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: Distributed Systems

CC - Cloud Computing and Interoperability Track

Track Co-Chairs: Priya Chandran, National Institute of Technology Calicut, India
SD Madhu Kumar, National Institute of Technology Calicut, India
Young-Gab Kim, Sejong University, Korea

Track Editorial ................................................................................................................................................................. 1

Transpose-Xen: Virtualized Mixed-Criticality through Dynamic Allocation ................................................................. 3
John McFarland, North Carolina State University, USA
Amro Awad, North Carolina State University, USA

Domain Name Service Trust Delegation in Cloud Computing: Exploitation, Risks, and Defense .......... 13
Craig Laprade, George Washington University, USA
H. Howie Huang, George Washington University, USA

Security Interoperability in Heterogeneous IoT Platforms: Threat Model of the Interoperable OAuth 2.0 Framework ................................................................................................................................... 22
Se-Ra Oh, Miro Corporation, Korea
Jahoon Koo, Sejong University, Korea
Young-Gab Kim, Sejong University, Korea

Poster Papers

Deep Learning Based Self-Adaptive Framework for Environmental Interoperability in Internet of Things ................................................................................................................................. 32
Euijong Lee, Chungbuk National University, Korea
Sukhoon Lee, Kunsan National University, Korea
Young-Duk Seo, Inha University, Korea

RT-Kubernetes – Containerized Real-Time Cloud Computing ...................................................................................... 36
Stefano Fiori, University of Pisa, Italy
Luca Abeni, Scuola Superiore Sant’Anna, Italy
Tommaso Cucinotta, Scuola Superiore Sant’Anna, Italy
Theme: Artificial Intelligence and Agents

CIVIA - Computational Intelligence and Video & Image Analysis Track

Track Co-Chairs: Agostinho Rosa, University of Lisbon, Portugal
                Andre L.C. Barczak, Massey University, New Zealand

Track Editorial ................................................................................................................................................... 40

The Impact of Different Facial Expression Intensities on the Performance of Pre-trained Emotion Recognition Models ................................................................................................................................. 41
Hermon Faria de Araujo, Universidade de São Paulo, Brazil
Fatima L.S. Nunes, Universidade de São Paulo, Brazil
Ariane Machado-Lima, Universidade de São Paulo, Brazil

A Better Loss for Visual-Textual Grounding .................................................................................................. 49
Davide Rigoni, University of Padua and Fondazione Bruno Kessler, Italy
Luciano Serafini, Fondazione Bruno Kessler, Italy
Alessandro Sperduti, University of Padua, Italy

Adversarial Defense by Restricting In-Variance and Co-variance of Representations ............................... 58
Jeevithan Alagurajah, University of Louisiana at Lafayette, USA
Chee-Hung Henry Chu, University of Louisiana at Lafayette, USA

Time2Vec Transformer: A Time Series Approach for Gas Detection in Seismic Data ............................... 66
Peterson Diniz, Universidade Federal do Maranhão, Brazil
Domingos A. Dias Junior, Universidade Federal do Maranhão, Brazil
João O.B. Diniz, Instituto Federal do Maranhão, Brazil
Anselmo Cardoso de Paiva, Universidade Federal do Maranhão, Brazil
Aristófanes Correa da Silva, Universidade Federal do Maranhão, Brazil
Marcelo Gattass, Pontificia Universidade Católica do Rio de Janeiro, Brazil
Roberto Quevedo, Pontificia Universidade Católica do Rio de Janeiro, Brazil
Diogo Michelon, Eneva, Brazil
Carlos Siedschlag, Eneva, Brazil
Roberto Ribeiro, Eneva, Brazil

Automated Video Editing Based on Learned Styles Using LSTM-GAN ...................................................... 73
Hsin-I Huang, National Taiwan University, Taiwan
Chi-Sheng Shih, National Taiwan University, Taiwan
Zi-Lin Yang, National Taiwan University, Taiwan

Poster Papers

Autorevise: Annotation Refinement Using Motion Signal Patterns .......................................................... 81
Jennifer Piane, DePaul University, USA
Yiyang Wang, DePaul University, USA
Xufan Ma, DePaul University, USA
Jacob Furst, DePaul University, USA
Daniela Stan Raicu, DePaul University, USA
Theme: System Software and Security

