Ignacio Hidalgo, Universidad Complutense de Madrid, Spain

Poster Papers

High-Content Screening Images Streaming Analysis using the STriGen Methodology ............................. 537
Laura Melgar-Garcia, Universidad Pablo de Olavide, Spain
David Gutiérrez-Avilés, Universidad Pablo de Olavide, Spain
Cristina Rubio-Escudero, Universidad de Sevilla, Spain
Alicia Troncoso, Universidad Pablo de Olavide, Spain

Vulnerability Coverage for Adequacy Security Testing .............................................................................. 540
Shuvalaxmi Dass, Texas Tech University, USA
Akbar Siami Namin, Texas Tech University, USA

Theme: System Software and Security

EMBS - Embedded Systems Track

Track Co-Chairs: Marco Di Natale, Scuola Superiore S. Anna, Italy
Li-Pin Chang, National Chiao Tung University, Taiwan

Track Editorial ................................................................................................................................................. 544

Thermal-aware Memory System Synthesis for MPSoCs with 3D-stacked Hybrid Memories ................. 546
Chia-Yin Liu, Tohoku University, Japan
Yi-Jung Chen, National Chi Nan University, Taiwan
Masanori Hariyama, Tohoku University, Japan

CleanET: Enabling Timing Validation for Complex Automotive Systems ................................................. 554
Sergi Vilardell, Barcelona Supercomputing Center and Universitat Politècnica de Catalunya, Spain
Isabel Serra, Barcelona Supercomputing Center and Universitat Autònoma de Barcelona, Spain
Hamid Tabani, Barcelona Supercomputing Center, Spain
Jaume Abella, Barcelona Supercomputing Center, Spain
Joan Del Castillo, Universitat Autònoma de Barcelona, Spain
Francisco J. Cazorla, Barcelona Supercomputing Center, Spain

IntPred: Flexible, Fast, and Accurate Object Detection for Autonomous Driving Systems .................. 564
Hamid Tabani, Barcelona Supercomputing Center, Spain
Matteo Fusi, Barcelona Supercomputing Center, Spain
Leonidas Kosmidis, Barcelona Supercomputing Center, Spain
Jaume Abella, Barcelona Supercomputing Center, Spain
Francisco J. Cazorla, Barcelona Supercomputing Center, Spain
Adaptive Partitioning of Real-Time Tasks on Multiple Processors ............................................. 572
Luca Abeni, Scuola Superiore Sant’Anna, Italy
Tommaso Cucinotta, Scuola Superiore Sant’Anna, Italy

On the Reliability of Hardware Event Monitors in MPSoCs for Critical Domains .................. 580
Javier Barrera, Barcelona Supercomputing Center and Universitat Politècnica de Catalunya, Spain
Leonidas Kosmidis, Barcelona Supercomputing Center, Spain
Hamid Tabani, Barcelona Supercomputing Center, Spain
Enrico Mezzetti, Barcelona Supercomputing Center, Spain
Jaume Abella, Barcelona Supercomputing Center, Spain
Mikel Fernandez, Barcelona Supercomputing Center, Spain
Guillem Bernat, Rapita Systems Ltd., UK
Francisco J. Cazorla, Barcelona Supercomputing Center, Spain

Poster Papers

Early Eviction and Swapping for MLC STT-RAM-based LLC ............................................ 590
Ping Cheng, National Taiwan University of Science and Technology, Taiwan
Jen-Wei Hsieh, National Taiwan University of Science and Technology, Taiwan

Security based Design Space Exploration for CPS ................................................................ 593
Lukas Gressl, Graz University of Technology, Austria
Alexander Rech, Graz University of Technology, Austria
Christian Steger, Graz University of Technology, Austria
Andreas Sinnhofer, NXP Semiconductors Austria GmbH, Austria
Ralph Weissnegger, CISC Semiconductor GmbH, Austria

VIRA: A Virtualization Assisted Deterministic System-Level Simulation .............................. 596
Hsin-I Wu, National Tsing Hua University, Taiwan
Ren-Song Tsay, National Tsing Hua University, Taiwan
Hsu-Hsun Chin, National Tsing Hua University, Taiwan

Theme: Information Systems

GIA - GeoInformation Analytics Track

Track Co-Chairs: Eric Kergosien, University of Lille, France
                Cyril de Runz, University of Tours, France
                Christian Sallaberry, University of Pau & Pays de l’Adour, France
                Gavin Mcardle, University College Dublin, Ireland
                Luis Otavio Alvares, Universidade Federal de Santa Catarina, Brazil

Track Editorial .......................................................................................................................... 599

Learning Locality Maps from Noisy Geospatial Labels ....................................................... 601
Manjeet Dahiya, Delhivery, India
Devendra Samatia, Delhivery, India
Kabir Rustogi, Delhivery, India

Sampling Strategies to Create Moving Regions from Real World Observations ..................... 609
Rogério Luís C. Costa, University of Aveiro, Portugal
Enrico Miranda, University of Aveiro, Portugal
Paulo Dias, University of Aveiro, Portugal
José Moreira, University of Aveiro, Portugal
Automatic Flood Detection in Sentinel-2 Images using Deep Convolutional Neural Networks .......................... 617
Pallavi Jain, Technological University Dublin, Ireland
Bianca Schoen-Phelan, Technological University Dublin, Ireland
Robert Ross, Technological University Dublin, Ireland

Exploring Frequency-based Approaches for Efficient Trajectory Classification ...................................... 624
Francisco Vicenzi, Universidade Federal de Santa Catarina, Brazil
Lucas May Petry, Universidade Federal de Santa Catarina, Brazil
Camila Leite da Silva, Universidade Federal de Santa Catarina, Brazil
Luis Otavio Alvares, Universidade Federal de Santa Catarina, Brazil
Vania Bogorny, Universidade Federal de Santa Catarina, Brazil

Poster Papers

Mining Association Rules in Asymmetric Data for Territorial Evolution Modeling .................................. 632
Asma Gharbi, University of Paris 8, France
Cyril de Runz, University of Tours, France
Herman Akdag, University of Paris 8, France
Sami Faiz, ISAAM, Tunisia

A Contextual Edit Distance for Semantic Trajectories ............................................................................... 635
Clement Moreau, University of Tours, France
Thomas Devogele, University of Tours, France
Veronika Peralta, University of Tours, France
Laurent Etienne, University of Tours, France

Theme: Information Systems

HI - Health Informatics Track

Track Co-Chairs: Anu Mary Chacko, NIT Calicut, India
Gopakumar G, NIT Calicut, India

Respiration Signal based Two Layer Stress Recognition across Non-verbal and Verbal Situations ...... 638
Munhee Lee, Yonsei University, South Korea
Junhyung Moon, Yonsei University, South Korea
Dongmi Cheon, Yonsei University, South Korea
Juneil Lee, Yonsei University, South Korea
Kyungwoo Lee, Yonsei University, South Korea

Explaining Reasoning Algorithms with Persuasiveness: A Case Study for a Behavioural Change System .......................................................................................................................... 646
Ivan Donadello, Fondazione Bruno Kessler, Italy
Mauro Dragoni, Fondazione Bruno Kessler, Italy
Claudio Eccher, Fondazione Bruno Kessler, Italy

An Agent Program in an IoT System to Recommend Activities to Minimize Childhood Obesity Problems ................................................................................................................................. 654
Jerffeson Teixeira de Souza, Ceará State University, Brazil
Gustavo Augusto Lima de Campos, Ceará State University, Brazil
Cleilton Rocha, Instituto Atlântico, Brazil
Eriko Werbet, Instituto Atlântico, Brazil
Leonardo Ferreira da Costa, Instituto Atlântico, Brazil
Rodrigo Teixeira de Melo, Instituto Atlântico, Brazil
Lucas Vieira Alves, Instituto Atlântico, Brazil
Evaluating Semantic Textual Similarity in Clinical Sentences using Deep Learning and Sentence Embeddings
Rui Antunes, University of Aveiro, Portugal
João Figueira Silva, University of Aveiro, Portugal
Sérgio Matos, University of Aveiro, Portugal

Rule-Based Extraction of Family History Information from Clinical Notes
João Rafael Almeida, Universidade de Aveiro, Portugal
Sérgio Matos, University of Aveiro, Portugal

Poster Papers

Deep Learning from Spontaneous Reporting Systems Data to Detect ADR Signals
Cheng-Hao Wang, National University of Kaohsiung, Taiwan
Wen-Yang Lin, National University of Kaohsiung, Taiwan

Theme: Information Systems

IAR - Information Access and Retrieval Track
Track Co-Chairs: Gloria Bordogna, Consiglio Nazionale delle Ricerche - CNR IREA, Italy
Gabriella Pasi, Università degli Studi di Milano Bicocca - DISCo, Italy

Track Editorial

Evaluating the Usefulness of Citation Graph and Document Metadata in Scientific Document Recommendation for Neophytes
Bissan Audeh, University of Lyon, France
Michel Beigbeder, University of Lyon, France
Christine Largeron, University of Lyon, France
Diana Ramírez-Cifuentes, University of Lyon, France

Forward and Backward Feature Selection for Query Performance Prediction
Sébastien Déjean, University of Toulouse, France
Radu Tudor Ionescu, University of Bucharest, Romania
Josiane Mothe, University of Toulouse, France
Md Zia Ullah, CNRS, France

Iterative Learning to Rank from Explicit Relevance Feedback
Mateus Pereira, Dalhousie University, Canada
Elham Etemad, Dalhousie University, Canada
Fernando Paulovich, Dalhousie University, Canada

Poster Papers

Unsupervised Cross-Modal Audio Representation Learning from Unstructured Multilingual Text
Alexander Schindler, Austrian Institute of Technology, Austria
Sergiu Gordea, Austrian Institute of Technology, Austria
Peter Knees, Technische Universität Wien, Austria

Retrieval of Visiting Paths through Relevant Resources and Services for Enabling Smart Communities
Gloria Bordogna, CNR IREA, Italy
Luca Frigerio, CNR IREA, Italy
Anna Rampini, CNR IREA, Italy
Theme: System Software and Security

IoT - Internet of Things Track

Track Co-Chairs:  Gail-Joon Ahn, Arizona State University, USA
                  Seong-Je Cho, Dankook University, South Korea
                  Jun Zheng, New Mexico Institute of Mining and Technology, USA

Track Editorial ................................................................................................................................................. 717

AutoIoT: A Framework based on User-driven MDE for Generating IoT Applications .................. 719
Thiago Nepomuceno, Fraunhofer-Arbeitsgruppe für Supply Chain Services, Germany
Tiago Carneiro, INRIA, France
Paulo Henrique Maia, State University of Ceará, Brazil
Muhammad Adnan, Fraunhofer-Arbeitsgruppe für Supply Chain Services, Germany
Thalyson Nepomuceno, Federal Institute of Ceará, Brazil
Alexander Martin, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

OVER: Overhauling Vulnerability Detection for IoT through an Adaptable and Automated Static
Analysis Framework ........................................................................................................................................ 729
Vinay Sachidananda, Trustwave, Singapore
Suhas Bhairav, iTrust, Singapore University of Technology and Design, Singapore
Yuval Elovici, Ben-Gurion University of the Negev, Israel

Sensmart: Sensor Data Market for the Internet of Things ................................................................. 739
Ricardo Miranda, Universidade de Lisboa, Portugal
Miguel L. Pardal, Universidade de Lisboa, Portugal
António Grilo, Universidade de Lisboa, Portugal

Embedded Machine Learning-Based Data Reduction in Application-Specific Constrained
IoT Networks .................................................................................................................................................... 747
Adarsh Pal Singh, International Institute of Information Technology Hyderabad, India
Sachin Chaudhari, International Institute of Information Technology Hyderabad, India

A Smart Speaker Performance Measurement Tool .............................................................................. 755
Hyunsu Mun, Chungnam National University, South Korea
Hyungjin Lee, ChungNam National University, South Korea
Soohyun Kim, Chungnam National University, South Korea
Youngseok Lee, Chungnam National University, South Korea

Poster Papers

Empowering Personalized Feedback on Hot Water Usage: A Field Study with Shower Meters ....... 763
Sebastian A. Günther, University of Bamberg, Germany
Carlo Stingl, University of Bamberg, Germany
Vlad C. Coroamă, ETH Zurich, Switzerland
Samuel Schöb, Massachusetts Institute of Technology, USA
Thorsten Staake, University of Bamberg, Germany

SeCon-NG: Implementing a Lightweight Cryptographic Library based on ECDH and ECDSA for
the Development of Secure and Privacy-Preserving Protocols in Contiki-NG .......................................... 767
Eugene Frimpong, Tampere University, Finland
Antonios Michalas, Tampere University, Finland
Towards a Heterogeneous IoT Privacy Architecture ................................................................. 770
Sanonda Datta Gupta, University of Maine, USA
Sepideh Ghanavati, University of Maine, USA

Theme: AI and Agents

IRMAS - Intelligent Robotics and Multi-Agent Systems Track
Track Co-Chairs: Rui P. Rocha, ISR – University of Coimbra, Portugal
Daniel Kudenko, L3S – Leibniz Universität Hannover, Germany
Denis F. Wolf, University of São Paulo, Brazil

Track Editorial ................................................................................................................................................. 773

Optimized Directed Roadmap Graph for Multi-Agent Path Finding using Stochastic Gradient Descent ............................................................. 776
Christian Henkel, University of Stuttgart, Germany
Marc Toussaint, University of Stuttgart, Germany

Topology-based Group Routing in Partially Known Environments ................................................................. 784
Jory Denny, University of Richmond, USA
Benjamin T. Fine, Ramapo College of New Jersey, USA

A Distributed Approach for Autonomous Cooperative Transportation in a Dynamic Multi-robot Environment .............................................................................................................. 792
Amar Nath, Indian Institute of Technology Roorkee, India
Arun AR, Indian Institute of Technology Roorkee, India
Rajdeep Niyogi, Indian Institute of Technology Roorkee, India

Towards a Distributed Planning of Decision Making under Uncertainty for a Fleet of Robots .......... 800
Paul Jourdan, INRA Occitanie-Toulouse, France
Guillaume Lozenguez, IMT Lille Douai, France
Luc Fabresse, IMT Lille Douai, France
Noury Bouraqqadi, IMT Lille Douai, France

Greedy Randomized Adaptive Search Procedure for Close Enough Orienteering Problem .......... 808
Petra Štefániková, Czech Technical University in Prague, Czechia
Petr Váňa, Czech Technical University in Prague, Czechia
Jan Faigl, Czech Technical University in Prague, Czechia

A Model Transformation Approach to Constructing Agent-oriented Design Models for CPS/IoT Systems .............................................................................................................................................. 815
Hirayuki Nakagawa, Osaka University, Japan
Shinpei Ogata, Shinshu University, Japan
Yoshitaka Aoki, Nihon Unisys, Ltd., Japan
Kazuki Kobayashi, Shinshu University, Japan

Poster Papers

Agents in Dynamic Contexts, a System for Learning Plans ......................................................................... 823
Francesco Lanza, Università degli Studi di Palermo, Italy
Patrick Hammer, Temple University, USA
Valeria Seidita, Università degli Studi di Palermo, Italy
Pei Wang, Temple University, USA
Antonio Chella, Università degli Studi di Palermo, Italy
Dynamic Proxemia Modeling Approach (DPMA) for Navigation and Interaction with a Group of Persons

Abir Bellarbi, Université des sciences et de la technologie Houari Boumédiène, Algeria
Abdel-illah Mouaddib, GREYC, France
Nouara Achour, USTHB, Algeria
Noureddine Ouadah, CDTA, Algeria

On Finding Time-efficient Trajectories for Fixed-wing Aircraft using Dubins Paths with Multiple Radii

Kristýna Kučerová, Czech Technical University in Prague, Czechia
Petr Váňa, Czech Technical University in Prague, Czechia
Jan Faigl, Czech Technical University in Prague, Czechia

Theme: AI and Agents

KLP - Knowledge and Language Processing Track

Track Co-Chairs: Mauro Dragoni, Fondazione Bruno Kessler, Italy
Marco Rospocher, Università degli studi di Verona, Italy

Better Together - An Ensemble Learner for Combining the Results of Ready-made Entity Linking Systems

Renato Stoffalette João, University of Hannover, Germany
Pavlos Fafalios, FORTH-ICS, Greece
Stefan Dietze, GESIS - Leibniz Institute for the Social Sciences, Germany

Semantic Similarity to Improve Question Understanding in a Virtual Patient

Fréjus A.A. Laleye, CEA, France
Antonia Blanié, APHP, France
Antoine Brouquet, CEA, France
Dan Benhamou, APHP, France
Gaël de Chalendar, CEA, France
Mining Micro-Influencers from Social Media Posts
Simone Leonardi, Politecnico di Torino, Italy
Diego Monti, Politecnico di Torino, Italy
Giuseppe Rizzo, LINKS Foundation, Italy
Maurizio Morisio, Politecnico di Torino, Italy

Decoupled Word Embeddings using Latent Topics
Heesoo Park, Sungkyunkwan University, South Korea
Jongwuk Lee, Sungkyunkwan University, South Korea

Diversity Regularized Autoencoders for Text Generation
Hyeon Ko, Sungkyunkwan University, South Korea
Junhyuk Lee, Sungkyunkwan University, South Korea
Jinhong Kim, Sungkyunkwan University, South Korea
Jongwuk Lee, Sungkyunkwan University, South Korea
Hyunjung Shim, Yonsei University, South Korea

On Document Representations for Detection of Biased News Articles
André Ferreira Cruz, University of Porto, Portugal
Gil Rocha, University of Porto, Portugal
Henrique Lopes Cardoso, University of Porto, Portugal

Poster Papers
Personalizing Large-scale Text Classification by Modeling Individual Differences
Jungho Lee, Korea University, South Korea
Byung-Ju Choi, Korea University, South Korea
Yeachan Kim, Korea University, South Korea
Kang-Min Kim, Korea University, South Korea
Woo-Jong Ryu, Korea University, South Korea
SangKeun Lee, Korea University, South Korea

Adapting Deep Learning for Sentiment Classification of Code-Switched Informal Short Text
Muhammad Haroon Shakeel, Lahore University of Management Sciences, Pakistan
Asim Karim, Lahore University of Management Sciences, Pakistan

Theme: AI and Agents
KomIS - Knowledge Discovery meets Information Systems Track
Track Co-Chairs: Fabio Mercorio, University of Milano-Bicocca, Italy
Mario Mezzanzanica, University of Milano-Bicocca, Italy
Antonio Picariello, University of Naples "Federico II", Italy

Selecting Suitable Configurations for Automated Link Discovery
Carlos R. Rivero, Rochester Institute of Technology, USA
David Ruiz, University of Seville, Spain

An E-sports Video Highlight Generator using Win-Loss Probability Model
Seok-Kyu Kang, Sungkyunkwan University, South Korea
Jee-Hyong Lee, Sungkyunkwan University, South Korea

Conflict or Cooperation? Predicting Future Tendency of International Relations
Peng Chen, Kyoto University, Japan
Adam Jatowt, Kyoto University, Japan
Masatoshi Yoshikawa, Kyoto University, Japan
**Poster Papers**

**Some Lessons Learned using Health Data Literature for Smart Information Retrieval** ........................................... 931
Mario Ciampi, ICAR-CNR, Italy
Giuseppe De Pietro, ICAR-CNR, Italy
Elio Masciari, Federico II University, Italy
Stefano Silvestri, ICAR-CNR, Italy

**A Deep Learning based Chatbot for Cultural Heritage** ................................................................. 935
Giancarlo Sperlì, University of Naples "Federico II", Italy

**Theme: AI and Agents**

**KRR - Knowledge Representation and Reasoning Track**

**Track Co-Chairs:**
Stefano Bistarelli, Università di Perugia, Italy
Martine Ceberio, Univeristy of Texas El Paso, USA
Eric Monfroy, Université de Nantes, France
Francesco Santini, Università di Perugia, Italy

**Track Editorial** ................................................................................................................................................. 938

**Formal Verification of Debates in Argumentation Theory** ................................................................. 940
Ria Jha, Imperial College London, UK
Francesco Belardinelli, Imperial College London, UK
Francesca Toni, Imperial College London, UK