CPS - Cyber-Physical Systems Track

Track Co-Chairs: Wanli Chang, Hunan University, China
Pi-Cheng Hsiu, Academia Sinica, Taiwan
Jingtong Hu, University of Pittsburgh, USA

Residual Size Is Not Enough for Anomaly Detection: Improving Detection Performance Using Residual Similarity in Multivariate Time Series ................................................................. 87
Jeong-Han Yun, The Affiliated Institute of ETRI, Korea
Jonguk Kim, The Affiliated Institute of ETRI, Korea
Won-Seok Hwang, The Affiliated Institute of ETRI, Korea
Young Geun Kim, Sungkyunkwan University, Korea
Simon S. Woo, Sungkyunkwan University, Korea
Byung-Gil Min, The Affiliated Institute of ETRI, Korea

CSP Specification and Verification of Relay-Based Railway Interlocking Systems ..................... 97
D.I. de Almeida Pereira, Clearsy, France
M.V.M. Oliveira, Universidade Federal do Rio Grande do Norte, Brazil
P.E.R. Bezerra, Universidade Federal do Rio Grande do Norte, Brazil
P. Bon, Université Gustave Eiffel, France
S. Collart-Dutilleul, Université Gustave Eiffel, France

On Enduring More Data through Enabling Page Rewrite Capability on Multi-Level-Cell Flash Memory ........................................................................................................................................ 107
Yu-Ming Chang, Wolley, Taiwan
Chien-Chung Ho, National Cheng Kung University, Taiwan
Che-Wei Tsao, Academia Sinica, Taiwan
Shu-Hsien Liao, National Taiwan University, Taiwan
Wei-Chen Wang, Macronix International Co., Ltd. and National Taiwan University, Taiwan
Tei-Wei Kuo, City University of Hong Kong, China and National Taiwan University, Taiwan
Yuan-Hao Chang, Academia Sinica, Taiwan

RAM: Exploiting Restrained and Approximate Management for Enabling Neural Network Training on NVM-Based Systems ................................................................. 116
Chien-Chung Ho, National Cheng Kung University, Taiwan
Wei-Chen Wang, Macronix International Co., Ltd., Taiwan
Szu-Yu Chen, National Chung Cheng University, Taiwan
Yung-Chun Li, Macronix International Co., Ltd., Taiwan
Kun-Chi Chiang, Macronix International Co., Ltd., Taiwan

CIIA: Critical Infrastructure Impact Assessment ............................................................................. 124
Olga Carvalho, INOV INESC Inovação, Portugal
Filipe Apolinário, INOV INESC Inovação, Portugal
Nelson Escravana, INOV INESC Inovação, Portugal
Carlos Ribeiro, Universidade de Lisboa, Portugal

Fast, Lightweight IoT Anomaly Detection Using Feature Pruning and PCA .................................. 133
John Carter, Drexel University, USA
Spiros Mancoridis, Drexel University, USA
Érick Galinkin, Drexel University, USA
Software-Defined Hardware-Assisted Isolation for Trusted Next-Generation IoT Systems .......................... 139
Filippos-George Kolimbianakis, Hellenic Mediterranean University, Greece
George Kornaros, Hellenic Mediterranean University, Greece

PICO: Privacy-Preserving Access Control in IoT Scenarios through Incomplete Information ............... 147
Savio Sciancalepore, Eindhoven University of Technology, The Netherlands
Nicola Zannone, Eindhoven University of Technology, The Netherlands

Improving Response Time of Home IoT Services in Federated Learning .................................................. 157
Dongjun Hwang, Chungnam National University, Korea
Hyunsu Mun, Chungnam National University, Korea
Youngseok Lee, Chungnam National University, Korea

SureSpace: Orchestrating Beacons and Witnesses to Certify Device Location ........................................... 164
João Tiago, INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal
Samih Eisa, INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal
Miguel L. Pardal, INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal

Ontology-Based User Privacy Management in the Smart Grid ................................................................. 174
Raisa Islam, New Mexico Tech, USA
Tomas Cerny, Baylor University, USA
Dongwan Shin, New Mexico Tech, USA

Poster Papers

FingerCI: Generating Specifications for Critical Infrastructures ................................................................. 183
Filipe Apolinário, INOV INESC Inovação, Portugal
Nelson Escravana, INOV INESC Inovação, Portugal
Éric Hervé, Alstef Group, France
Miguel L. Pardal, INESC-ID, Portugal
Miguel Correia, INESC-ID, Portugal