**On Satisfiability Problem in Modal Logic S5** .................................................................................... 948
Yakoub Salhi, Université d’Artois, France

**A Categorization of Simultaneous Localization and Mapping Knowledge for Mobile Robots** .......... 956
Maria A. Cornejo Lupa, Universidad Católica San Pablo, Peru
Regina P. Ticona-Herrera, Universidad Católica San Pablo, Peru
Yudith Cardinale, Universidad Simón Bolívar, Venezuela
Dennis Barrios-Aranibar, Universidad Católica San Pablo, Peru

**GrCluster: A Score Function to Model Hierarchy in Knowledge Graph Embeddings** ......................... 964
Varun Ranganathan, University of Alberta, Canada
Siddharth Suresh, PES University, India
Yash Mathur, PES University, India
Natarajan Subramanyam, PES University, India
Denilson Barbosa, University of Alberta, Canada

**Substitute Selection for a Missing Tool using Robot-Centric Conceptual Knowledge Of Objects** ........ 972
Madhura Thosar, Otto-Von-Guericke University, Germany
Christian A. Mueller, Jacobs University, Germany
Georg Jaeger, Technische Universität Bergakademie, Germany
Max Pfingsthorn, OFFIS Institute for Information Technology, Germany
Michael Beetz, University of Bremen, Germany
Sebastian Zug, Technische Universität Bergakademie, Germany
Till Mossakowski, Otto-von-Guericke University, Germany
**Poster Papers**

**Argumentation for All**  
Nikolaos Spanoudakis, Technical University of Crete, Greece  
Konstantinos Kostis, Technical University of Crete, Greece  
Katerina Mania, Technical University of Crete, Greece

**Theme: Distributed Systems**

**MCA - Mobile Computing and Applications Track**

**Track Co-Chairs:**  
Hong Va Leong, The Hong Kong Polytechnic University, China  
Sheikh Iqbal Ahamed, Marquette University, USA

**Track Editorial**

**A Model-Driven Approach to Cross-Platform Development of Accessible Business Apps**  
Christoph Rieger, University of Münster, Germany  
Daniel Lucrédio, Federal University of São Carlos, Brazil  
Renata Pontin M. Fortes, ICMC-USP, Brazil  
Herbert Kuchen, University of Münster, Germany  
Felipe Dias, ICMC-USP, Brazil  
Lianna Duarte, ICMC-USP, Brazil

**Prongle: Lightweight Communication over Unassociated Wi-Fi**  
Otto Waltari, University of Helsinki, Finland  
Jussi Kangasharju, University of Helsinki, Finland

**A Game-theoretic approach for the Multi-objective Frequency Assignment Problem in Mobile Networks**  
Fatma Laidoui, École nationale Supérieure d'Informatique, Algeria  
Fatima Benbouzid-Si Tayeb, École nationale Supérieure d'Informatique, Algeria  
Malika Bessedik, École nationale Supérieure d'Informatique, Algeria  
Fatima Zahra Laidi, École nationale Supérieure d'Informatique, Algeria

**Poster Papers**

**AppSpeedXray: A Mobile Application Performance Measurement Tool**  
Hyunsu Mun, Chungnam National University, South Korea  
Youngseok Lee, Chungnam National University, South Korea

**Theme: AI and Agents**

**MLA - Machine Learning and its Applications Track**

**Track Co-Chairs:**  
Keon Myung Lee, Chungbuk National University, South Korea  
Jee-Hyong Lee, Sungkyunkwan University, South Korea

**Event Ticket Price Prediction with Deep Neural Network on Spatial-Temporal Sparse Data**  
Fei Huang, Microsoft, USA  
Hao Huang, GE Global Research, USA

**GMDH Modelling for Mobile User Throughput Forecasting**  
Isah A. Lawal, Noroff University College, Norway
A Novel Network Traffic Classification Approach via Discriminative Feature Learning
Lixin Zhao, Chinese Academy of Sciences, China
Lijun Cai, Chinese Academy of Sciences, China
Aimin Yu, Chinese Academy of Sciences, China
Zhen Xu, Chinese Academy of Sciences, China
Dan Meng, Chinese Academy of Sciences, China

Applying Fast Matrix Multiplication to Neural Networks
Ahmed Khaled, Cairo University, Egypt
Amir F. Atiya, Cairo University, Egypt
Ahmed H. Abdel-Gawad, Cairo University, Egypt

A Data Science Approach to Dynamically Optimizing Bus Departure Time
Shuheng Cao, National Tsing Hua University, Taiwan
Arbee L.P. Chen, Asia University, Taiwan

CANTransfer – Transfer Learning based Intrusion Detection on a Controller Area Network using Convolutional LSTM Network
Shahroz Tariq, Sungkyunkwan University, South Korea
Sangyup Lee, Sungkyunkwan University, South Korea
Simon S. Woo, Sungkyunkwan University, South Korea

Automatic Baseball Commentary Generation using Deep Learning
Byeong Jo Kim, Hanyang University, South Korea
Yong Suk Choi, Hanyang University, South Korea

A Generative Semi-Supervised Classifier for Datasets with Unknown Classes
Stefan Schrunner, Oslo University Hospital, Norway
Bernhard C. Geiger, Know-Center GmbH, Austria
Anja Zernig, KAI GmbH, Austria
Roman Kern, Know-Center GmbH, Austria

Attention History-based Attention for Abstractive Text Summarization
Hyunsoo Lee, Sungkyunkwan University, South Korea
YunSeok Choi, Sungkyunkwan University, South Korea
Jee-Hyong Lee, Sungkyunkwan University, South Korea

Mining Environmental Chemicals with Boosted Trees
Natalia Khuri, Wake Forest University, USA

Long Bone Fracture Type Classification for Limited Number of CT Data with Deep Learning
Keon Myung Lee, Chungbuk National University, South Korea
Chan Sik Han, Chungbuk National University, South Korea
Sang Yeon Lee, Chungbuk National University, South Korea
Seung Myung Choi, Konkuk University, South Korea

Similarity-based Calibration Method for Zero-Shot Recognition in Multi-object Scenes
Doo Soo Chang, Hanyang University, South Korea
Gun Hee Cho, Hanyang University, South Korea
Yong Suk Choi, Hanyang University, South Korea
Robust ECG R-peak Detection using LSTM ................................................................. 1104
Juho Laitala, University of Turku, Finland
Mingzhe Jiang, University of Turku, Finland
Elise Syrjälä, University of Turku, Finland
Emad Kasaeian Naeini, University of California Irvine, USA
Antti Airola, University of Turku, Finland
Amir M. Rahmani, University of California Irvine, USA
Nikil D. Dutt, University of California Irvine, USA
Pasi Liljeberg, University of Turku, Finland

Understanding Features on Evolutionary Policy Optimizations: Feature Learning Difference between Gradient-based and Evolutionary Policy Optimizations ................................................................. 1112
Sangyeop Lee, Seoul National University, South Korea
Myoung Hoon Ha, KAIST, South Korea
Byoungro Moon, Seoul National University, South Korea

Data Augmentation and Semi-supervised Learning for Deep Neural Networks-based Text Classifier .... 1119
Heereen Shim, Philips Research and KU Leuven, The Netherlands
Stijn Luca, Ghent University, Belgium
Dietwig Lowet, Philips Research, The Netherlands
Bart Vanrumste, KU Leuven, Belgium

Analysis of Label Noise in Graph-based Semi-supervised Learning ................................................................. 1127
Bruno Klaus de Aquino Afonso, Federal University of São Paulo, Brazil
Lilian Berton, Federal University of São Paulo, Brazil

TextCSN: A Semi-Supervised Approach for Text Clustering using Pairwise Constraints and Convolutional Siamese Networks ................................................................. 1135
Lucas Akayama Vilhagra, Federal University of Mato Grosso do Sul, Brazil
Eraldo Rezende Fernandes, Federal University of Mato Grosso do Sul, Brazil
Bruno Magalhães Nogueira, Federal University of Mato Grosso do Sul, Brazil

Poster Papers

Large-Scale Machine Learning for Business Sector Prediction ................................................................. 1143
Mitch N. Angenent, Leiden University, The Netherlands
António Pereira Barata, Leiden University, The Netherlands
Frank W. Takes, Leiden University, The Netherlands

Attentive Recurrent Text Categorisation Models using Word-Category Cross Embedding on Financial Comments ................................................................. 1147
Macedo Maia, University of Passau, Germany
Vivian S. Silva, University of Passau, Germany
Markus Endres, University of Passau, Germany
André Freitas, University of Manchester, UK
Siegfried Handschuh, University of St. Gallen, Switzerland

Student Research Abstract

Student Research Abstract: Extracting Architectural Patterns of Deep Neural Networks for Disease Detection ................................................................. 1150
Mafalda Falcão Ferreira, University of Porto, Portugal
**Theme: Distributed Systems**

**NET - Networking Track**

**Track Co-Chairs:**
- Mário M. Freire, University of Beira Interior, Portugal
- Marília Curado, University of Coimbra, Portugal
- Ivan Ganchev, University of Limerick, University of Plovdiv “Paisii Hilendarski”, Ireland, Bulgaria
- Mohamed Mosbah, LaBRI, Bordeaux INP, France

**Track Editorial**

**Enhanced Network Intrusion Detection System Protocol for Internet of Things** .......................................................... 1156

*Bacem Mbarek, Masaryk University, Czechia*
*Mouzhi Ge, Masaryk University, Czechia*
*Tomás Pitner, Masaryk University, Czechia*

**Adapting Priority Schemes to achieve Network Slice Isolation** .................................................................................. 1164

*Afonso Oliveira, Universidade de Lisboa, Portugal*
*Teresa Vazão, Universidade de Lisboa, Portugal*

**Spark-Based Port and Net Scan Detection** .......................................................... 1172

*Antonia Affinito, University of Napoli Federico II, Italy*
*Alessio Botta, University of Napoli Federico II, Italy*
*Luigi Gallo, University of Napoli Federico II, Italy*
*Mauro Garofalo, University of Napoli Federico II, Italy*
*Giorgio Ventre, University of Napoli Federico II, Italy*

**Performability Analysis of Services in a Software-Defined Networking Adopting Time-Based Moving Target Defense Mechanisms** .................................................................................. 1180

*Júlio Mendonça, Federal University of Pernambuco, Brazil*
*Jin-Hee Cho, Virginia Tech, USA*
*Terrence J. Moore, Army Research Laboratory, USA*
*Frederica F. Nelson, Army Research Laboratory, USA*
*Hyuk Lim, Gwangju Institute of Science and Technology, South Korea*
*Armin Zimmermann, Ilmenau University of Technology, Germany*
*Dong Seong Kim, University of Queensland, Australia*

**Resource Allocation for Edge Computing with Multiple Tenant Configurations** .......................................................... 1190

*Andrea Araldo, Télécom SudParis, France*
*Alessandro Di Stefano, University of Catania, Italy*
*Antonella Di Stefano, University of Catania, Italy*

**Poster Papers**

**Advanced System for the Prevention and Early Detection of Forest Fires (ASPires)** .................................................. 1200

*Peter Peinl, Fulda University of Applied Sciences, Germany*
*Rossitza Goleva, New Bulgarian University, Bulgaria*
*Jugoslav Ackoski, Military Academy Skopje, North Macedonia*
SOM-based Behavioral Analysis for Virtualized Network Functions ................................................................. 1204
Giacomo Lanciano, Scuola Normale Superiore and Scuola Superiore Sant'Anna, Italy
Antonio Ritacco, Scuola Superiore Sant'Anna, Italy
Tommaso Cucinotta, Scuola Superiore Sant'Anna, Italy
Marco Vannucci, Scuola Superiore Sant'Anna, Italy
Antonino Artale, Vodafone, Italy
Luca Basili, Vodafone, Italy
Enrica Sposato, Vodafone, Italy
Joao Barata, Vodafone, Portugal

Theme: System Software and Security
OS - Operating Systems Track
Track Co-Chairs: George Hamer, South Dakota State University, USA
Bongjae Kim, Sun Moon University, South Korea
Jaeheung Lee, Daejeon University, South Korea

An Exploration of Targeted Provenance for Reliability .................................................................................. 1207
Robert Roy, Florida State University, USA
Erika Dennis, Florida State University, USA
An-I Andy Wang, Florida State University, USA
Peter Reiher, University of California Los Angeles, USA
Sarah Diesburg, University of Northern Iowa, USA

Fast Journaling made simple with NVM ........................................................................................................ 1214
Woong Sul, Hanyang University, South Korea
Kihwang Kim, Hanyang University, South Korea
Minsoo Ryu, Hanyang University, South Korea
Hyungsuk Jung, Hanyang University, South Korea
Hyuck Han, Dongduk Women's University, South Korea

GPU Swap-aware Scheduler: Virtual Memory Management for GPU Applications ................................. 1222
Su-Wei Yang, National Taiwan University of Science and Technology, Taiwan
Zhao-Wei Qiu, National Taiwan University of Science and Technology, Taiwan
Ya-Shu Chen, National Taiwan University of Science and Technology, Taiwan

An Efficient Tinification of the Linux Kernel for Minimizing Resource Consumption ................................ 1228
Takuya Shizukuishi, Future University Hakodate, Japan
Katsuya Matsubara, Future University Hakodate, Japan

An Efficient Garbage Collection in Java Virtual Machine via Swap I/O Optimization ................................. 1238
Hyojeong Lee, Seoul National University, South Korea
Qichen Chen, Seoul National University, South Korea
Heon Young Yeom, Seoul National University, South Korea
Yongsok Son, Chung-Ang University, South Korea

Two-Tier Garbage Collection for Persistent Object ..................................................................................... 1246
Dokeun Lee, Hanyang University, South Korea
Youjip Won, KAIST, South Korea
Yongjun Park, Hanyang University, South Korea
Seongjin Lee, Gyeongsang National University, South Korea
Efficient Scheme for Compressing and Transferring Data in Hadoop Clusters .................................................. 1256
Seungyeon Lee, Soongsil University, South Korea
Jusuk Lee, Soongsil University, South Korea
Yongmin Kim, Soongsil University, South Korea
Kicheol Park, Soongsil University, South Korea
Jiman Hong, Soongsil University, South Korea
Junyoung Heo, Hansung University, South Korea

Near Real-Time Scheduling in Cloud-Edge Platforms .......................................................................................... 1264
Vasile-Daniel Balteanu, University Politehnica of Bucharest, Romania
Alexandru Neculai, University Politehnica of Bucharest, Romania
Catalin Negru, University Politehnica of Bucharest, Romania
Florin Pop, University Politehnica of Bucharest, Romania
Adrian Stoica, TERRASIGNA SRL, Romania

Theme: System Software and Security
PDP - Privacy by Design in Practice Track
Track Co-Chairs: Ronald Petrlic, The Commissioner for Data Protection and Freedom of Information Baden-Württemberg, Germany
Christoph Sorge, Saarland University, Germany

Bringing Privacy Control back to Citizens: DISPEL – A Distributed Privacy Management Platform for the Internet of Things .............................................................................................................. 1272
Christoph Stach, University of Stuttgart, Germany
Clémentine Gritti, Norwegian University of Science and Technology, Norway
Bernhard Mitschang, University of Stuttgart, Germany

A Descriptive Study of Assumptions made in LINDDUN Privacy Threat Elicitation .............................. 1280
Dimitri Van Landuyt, KU Leuven, Belgium
Wouter Joosen, KU Leuven, Belgium

Towards Application-Layer Purpose-Based Access Control .............................................................................. 1288
Frank Pallas, Technische Universität Berlin, Germany
Max-R. Ulbricht, Technische Universität Berlin, Germany
Stefan Tai, Technische Universität Berlin, Germany
Thomas Petkert, Technische Universität Berlin, Germany
Marcel Reppenhagen, Technische Universität Berlin, Germany
Daniel Wenzel, Technische Universität Berlin, Germany
Paul Wille, Technische Universität Berlin, Germany
Karl Wolf, Technische Universität Berlin, Germany

A Framework and Roadmap for Enhancing the Application of Privacy Design Patterns .......................... 1297
Julio C. Caiza, Universidad Politécnica de Madrid, Spain
Jose M. Del Alamo, Universidad Politécnica de Madrid, Spain
Danny S. Guamán, Universidad Politécnica de Madrid, Spain

Poster Papers
Using Natural Language Processing to Detect Privacy Violations in Online Contracts .......................... 1305
Paulo Silva, University of Coimbra, Portugal
Carolina Gonçalves, University of Coimbra, Portugal
Carolina Godinho, University of Coimbra, Portugal
Nuno Antunes, University of Coimbra, Portugal
Marilia Curado, University of Coimbra, Portugal
PEEPLL: Privacy-Enhanced Event Pseudonymisation with Limited Linkability .............................................. 1308
Ephraim Zimmer, University of Hamburg, Germany
Christian Burkert, University of Hamburg, Germany
Tom Petersen, University of Hamburg, Germany
Hannes Federrath, University of Hamburg, Germany

Theme: System Software and Security

PL - Programming Languages Track

Track Co-Chairs: Barrett R. Bryant, University of North Texas, USA
Rajeev Raje, Indiana University-Purdue University-Indianapolis, USA

Track Editorial ............................................................................................................................................... 1312

Inferring Types and Effects via Static Single Assignment ................................................................................. 1314
Leonardo Filipe Rigon, Santa Catarina State University, Brazil
Paulo Torrens, Santa Catarina State University, Brazil
Cristiano Vasconcellos, Santa Catarina State University, Brazil

On the Nature of Cooperative Scheduling in Active Objects .............................................................................. 1322
Vlad Serbanescu, Centrum Wiskunde and Informatica, The Netherlands
Frank de Boer, Centrum Wiskunde and Informatica, The Netherlands

Analyses of a Model-Based Real-Time Language Embedded in C++ ................................................................. 1330
Tadeus Prastowo, University of Trento, Italy
Luigi Palopoli, University of Trento, Italy
Luca Abeni, Scuola Superiore Sant'Anna, Italy
Giuseppe Lipari, Université de Lille 1, France

Poster Papers

Usability Heuristics for Domain-Specific Languages (DSLs) ............................................................................. 1340
Eduardo Mosqueira-Rey, University of A Coruña, Spain
David Alonso-Rios, University of A Coruña, Spain

Distributed futures for Efficient Data Transfer between Parallel Processes ...................................................... 1344
Pierre Leca, Huawei Technologies Co., Ltd., France
Wijnand Suijlen, Huawei Technologies Co., Ltd., France
Ludovic Henrio, University of Lyon, France
François Baude, Université Côte d’Azur, France

Expressing Disambiguation Filters as Combinators ......................................................................................... 1348
José Nuno Macedo, University of Minho, Portugal
João Saraiva, University of Minho, Portugal
Theme: Software Design and Development

RE - Requirements Engineering Track

Track Co-Chairs:  Maria Lencastrate, Universidade de Pernambuco, Brazil
                  Ana Moreira, Universidade NOVA de Lisboa, Portugal
                  Julio Cesar Sampaio do Prado, Pontificia Universidade Católica do Rio de Janeiro, Brazil

Track Editorial ............................................................................................................................................... 1352

Managing Sessions of Creative Requirements Elicitation and Assessment ............................................. 1355
Rafael Pinto, Federal Institute of Rio Grande do Norte, Brazil
Lyrene Silva, Federal University of Rio Grande do Norte, Brazil
Ricardo Valentim, Federal University of Rio Grande do Norte, Brazil

A Process to Support the Creation of iStar Extensions .............................................................................. 1363
Enyo Gonçalves, Universidade Federal do Ceará and Universidade Federal de Pernambuco, Brazil
João Araujo, Universidade Nova de Lisboa, Portugal
Jaelson Castro, Universidade Federal de Pernambuco, Brazil

Towards a Library of Usability Requirements ........................................................................................... 1371
Alberto Rodrigues da Silva, Universidade de Lisboa, Portugal
Carolina Lisboa Sequeira, Universidade de Lisboa and Universidade Aberta, Portugal