Efficient and Scalable Geographical Peer Matching for P2P Energy Sharing Communities ....................... 187
Romaric Duvignau, Chalmers University of Technology, Sweden
Vincenzo Gulisano, Chalmers University of Technology, Sweden
Marina Papatriantafilou, Chalmers University of Technology, Sweden

Planetary Digital Twin: A Case Study in Aquaculture ........................................................................... 191
Rafael Teixeira, Federal University of Rio Grande, Brazil
Juliana Puccinelli, Federal University of Rio Grande, Brazil
Bruna de Vargas Guterres, Federal University of Rio Grande, Brazil
Marcelo Rita Pias, Federal University of Rio Grande, Brazil
Vinícius Menezes Oliveira, Federal University of Rio Grande, Brazil
Silvia Silva da Costa Botelho, Federal University of Rio Grande, Brazil
Luis Poersch, Federal University of Rio Grande, Brazil
Nelson Duarte Filho, Federal University of Rio Grande, Brazil
Ahmed Janati, Bioceanor, France
Maxime Paris, Bioceanor, France
A Framework for Representing Internet of Things Security and Privacy Policies and Detecting Potential Problems .......................................................... 198
Anthony Opara, University of Texas at Dallas, USA
Haan Johng, University of Texas at Dallas, USA
Tom Hill, Fellows Consulting Group, LLC, USA
Lawrence Chung, University of Texas at Dallas, USA

cpp-tiny-client: A Secure API Client Generator for IoT Devices ................................................................. 202
Anders Aaen Springborg, Aalborg University, Denmark
Martin Kaldahl Andersen, Aalborg University, Denmark
Kaare Holland Hattel, Aalborg University, Denmark
Michele Albano, Aalborg University, Denmark

Energy-Efficient Fog Computing-Enabled Data Transmission Protocol in Tactile Internet-Based Applications .............................................................................. 206
Ali Kadhum Idrees, University of Babylon, Iraq
Tara Ali-Yahiya, Universite Paris-Saclay, France
Sara Kadhum Idrees, University of Babylon, Iraq
Raphael Couturier, Universite Bourgogne Franche-Comte, France

Rethinking the Security of IoT from the Perspective of Developer Customized Device-Cloud Interaction ................................................................. 210
Yiwei Zhang, Shanghai Jiao Tong University, China
Juanru Li, Shanghai Jiao Tong University, China
Dawu Gu, Shanghai Jiao Tong University,

Theme: Distributed Systems
DADS - Dependable, Adaptive, and Trustworthy Distributed Systems Track
Track Co-Chairs: Karl M. Goeschka, UAS Technikum Vienna, Austria
Matti Hiltunen, AT&T Shannon Laboratory, USA
Rui Oliveira, Universidade do Minho, Portugal

Track Editorial ................................................................................................................................................. 214

A General and Configurable Framework for Blockchain-Based Marketplaces ........................................... 216
Andrea Merlina, University of Oslo, Norway
Roman Vitenberg, University of Oslo, Norway
Vinay Setty, University of Stavanger, Norway

Redundant Dataflow Applications on Clustered Manycore Architectures ................................................. 226
Christoph Kühbacher, University of Augsburg, Germany
Theo Ungerer, University of Augsburg, Germany
Sebastian Altmeyer, University of Augsburg, Germany

RANC: Reward-All Nakamoto Consensus .................................................................................................... 236
Rami A. Khalil, Imperial College London, UK
Naranker Dulay, Imperial College London, UK
ElastiQuant: Elastic Quantization Strategy for Communication Efficient Distributed Machine Learning in IoT ................................................................. 246
Bharath Sudharsan, National University of Ireland, Galway, Ireland
John G. Breslin, National University of Ireland, Galway, Ireland
Muhammad Intizar Ali, Dublin City University, Ireland
Peter Corcoran, National University of Ireland, Galway, Ireland
Rajiv Ranjan, Newcastle University, UK

An Event-Driven Strategy for Reactive Replica Balancing on Apache Hadoop Distributed File System .............................................................. 255
Rhauani Weber Aita Fazul, Universidade Federal de Santa Maria, Brazil
Patrícia Pitthan Barcelos, Universidade Federal de Santa Maria, Brazil