Lessons Learned about Oral-auditory and Visual-spatial Communication in Requirements Engineering with Deaf Stakeholders ............................................................................................................ 1379
Antônio C.F. Silva, Instituto Federal do Mato Grosso, Brazil
Cássio L. Rodrigues, Universidade Federal de Goiás, Brazil
Neuma Chaveiro, Universidade Federal de Goiás, Brazil
Renata R.O. Garcia, Universidade Federal de Goiás, Brazil
Soraya B.R. Duarte, Instituto Federal de Goiás, Brazil
Mariá A.R. Araújo, Universidade Federal de Goiás, Brazil
Vinícius B. Santos, Universidade Federal de Goiás, Brazil
Karina R.G. Silva, Universidade Federal de Goiás, Brazil
Paulo M.S. Rodrigues, Universidade Federal de Goiás, Brazil
Luíla M. Oliveira, Universidade Federal de Goiás, Brazil
Caió César Silva Sousa, Universidade Federal de Goiás, Brazil

Goal-based Configuration Analysis for Networks of Collaborative Cyber-physical Systems .................. 1387
Jennifer Brings, University of Duisburg-Essen, Germany
Marian Daun, University of Duisburg-Essen, Germany
Thorsten Weyer, University of Koblenz-Landau, Germany
Klaus Pohl, University of Duisburg-Essen, Germany

Incorporating the Voice of the Customer into Mass-Market Software Product Management .................... 1397
Dana Naous, University of Lausanne, Switzerland
Andrea Giessmann, SAP SE, Germany
Christine Legner, University of Lausanne, Switzerland

Towards the Improvement of Natural Language Requirements Descriptions: The C&L Tool .................. 1405
Edgar Sarmiento-Calisaya, Universidad Nacional de San Agustín de Arequipa, Peru
Edward Hinojosa Cárdenas, Universidad Nacional de San Agustín de Arequipa, Peru
Víctor Cornejo-Aparicio, Universidad Nacional de San Agustín de Arequipa, Peru
Guina Sotomayor Alzamora, Universidad Nacional del Altiplano de Puno, Peru
Poster Papers

Request for Comments: Conversation Patterns in Issue Tracking Systems of Open-Source Projects ..... 1414
Michael Rath, Technical University Ilmenau, Germany
Patrick Mäder, Technical University Ilmenau, Germany

Towards a Non-Functional Requirements Discovery Approach for Persuasive Systems ....................... 1418
Nelly Condori-Fernández, Universidade da Coruña, Spain
Joao Araujo, Universidade Nova de Lisboa, Portugal
Alejandro Catala, Universidade de Santiago de Compostela, Spain
Patricia Lago, Vrije Universiteit Amsterdam, The Netherlands

Defining Agile Requirements Change Management: A Mapping Study .................................................. 1421
Danyllo Albuquerque, Federal University of Campina Grande, Brazil
Everton Guimarães, The Pennsylvania State University, USA
Mirko Perkusich, Federal University of Campina Grande, Brazil
Alexandre Costa, Federal University of Campina Grande, Brazil
Emanuel Dantas, Federal University of Campina Grande, Brazil
Felipe Ramos, Federal University of Campina Grande, Brazil
Hyggo Almeida, Federal University of Campina Grande, Brazil

Theme: System Software and Security

RS - Recommender Systems: Theory and Applications Track
Track Co-Chairs: Markus Zanker, Free University of Bozen-Bolzano, Italy
Panagiotis Symanidinis, Free University of Bozen-Bolzano, Italy
Yong Zheng, Illinois Institute of Technology, USA

Track Editorial ............................................................................................................................................... 1425

Mixture-Preference Bayesian Matrix Factorization for Implicit Feedback Datasets ......................... 1427
Shaowen Peng, Kyushu University, Japan
Tsunenori Mine, Kyushu University, Japan

Debiased Offline Evaluation of Recommender Systems: A Weighted-Sampling Approach .............. 1435
Diego Carraro, University College Cork, Ireland
Derek Bridge, University College Cork, Ireland

Fair Sequential Group Recommendations ................................................................................................. 1443
Maria Stratigi, Tampere University, Finland
Jyrki Nummenmaa, Tampere University, Finland
Evaggelia Pitoura, University of Ioannina, Greece
Kostas Stefanidis, Tampere University, Finland

A Recommender System for Investing in Early-Stage Enterprises ......................................................... 1453
Johannes Luef, Technische Universität Wien, Austria
Christian Ohrfandl, Technische Universität Wien, Austria
Dimitris Sacharidis, Technische Universität Wien, Austria
Hannes Werthner, Technische Universität Wien, Austria
**Poster Papers**

**Modeling User Exposure with Recommendation Influence** ................................................................. 1461  
Masahiro Sato, Fuji Xerox, Japan  
Janmajay Singh, Fuji Xerox, Japan  
Sho Takemori, Fuji Xerox, Japan  
Takashi Sonoda, Fuji Xerox, Japan  
Qian Zhang, Fuji Xerox, Japan  
Tomoko Ohkuma, Fuji Xerox, Japan

**Designing a Recommender System for Board Games** ........................................................................ 1465  
Michael Ion, Technische Universität Wien, Austria  
Dimitris Sacharidis, Technische Universität Wien, Austria  
Hannes Werthner, Technische Universität Wien, Austria

**Theme: Software Design and Development**

**SATTA - Software Architecture: Theory, Technology, and Applications Track**

**Track Co-Chairs:** Matteo Camilli, Free University of Bozen-Bolzano, Italy  
Patrizia Scandurra, University of Bergamo, Italy

**Track Editorial** ............................................................................................................................................... 1468

**Engineering Trustable Choreography-based Systems using Blockchain** ................................................. 1470  
F. Corradini, University of Camerino, Italy  
A. Marcelletti, University of Camerino, Italy  
A. Morichetta, University of Camerino, Italy  
A. Polini, University of Camerino, Italy  
B. Re, University of Camerino, Italy  
F. Tiezzi, University of Camerino, Italy

**Detecting Architectural Integrity Violation Patterns using Machine Learning** ....................................... 1480  
Alla Zakurdaeva, Carleton University, Canada  
Michael Weiss, Carleton University, Canada  
Steven Muegge, Carleton University, Canada

**An Architectural Style for Internet of Things Systems** ........................................................................ 1488  
Lidiane Santos, Federal University of Rio Grande do Norte, Brazil  
Eduardo Silva, Federal University of Rio Grande do Norte, Brazil  
Thais Batista, Federal University of Rio Grande do Norte, Brazil  
Everton Cavalcante, Federal University of Rio Grande do Norte, Brazil  
Jair Leite, Federal University of Rio Grande do Norte, Brazil  
Flavio Oquendo, Université Bretagne Sud, France

**An Overview of Reference Architectures for Cloud of Things** ............................................................. 1498  
Diógenes Dias, University of São Paulo, Brazil  
Flávia C. Delicato, Fluminense Federal University, Brazil  
Paulo F. Pires, Fluminense Federal University, Brazil  
Atslands R. Rocha, Federal University of Ceará, Brazil  
Elisa Y. Nakagawa, University of São Paulo, Brazil
Poster Papers

Modeling Microservice Architecture: A Comparative Experiment Towards the Effectiveness of Two Approaches ................................................................. 1506
Jonas Sorgalla, Dortmund University of Applied Sciences and Arts, Germany
Florian Rademacher, Dortmund University of Applied Sciences and Arts, Germany
Sabine Sachweh, Dortmund University of Applied Sciences and Arts, Germany
Albert Zündorf, University of Kassel, Germany

Student Research Abstract

Student Research Abstract: A Toolchain for Model-Based Development of a Robot Application ...... 1510
Mickaël Trezzy, Université de Toulouse, France

Theme: Software Design and Development

SE - Software Engineering Track
Track Co-Chairs: Byunjeong Lee, University of Seoul, South Korea
Eunjee Song, Baylor University, USA
Tao Zhang, Macau University of Science and Technology, China

Track Editorial ............................................................................................................................................... 1514

A Structural Modeling Notation for the Typed Functional Paradigm ................................................. 1515
Yusuf Moosa Motara, Rhodes University, South Africa

How Bugs are Fixed: Exposing Bug-fix Patterns with Edits and Nesting Levels ............................... 1523
Md Rakibul Islam, University of New Orleans, USA
Minhaz F. Zibran, University of New Orleans, USA

An Exploratory Study on Extract Method Floss-Refactoring ................................................................. 1532
Jaziel S. Moreira, Federal University of Campina Grande, Brazil
Everton L.G. Alves, Federal University of Campina Grande, Brazil
Wilkerson L. Andrade, Federal University of Campina Grande, Brazil

Customer Requests Matter: Early Stage Software Effort Estimation using K-Grams ...................... 1540
Kazım Kıvanç Eren, Idea Technology Solutions Inc., Turkey
Can Öz bey, Idea Technology Solutions Inc., Turkey
Beyza Eken, Istanbul Technical University, Turkey
Ayş e Tosun, Istanbul Technical University, Turkey

Actions and Impediments for Technical Debt Prevention: Results from a Global Family of Industrial Surveys ...................................................................................................................................... 1548
Sávio Freire, Federal University of Bahia and Federal Institute of Ceará, Brazil
Nicolli Rios, Federal University of Bahia, Brazil
Manoel Mendonça, Federal University of Bahia, Brazil
Davide Falessi, California Polytechnic State University, USA
Carolyn Seaman, University of Maryland Baltimore County, USA
Clemente Izurieta, Montana State University, USA
Rodrigo O. Spinola, State University of Bahia, Brazil

On the Measurement of Software Complexity for PLC Industrial Control Systems using TIQVA .... 1556
Adnan Muslija, Mälardalen University, Sweden
Eduard Enoiu, Mälardalen University, Sweden
Ameerah Muhsinah Jamil, Iowa State University, USA
Lotfi ben Othmane, Iowa State University, USA
Altaz Valani, Security Compass, Canada
Moataz Abdelkhalek, Iowa State University, USA
Ayhan Tek, Cyber Electra, Canada

Benchmarking Elasticity of FaaS Platforms as a Foundation for Objective-driven Design of Serverless Applications
Jörn Kuhlenkamp, Technische Universität Berlin, Germany
Sebastian Werner, Technische Universität Berlin, Germany
Maria C. Borges, Technische Universität Berlin, Germany
Dominik Ernst, Technische Universität Berlin, Germany
Daniel Wenzel, Technische Universität Berlin, Germany

What 5 Million Job Advertisements tell us about Testing: A Preliminary Empirical Investigation
Maura Cerioli, Università di Genova, Italy
Maurizio Leotta, Università di Genova, Italy
Filippo Ricca, Università di Genova, Italy

Dealing with Uncertainty in Model Transformations
Youness Laghouaouta, Le Mans University, France
Pierre Laforcade, Le Mans University, France

FACT- From Actual to Conceptual Tie-ins: A Multi-level Knowledge Graph Structured on Context and Semantics of Software Artefacts
Shipra Sharma, Indian Institute of Technology Ropar, India
Balwinder Sodhi, Indian Institute of Technology Ropar, India

A Metric Suite for Evaluating Interactive Scenarios in Video Games: An Empirical Validation
Eleni Paschali, Aristotle University of Thessaloniki, Greece
Apostolos Ampatzoglou, University of Macedonia, Greece
Remi Escurou, École Nationale Supérieure des Mines, France
Alexander Chatzigeorgiou, University of Macedonia, Greece
Ioannis Stamelos, Aristotle University of Thessaloniki, Greece

TAMAA: UPPAAL-based Mission Planning for Autonomous Agents
Rong Gu, Mälardalen University, Sweden
Eduard Enoiu, Mälardalen University, Sweden
Cristina Seceleanu, Mälardalen University, Sweden

Applying Deep Learning Algorithm to Automatic Bug Localization and Repair
Geunseok Yang, University of Seoul, South Korea
Kyeongsic Min, University of Seoul, South Korea
Byungjeong Lee, University of Seoul, South Korea

On Investigating Metamodel Inaccurate Structures
Elyes Cherfa, University South Brittany and Segula Engineering, France
Soraya Kesraoui, Segula Engineering, France
Chouki Tibermacine, LIRMM & CNRS, France
Regis Fleurquin, University South Brittany, France
Salah Sadou, University South Brittany, France
Poster Papers

UC2Map: Automatic Translation of Use Case Maps from Specification ................................................. 1650
Saurabh Tiwari, DA-IICT Gandhinagar, India
Rishab Arora, DA-IICT Gandhinagar, India
Ashray Bharambe, DA-IICT Gandhinagar, India

Chaining Model Transformations to Develop a System Model Verification Tool: Application to
Capella State Machines and Data Flows Models .......................................................... 1654
Christophe Duhil, Thales Defense Mission System, France
Jean-Philippe Babau, Université de Bretagne Occidentale, France
Eric Lépicier, Thales Defense Mission System, France
Jean-Luc Voirin, Thales Defense Mission System, France
Juan Navas, Thales Corporate Engineering, France

Verification of Forensic Readiness in Software Development: A Roadmap .......................... 1658
Lukáš Daubner, Masaryk University, Czechia
Martin Macák, Masaryk University, Czechia
Barbora Bůhmová, Masaryk University, Czechia
Tomáš Pitner, Masaryk University, Czechia

An Investigation of the Project Management Approaches of Agile and Plan-Based Companies .......... 1662
Ilya Khomyakov, Innopolis University, Russia
Ruzilya Mirgalimova, Innopolis University, Russia
Alberto Sillitti, Innopolis University, Russia

Theme: System Software and Security

SEC - Computer Security Track

Track Co-Chairs: Giampaolo Bella, Università di Catania, Italy
Rosario Giustolisi, IT University of Copenhagen, Denmark

Track Editorial .......................................................................................................................... 1666

Interpretable and Adversarially-Resistant Behavioral Malware Signatures .......................... 1668
Xiao Han, Orange Labs, France
Baptiste Olivier, Orange Labs, France

Raccoon: Automated Verification of Guarded Race Conditions in Web Applications .......... 1678
Simon Koch, Technische Universität Braunschweig, Germany
Tim Sauer, Technische Universität Braunschweig, Germany
Martin Johns, Technische Universität Braunschweig, Germany
Giancarlo Pellegrino, CISPA Helmholtz Center for Information Security, Germany

MANIS: Evading Malware Detection System on Graph Structure ........................................... 1688
Peng Xu, Technical University of Munich, Germany
Bojan Kolosnjaji, Technical University of Munich, Germany
Claudia Eckert, Technical University of Munich, Germany
Apostolis Zarras, Maastricht University, The Netherlands
HeadPrint: Detecting Anomalous Communications through Header-based Application Fingerprinting

Riccardo Bortolameotti, University of Twente, The Netherlands
Thijs van Ede, University of Twente, The Netherlands
Andrea Continella, University of California Santa Barbara, USA
Thomas Hupperich, University of Muenster, Germany
Maarten H. Everts, University of Twente, The Netherlands
Reza Rafati, Bitdefender, The Netherlands
Willem Jonker, University of Twente, The Netherlands
Pieter Hartel, Delft University of Technology, The Netherlands
Andreas Peter, University of Twente, The Netherlands

TrustEV: Trustworthy Electric Vehicle Charging and Billing

Andreas Fuchs, Fraunhofer SIT, Germany
Dustin Kern, Fraunhofer SIT, Germany
Christoph Krauß, Fraunhofer SIT, Germany
Maria Zhdanova, Fraunhofer SIT, Germany

Hybrid Taint Analysis for Java EE

Florian D. Loch, SAP Security Research & Karlsruhe Institute of Technology, Germany
Martin Johns, SAP Security Research & Karlsruhe Institute of Technology, Germany
Martin Hecker, SAP Security Research & Karlsruhe Institute of Technology, Germany
Martin Mohr, SAP Security Research & Karlsruhe Institute of Technology, Germany
Gregor Snelting, SAP Security Research & Karlsruhe Institute of Technology, Germany

HAL-RD: Cross-Correlating Heterogeneous Alerts and Logs using Resource Dependencies

Mahdieh Safarzadeh, Tarbiat Modares University, Iran
Mahdi Abadi, Tarbiat Modares University, Iran
Alireza Nowroozi, Sharif University of Technology, Iran

Write-protection Enforcement: Hypervisor-backed Kernel Hardening

Ahmed Abdelraoof, Alexandria University, Egypt
Mohamed Azab, Virginia Military Institute, USA
Igor Stoppa, Huawei Research Center, Finland

WAF-A-MoLE: Evading Web Application Firewalls through Adversarial Machine Learning

Luca Demetrio, Università di Genova, Italy
Andrea Valenza, Università di Genova, Italy
Gabriele Costa, IMT School for Advanced Studies Lucca, Italy
Giovanni Lagorio, Università di Genova, Italy

Polymorphic Circuit Generation using Random Boolean Logic Expansion

Jeffrey T. McDonald, University of South Alabama, USA
Trinity L. Stroud, University of South Alabama, USA
Todd R. Andel, University of South Alabama, USA
Theme: Information Systems

SFECS - Sustainability of Fog/Edge Computing Systems Track

Track Co-Chairs: Christian Esposito, University of Napoli “Federico II”, Italy
                Florin Pop, University POLITEHNICA of Bucharest, Romania
                Chang Choi, Chosun University, South Korea

An Experiment-Driven Performance Model of Stream Processing Operators in Fog Computing Environments

HamidReza Arkian, University of Rennes 1, France
Guillaume Pierre, University of Rennes 1, France
Johan Tordsson, Elastisys AB, Sweden
Erik Elmroth, Elastisys AB, Sweden

Access Control Method using Electrocardiogram Signal for Fog Computing Security

Jin Su Kim, Chosun University, South Korea
Min Gu Kim, Chosun University, South Korea
Myung-Won Lee, Chosun University, South Korea
Sung Bum Pan, Chosun University, South Korea

Situation Awareness via Information Hovering in Post-disaster Communications

Gaetano Manzo, University of Bern and University of Applied Sciences and Arts of Western Switzerland, Switzerland
Flavian Bonvin, University of Applied Sciences and Arts of Western Switzerland, Switzerland
Christian Esposito, University of Salerno, Italy
Torsten Braun, University of Bern, Switzerland
Gianluca Rizzo, University of Applied Sciences and Arts of Western Switzerland, Switzerland

A Comparative Survey of Connectivity Models in Vehicular Networks

Mingzhou Liang, Hohai University, China
Yu Shen, Hohai University, China
Xin Su, Hohai University, China
Xiaofeng Liu, Hohai University, China
Chang Choi, Choson University, South Korea

Poster Papers

Comparison of Simulators for Fog Computing

Christian Kunde, University of Duisburg-Essen, Germany
Zoltán Ádám Mann, University of Duisburg-Essen, Germany

Theme: System Software and Security

SiSoS - Software-intensive Systems-of-Systems Track

Track Co-Chairs: Flavio Oquendo, IRISA - UMR CNRS – Univ. Bretagne Sud, France
                Khalil Drira, LAAS - CNRS – Univ. Toulouse, France
                Axel Legay, University Catholique de Louvain, Belgium
                Thais Vasconcelos Batista, DIMAp – UFRN, Brazil

Track Editorial

Modeling and Verification Method for an Early Evaluation of Systems of Systems Interactions

Ronan Baduel, University of Toulouse, France
Julian Ober, University of Toulouse, France
Jean-Michel Bruel, University of Toulouse, France
Topology-Aware Distributed Smart Grid Control using a Clustering-Based Utility Maximization Approach
Marius Stübs, Universität Hamburg, Germany
Hanko Ipach, Hamburg University of Technology, Germany
Christian Becker, Hamburg University of Technology, Germany

Theme: Information Systems
SONAMA - Social Network and Media Analysis Track
Track Chair: Sang-Wook Kim, Hanyang University, South Korea

Comparing Automatically Extracted Topics from Online Suicidal Ideation and the Responses they Invoke
Elise Glaser, Colorado College, USA
Alexander Morain, University of Illinois, USA
Jonathan Gemmell, DePaul University, USA
Daniela Raicu, DePaul University, USA

You are what Emojis say about your Pictures: Language-independent Gender Inference Attack on Facebook
Bizhan Alipour Pijani, Loria, France
Abdessamad Imine, Loria, France
Michaël Rusinowitch, Loria, France