Poster Papers

Adaptive Database Synchronization for an Online Analytical Cloud-to-Edge Continuum .................. 264
Daniel Costa, INESC TEC and Universidade do Minho, Portugal
José Pereira, INESC TEC and Universidade do Minho, Portugal
Ricardo Vilaça, INESC TEC and Universidade do Minho, Portugal
Nuno Faria, INESC TEC and Universidade do Minho, Portugal

An Architecture Proposal for Checkpoint/Restore on Stateful Containers .................................. 267
Rodrigo H. Müller, Universidade Federal de Santa Catarina, Brazil
Cristina Meinhardt, Universidade Federal de Santa Catarina, Brazil
Odorico M. Mendizabal, Universidade Federal de Santa Catarina, Brazil

Theme: Distributed Systems

DAPP - Decentralized Applications with Blockchain, DLT and Crypto-Currencies Track
Track Co-Chairs: Suzana Maranhão Moreno, University of Geneva, Switzerland
Jean-Marc Seigneur, University of Geneva, Switzerland

Track Editorial ................................................................. 271

Trac2Chain: Trackability and Traceability of Graph Data in Blockchain with Linkage Privacy ........ 272
Wenyi Tang, University of Notre Dame, USA
Changhao Chenli, University of Notre Dame, USA
Chanyang Ju, Hanyang University, Korea
Taeho Jung, University of Notre Dame, USA

Calibrating the Performance and Security of Blockchains via Information Propagation Delays ....... 282
Julius Fechner, Vrije Universiteit Amsterdam, The Netherlands
Balakrishnan Chandrasekaran, Vrije Universiteit Amsterdam, The Netherlands
Marc X. Makkes, Vrije Universiteit Amsterdam, The Netherlands

Porting a Benchmark with a Classic Workload to Blockchain: TPC-C on Hyperledger Fabric .......... 290
Attila Klenik, Budapest University of Technology and Economics, Hungary
Imre Kocsis, Budapest University of Technology and Economics, Hungary

FL-MAB: Client Selection and Monetization for Blockchain-Based Federated Learning ................. 299
Zahra Batool, École de Technologie Supérieure, Canada
Kaiwen Zhang, École de Technologie Supérieure, Canada
Matthew Toews, École de Technologie Supérieure, Canada
Towards CBDC-Based Machine-to-Machine Payments in Consumer IoT ................................................ 308
Nadia Pocher, Universitat Autònoma de Barcelona, Spain
Mirko Zichichi, Universidad Politécnica de Madrid, Spain

Model Checking of Vulnerabilities in Smart Contracts: A Solidity-to-CPN Approach ........................... 316
Ikram Garfatta, University of Tunis El Manar, Tunisia and University Sorbonne Paris North, France
Kais Klai, University Sorbonne Paris North, France
Mohamed Graiet, University of Monastir, Tunisia
Walid Gaaloul, Institut Mines-Télécom, Télécom SudParis, France

Poster Papers

Manipulation Detection in Cryptocurrency Markets: An Anomaly and Change Detection Based Approach ............................................................................................................................................... 326
Olaf Kampers, Utrecht University, The Netherlands
Abdulhakim Qahtan, Utrecht University, The Netherlands
Swati Mathur, ChainSlayer, The Netherlands
Yannis Velegrakis, Utrecht University, The Netherland and University of Trento, Italy

Towards a Decentralized Social Trust Solution to Proof-of-Address ......................................................... 330
Suzana Mesquita de Borba Maranhão Moreno, University of Geneva, Switzerland
Jean-Marc Seigneur, University of Geneva, Switzerland

An Extensive Agent-Based Simulation Study of Sycomore++, a DAG-Based Permissionless Ledger ..................................................................................................................................... 334
Aimen Djari, Université Paris-Saclay, France
Emmanuelle Anceaume, CNRS, France
Sara Tucci-Piergiovanni, Université Paris-Saclay, France

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 ................................................................................................................................................. 337

Toward Replicated and Asynchronous Data Streams for Edge-Cloud Applications ................................ 339
Owais Quayyum, University of Tromsø – The Arctic University of Norway, Norway
Weihai Yu, University of Tromsø – The Arctic University of Norway, Norway