Sponsored Content and User Engagement Dynamics on Instagram
Lucas Machado de Oliveira, Universidade Federal de Minas Gerais, Brazil
Olga Goussevskai, Universidade Federal de Minas Gerais, Brazil

Graph Sampling Methods for Big Complex Networks integrating Centrality, K-core and Spectral Sparsification
Seok-Hee Hong, University of Sydney, Australia
Shan Lu, University of Sydney, Australia

FOCAS: Penalising Friendly Citations to Improve Author Ranking
Jorge Silva, CRACS/INESC TEC and University of Porto, Portugal
David Aparicio, CRACS/INESC TEC and University of Porto, Portugal
Pedro Ribeiro, CRACS/INESC TEC and University of Porto, Portugal
Fernando Silva, CRACS/INESC TEC and University of Porto, Portugal

Investigation of Biases in Identity Linkage DataSets
Rishabh Kaushal, Indraprastha Institute of Information Technology Delhi, India
Shubham Gupta, Indraprastha Institute of Information Technology Delhi, India
Ponnurangam Kumaraguru, Indraprastha Institute of Information Technology Delhi, India

Wide-spectrum Characterization of Long-Running Political Phenomena on Social Media: The Brexit Case
Emre Calisir, Politecnico di Milano, Italy
Marco Brambilla, Politecnico di Milano, Italy
Poster Papers

Signed Heterogeneous Network Embedding in Social Media ................................................................. 1877
Fatemeh Salehi Rizi, University of Passau, Germany
Michael Granitzer, University of Passau, Germany

Topology and Robustness Analysis of Temporal Air Transport Network ............................................. 1881
Humberto Hayashi Sano, Universidade Federal de São Paulo, Brazil
Lilian Berton, Federal University of São Paulo, Brazil

Finding Interest Groups from Twitter Lists ............................................................................................. 1885
Mohamed Benabdelkrim, INSA Lyon, France
Jean Savinien, EM Lyon, France
Céline Robardet, Insa Lyon, France

Influence Maximization through User Interaction Modeling ................................................................. 1888
David Oriedi, University of Reims, France
Cyril de Runz, University of Tours, France
Zahia Guessoum, University of Reims, France
Amine Aït Younes, University of Reims, France
Henry Nyongesa, Dedan Kimathi University of Technology, Kenya

Theme: System Software and Security

SP - Software Platforms Track
Track Co-Chairs: Juw Won Park, University of Louisville, USA
Jinman Jung, Hannam University, South Korea
Jun Huang, Chongqing University of Posts and Telecom, China

Track Editorial ............................................................................................................................................. 1891

Smart Home Platform supporting Decentralized Adaptive Automation Control .................................. 1893
Paolo Arcaini, National Institute of Informatics, Japan
Raffaela Mirandola, Politecnico di Milano, Italy
Elvìnnia Riccobene, Università degli Studi di Milano, Italy
Patrizia Scandurra, University of Bergamo, Italy
Alberto Arrigoni, University of Bergamo, Italy
Daniele Bosc, University of Bergamo, Italy
Federico Modica, University of Bergamo, Italy
Rita Pedercini, University of Bergamo, Italy

Time Series Analysis for Enhancing the Recognition of License Plate Number in Video Stream of
IoT Camera ................................................................................................................................................. 1901
Bada Kim, Hansung University, South Korea
Doohyuk Chang, Hansung University, South Korea
Junyoung Heo, Hansung University, South Korea
Sung Y. Shin, South Dakota State University, USA

AppGen: A Framework for Automatic Generation of Data Collection Apps ...................................... 1906
Mostafa Alaa, German University in Cairo, Egypt
Alia El Bolock, German University in Cairo and Ulm University, Egypt
Mostafa Abas, German University in Cairo, Egypt
Slim Abdennadher, German University in Cairo, Egypt
Cornelia Herbert, Ulm University, Germany
Counterfeiting Scalable Detection Image based System for E-commerce .................................................. 1914
Robert-Ioan Onesim, Alexandru Ioan Cuza University of Iasi, Romania
Andrei Pricop, Alexandru Ioan Cuza University of Iasi, Romania
Lenuta Alboae, Alexandru Ioan Cuza University of Iasi, Romania
Andrei Panu, Alexandru Ioan Cuza University of Iasi, Romania

Smart Transportation Platform for Private Transportation .............................................................................. 1920
Vially Kazadi Mutombo, Soongsil University, South Korea
Yena Lee, Soongsil University, South Korea
Heejin Kim, Soongsil University, South Korea
Younggwan Kim, Soongsil University, South Korea
Natalia Weronika Debska, Soongsil University, South Korea
Jiman Hong, Soongsil University, South Korea

Poster Papers

Sophisticated PV Prediction Platform using Optimized PV Physical Model .................................................. 1928
Hyunho Ji, Korea Electronics Technology Institute, South Korea
Taehyounf Kim, Korea Electronics Technology Institute, South Korea
Kyung Sun Ham, Korea Electronics Technology Institute, South Korea

Day-Ahead Photovoltaic Power Forecasting using Numerical Weather Prediction ....................................... 1931
Taehyounf Kim, Korea Electronics Technology Institute, South Korea
Jaeho Park, Korea Electronics Technology Institute, South Korea
Kyung Sun Ham, Korea Electronics Technology Institute, South Korea

Internet of Things based Virtual Display Platform to Provide a Screen .......................................................... 1934
Seoyeon Kim, Hannam University, South Korea
Jaehyeok Jeong, Hannam University, South Korea
Inhwan Na, coForward co., Ltd., South Korea
Young-Sun Yun, Hannam University, South Korea
Seongbae Eun, Hannam University, South Korea
Jinman Jung, Hannam University, South Korea

Theme: Software Design and Development

SVT - Software Verification and Testing Track
Track Co-Chairs: Matthias Güdemann, IOHK, Hong Kong
Nikolai Kosmatov, CEA List and Thales Research & Technology, France

Estimating Fault Masking using Squeeziness based on Rényi's Entropy ........................................................... 1936
Alfredo Ibias, Universidad Complutense de Madrid, Spain
Manuel Núñez, Universidad Complutense de Madrid, Spain

Cross-Program Taint Analysis for IoT Systems .............................................................................................. 1944
Amit Mandal, SRM University, India
Pietro Ferrara, JuliaSoft SRL, Italy
Yuliy Khlyebnikov, Università Ca' Foscari Venezia, Italy
Agostino Cortesi, Università Ca' Foscari Venezia, Italy
Fausto Spoto, Università di Verona, Italy
En-Route: On Enabling Resource Usage Testing for Autonomous Driving Frameworks ........................................ 1953
Miguel Alcon, Barcelona Supercomputing Center, Spain
Hamid Tabani, Barcelona Supercomputing Center, Spain
Jaume Abella, Barcelona Supercomputing Center, Spain
Leonidas Kosmidis, Barcelona Supercomputing Center, Spain
Francisco J. Cazorla, Barcelona Supercomputing Center, Spain

Data-Flow-Based Evolutionary Fault Localization .................................................................................... 1963
Deuslirio Silva-Junior, Federal University of Goiás, Brazil
Plinio S. Leitao-Junior, Federal University of Goiás, Brazil
Altino Dantas, Federal University of Goiás, Brazil
Celso G. Camilo-Junior, Federal University of Goiás, Brazil
Rachel Harrison, Oxford Brookes University, UK

Constrained Detecting Arrays for Fault Localization in Combinatorial Testing ........................................ 1971
Hao Jin, Osaka University, Japan
Ce Shi, Shanghai Lixin University of Accounting and Finance, China
Tatsuhiro Tsuchiya, Osaka University, Japan

A Sound Abstract Interpreter for Dynamic Code ...................................................................................... 1979
Vincenzo Arceri, University of Verona, Italy
Isabella Mastroeni, University of Verona, Italy

Testing as a Service (TaaS): A Systematic Literature Map ................................................................. 1989
Gustavo Girardon, Federal University of Pampa, Brazil
Victor Costa, Federal University of Pampa, Brazil
Rodrigo Machado, Federal University of Pampa, Brazil
Maicon Bernardino, Federal University of Pampa, Brazil
Guilherme Legramante, Federal University of Pampa, Brazil
Fábio Paulo Basso, Federal University of Pampa, Brazil
Elder de Macedo Rodrigues, Federal University of Pampa, Brazil
Aníbal Neto, Federal University of Pampa, Brazil

Victor Costa, Federal University of Pampa, Brazil
Gustavo Girardon, Federal University of Pampa, Brazil
Maicon Bernardino, Federal University of Pampa, Brazil
Rodrigo Machado, Federal University of Pampa, Brazil
Guilherme Legramante, Federal University of Pampa, Brazil
Aníbal Neto, Federal University of Pampa, Brazil
Fábio Paulo Basso, Federal University of Pampa, Brazil
Elder de Macedo Rodrigues, Federal University of Pampa, Brazil

Trends in prioritization of Test Cases: 2017-2019 ...................................................................................... 2005
M. del Carmen de Castro-Cabrera, University of Cádiz, Spain
Antonio García-Dominguez, Aston University, UK
Inmaculada Medina-Bulo, University of Cádiz, Spain
Theme: Information Systems

SWA - Semantic Web and Applications Track

Track Co-Chairs:  Hyoli Han, Illinois State University, USA
                 Soon Ae Chun, City University of New York, USA
                 Sangsoo Sung, Google Inc., USA

Track Editorial

Injection of Automatically Selected DBpedia Subjects in Electronic Medical Records to boost Hospitalization Prediction

Raphaël Gazzotti, Université Côte d’Azur, France
Catherine Faron-Zucker, Université Côte d’Azur, France
Fabien Gandon, Université Côte d’Azur, France
Virginie Lacroix-Hugues, Université Côte d’Azur, France
David Darmon, Université Côte d’Azur, France

VTKEL: A Resource for Visual-Textual-Knowledge Entity Linking

Shahi Dost, Fondazione Bruno Kessler and University of Padova, Italy
Luciano Serafini, Fondazione Bruno Kessler, Italy
Marco Rospocher, University of Verona, Italy
Lamberto Ballan, University of Padova, Italy
Alessandro Sperduti, University of Padova, Italy

Ontology-Based Knowledge Model for Human-Robot Interactive Services

Doo Soo Chang, Hanyang University, South Korea
Gun Hee Cho, Hanyang University, South Korea
Yong Suk Choi, Hanyang University, South Korea

MOMENT: Temporal Meta-Fact Generation and Propagation in Knowledge Graphs

Fatiha Saïs, Université Paris-Saclay, France
Joana E. Gonzales Malaverri, Université Paris-Saclay, France
Gianluca Quercini, Université Paris-Saclay, France

Representation Learning for Entity Type Ranking

Md Mostafizur Rahman, National Institute of Informatics, Japan
Atsuhiro Takasu, National Institute of Informatics, Japan
Gianluca Demartini, The University of Queensland, Australia

Poster Papers

Towards the Semantic Formalization of Science

Said Fatalla, University of Bonn, Germany; Alexandria University, Egypt
Sören Auer, University of Hannover, Germany
Christoph Lange, RWTH Aachen University, Germany

Student Research Abstract

Student Research Abstract: Towards an Ontology for Personalized Hotel Room Recommendation

Ronald Ochieng Ojino, University of Dar es Salaam, Tanzania
Theme: AI and Agents

VPHBA - Video Processing for Human Behavioral Analysis Track

Track Co-Chairs:
- Donatello Conte, University of Tours, France
- Raffaella Lanzarotti, University of Milano, Italy
- Jean-Yves Ramel, University of Tours, France

Track Editorial

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siamese-rPPG Network: Remote Photoplethysmography Signal Estimation from Face Videos</td>
<td>2066</td>
</tr>
<tr>
<td>Yun-Yun Tsou, National Tsing Hua University, Taiwan</td>
<td></td>
</tr>
<tr>
<td>Yi-An Lee, National Tsing Hua University, Taiwan</td>
<td></td>
</tr>
<tr>
<td>Chiou-Ting Hsu, National Tsing Hua University, Taiwan</td>
<td></td>
</tr>
<tr>
<td>Shang-hung Chang, Linkou Chang Gung Memorial Hospital, Taiwan</td>
<td></td>
</tr>
<tr>
<td>Lightweight Network Architecture for Real-Time Action Recognition</td>
<td>2074</td>
</tr>
<tr>
<td>Alexander Kozlov, Intel Corp., Russia</td>
<td></td>
</tr>
<tr>
<td>Vadim Andronov, Intel Corp., Russia</td>
<td></td>
</tr>
<tr>
<td>Yana Gritsenko, Intel Corp., Russia</td>
<td></td>
</tr>
<tr>
<td>Robust, Efficient and Privacy-Preserving Violent Activity Recognition in Videos</td>
<td>2081</td>
</tr>
<tr>
<td>Javed Imran, Indian Institute of Technology Roorkee, India</td>
<td></td>
</tr>
<tr>
<td>Balasubramanian Raman, Indian Institute of Technology Roorkee, India</td>
<td></td>
</tr>
<tr>
<td>Amitesh Singh Raipur, Indian Institute of Technology Roorkee, India</td>
<td></td>
</tr>
<tr>
<td>Appearance Features for Online Multiple Camera Multiple Target Tracking</td>
<td>2089</td>
</tr>
<tr>
<td>Quoc Cuong Le, University of Tours, France</td>
<td></td>
</tr>
<tr>
<td>Moncef Hidane, INSA Centre Val de Loire, France</td>
<td></td>
</tr>
<tr>
<td>Markerless Gait Analysis in Stroke Survivors based on Computer Vision and Deep Learning: A Pilot Study</td>
<td>2097</td>
</tr>
<tr>
<td>Matteo Moro, Universita' degli Studi di Genova, Italy</td>
<td></td>
</tr>
<tr>
<td>Giorgia Marchesi, Universita' degli Studi di Genova, Italy</td>
<td></td>
</tr>
<tr>
<td>Francesca Odone, Universita' degli Studi di Genova, Italy</td>
<td></td>
</tr>
<tr>
<td>Maura Casadio, Universita' degli Studi di Genova, Italy</td>
<td></td>
</tr>
<tr>
<td>A Decision Level Fusion Approach for Deception Detection based on Speech and Behavioral Cues</td>
<td>2105</td>
</tr>
<tr>
<td>Safa Chebbi, Sup'Com, Tunisia</td>
<td></td>
</tr>
<tr>
<td>Sofia Ben Jebara, Sup'Com, Tunisia</td>
<td></td>
</tr>
</tbody>
</table>

Poster Papers

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template Co-updating in Multi-modal Human Activity Recognition Systems</td>
<td>2113</td>
</tr>
<tr>
<td>Annalisa Franco, University of Bologna, Italy</td>
<td></td>
</tr>
<tr>
<td>Antonio Magnani, University of Bologna, Italy</td>
<td></td>
</tr>
<tr>
<td>Dario Maio, University of Bologna, Italy</td>
<td></td>
</tr>
<tr>
<td>Towards a Data-Driven Method for RGB Video-Based Hand Action Quality Assessment in Real Time</td>
<td>2117</td>
</tr>
<tr>
<td>Tianyu Wang, Shanghai Jiao Tong University, China</td>
<td></td>
</tr>
<tr>
<td>Minhao Jin, Shanghai Jiao Tong University, China</td>
<td></td>
</tr>
<tr>
<td>Jingying Wang, Shanghai Jiao Tong University, China</td>
<td></td>
</tr>
<tr>
<td>Yijie Wang, Shanghai Jiao Tong University, China</td>
<td></td>
</tr>
<tr>
<td>Mian Li, Shanghai Jiao Tong University, China</td>
<td></td>
</tr>
</tbody>
</table>
**Theme: Distributed Systems**

**WCN - Selected Areas of Wireless Communications and Networking Track**

**Track Co-Chairs:** Dongkyun Kim, Kyungpook National University, South Korea  
Wei Wang, San Diego State University, USA

---

**Enhanced Clustering Approach for Traffic Regulation in Directional Antennas based Nanonetworks** ........................ 2121  
Lina Aliouat, University Bourgogne Franche-Comté, France  
Hakim Mabed, University Bourgogne Franche-Comté, France  
Julien Bourgeois, University Bourgogne Franche-Comté, France

---

**Enabling Wireless Ad Hoc Edge Systems with Yggdrasil** .......................................................... 2129  
Pedro Akos Costa, University of Lisbon, Portugal  
André Rosa, University of Lisbon, Portugal  
João Leitão, University of Lisbon, Portugal

---

**An Effective AP Placement Scheme for Reliable WiFi Connection in Industrial Environment** .............. 2137  
Han Ul Lee, Seoul National University, South Korea  
Wha Sook Jeon, Seoul National University, South Korea  
Dong Guen Jeong, Hankuk University of Foreign Studies, South Korea

---

**A Service-aware Channel Partition and Selection for Advertising in Bluetooth Low Energy Networks** ....... 2144  
Ting-Ting Yang, National Defense University, Taiwan  
Hsueh-Wen Tseng, National Chung-Hsing University, Taiwan

---

**A Secure Network Coding-enabled approach for a Confidential Cluster-based Routing in Wireless Sensor Networks** ............................................................................................................................................. 2151  
Hana Rhim, Sup'Com, Tunisia  
Ryma Abbasi, Sup'Com, Tunisia  
Karim Tamine, Université de Limoges, France  
Damien Sauveron, Université de Limoges, France  
Sihem Guemara, Sup'Com, Tunisia

---

**A New CoAP Congestion Control Scheme Considering Strong and Weak RTT for IoUT** ..................... 2158  
Junho Seo, Kyungpook National University, South Korea  
Sungwon Lee, Kyungpook National University, South Korea  
Muhammad Toaha Raza Khan, Kyungpook National University, South Korea  
Dongkyun Kim, Kyungpook National University, South Korea

---

**Trustworthy Intelligent Industrial Monitoring Architecture for Early Event Detection by Exploiting Social IoT** ..................................................................................................................................... 2163  
Abdul Rehman, Kyungpook National University, South Korea  
Anand Paul, Kyungpook National University, South Korea  
Muhammad Azfar Yaqub, University Islamabad, Pakistan  
Muhammad Mazhar Ullah Rathore, Hammad Bin Khalifa University, Qatar

---

**Distortion Exponent Analysis of Successive Refinement Source Code over Layered Multi-Relay Non-Orthogonal Amplify-Forward Networks** ........................................................................................................... 2170  
Pin-Han Ho, University of Waterloo, Canada  
Payam Padidar, University of Waterloo, Canada  
Yancheng Ji, Natong University, China  
Wei Duan, Natong University, China
Poster Papers

Evaluation of Fog Topologies in Fog Planning for IoT Task Scheduling ................................................. 2177
Zhiming He, Kyungpook National University, South Korea
Limei Peng, Kyungpook National University, South Korea

Theme: Distributed Systems

WT - Web Technologies Track
Track Co-Chairs: Francesco Poggi, University of Bologna, Italy
Cristian Mateos, UNICEN University, Argentina
Tim A. Majchrzak, University of Agder, Norway

Track Editorial ............................................................................................................................................... 2181

An Elastic Net Regularized Matrix Factorization Technique for Recommender Systems .................. 2184
Bianca Mitroi, Erasmus University Rotterdam, The Netherlands
Flavius Frasincar, Erasmus University Rotterdam, The Netherlands

A Browserless Architecture for extracting Web Prices ................................................................. 2193
Jorge Lloret-Gazo, University of Zaragoza, Spain

XIEv: Dynamic Analysis for Crawling and Modeling of Web Applications ................................. 2201
Manuel Leithner, SBA Research, Austria
Dimitris E. Simos, SBA Research, Austria

Poster Papers

Censorship-resistant Web Annotations based on Ethereum and IPFS ................................................. 2211
João Santos, Universidade de Lisboa, Portugal
Nuno Santos, Universidade de Lisboa, Portugal
David Dias, Protocol Labs, USA

RAMLFlask: Managing Artifact Coupling for Web APIs ................................................................. 2214
Stefan Sobernig, WU Vienna, Austria
Michael Maurer, Independent Developer, Austria
Mark Strembeck, WU Vienna, Austria