Evaluating the Integration of Datasets .......................................................................................................... 347
Matteo Paganelli, University of Modena and Reggio Emilia, Italy
Francesco Del Buono, University of Modena and Reggio Emilia, Italy
Francesco Guerra, University of Modena and Reggio Emilia, Italy
Nicola Ferro, University of Padua, Italy

A Graph-Based Blocking Approach for Entity Matching Using Pre-trained Contextual Embedding Models .......................................................................................................................................... 357
John Bosco Mugeni, University of Tsukuba, Japan
Toshiyuki Amagasa, University of Tsukuba, Japan
Unifying Categorical Representation of Multi-Model Data ................................................................. 365
Pavel Koupil, Charles University, Czech Republic
Irena Holubová, Charles University, Czech Republic

Indexer++: Workload-Aware Online Index Tuning with Transformers and Reinforcement Learning ................................................................. 372
Vishal Sharma, Utah State University, USA
Curtis Dyreson, Utah State University, USA

Poster Papers

Querying Multidimensional Big Data through a Chatbot System .............................................................. 381
Maria Helena Franciscatto, Federal University of Paraná, Brazil
Marcos Didonet Del Fabro, Federal University of Paraná, Brazil
Celio Trois, Federal University of Santa Maria, Brazil
Jordi Cabot, ICREA-UOC, Spain
Leon Augusto Okida Gonçalves, Federal University of Paraná, Brazil

A Comprehensive Approach to Conceptual Modelling and Visual Representation of Log Files .......... 385
Evelina Rakhmetova, Università degli Studi di Verona, Italy
Marco Garosi, Università degli Studi di Verona, Italy
Carlo Combi, Università degli Studi di Verona, Italy

Student Research Abstract: Spatial Data Processing Meets RDF Graph Exploration ................................ 389
Houssameddine Yousfi, LIAS Laboratory, France and LRIT Laboratory, Algeria

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 ................................................................................................................................................. 393

Variable Size Segmentation for Efficient Representation and Querying of Non-uniform Time Series Datasets ............................................................................................................................................ 395
Lamia Djebour, Inria, France
Reza Akbarinia, Inria, France
Florent Masseglia, Inria, France

“Do You Know Existing Accuracy Metrics Overrate Time-Series Anomaly Detection?” ................. 403
Won-Seok Hwang, The Affiliated Institute of ETRI, Korea
Jeong-Han Yun, The Affiliated Institute of ETRI, Korea
Jonguk Kim, The Affiliated Institute of ETRI, Korea
Byung Gil Min, The Affiliated Institute of ETRI, Korea
K-Core Decomposition on Super Large Graphs with Limited Resources .......................................................... 413
Shicheng Gao, Peking University, China
Jie Xu, Tencent Inc., China
Xiaosen Li, Tencent Inc., China
Fangcheng Fu, Peking University, China
Wentao Zhang, Peking University, China
Wen Ouyang, Tencent Inc., China
Yangyu Tao, Tencent Inc., China
Bin Cui, Peking University, China

Sparse Tensor Storage by Tensor Unfolding ...................................................................................................... 423
K. M. Azharul Hasan, Khulna University of Engineering & Technology, Bangladesh
Md. Safayet Hossain, Khulna University of Engineering & Technology, Bangladesh

EiFFeL: Enforcing Fairness in Forests by Flipping Leaves ............................................................................... 429
Seyum Assefa Abebe, Ca'Foscarì University of Venice, Italy
Claudio Lucchese, Ca'Foscarì University of Venice, Italy
Salvatore Orlando, Ca'Foscarì University of Venice, Italy

Poster Papers

Efficient Memory Utilization in Conformance Checking of Process Event Streams ........................................ 437
Rashid Zaman, Eindhoven University of Technology, The Netherlands
Marwan Hassani, Eindhoven University of Technology, The Netherlands
Boudewijn F. van Dongen, Eindhoven University of Technology, The Netherlands

Nested Trees for Longitudinal Classification .................................................................................................. 441
Sergey Ovchinnik, University of Kent, UK
Fernando Otero, University of Kent, UK
Alex A. Freitas, University of Kent, UK

Student Research Abstract: Mining High Average Utility Pattern Using Bio-Inspired Algorithm .......... 445
Nam Ngoc Pham, Tomas Bata University, Czech Republic

Theme: Information Systems

DS - Data Streams Track
Track Co-Chairs: Albert Bifet, AI Institute, University of Waikato, New Zealand
Carlos Ferreira, INESC Porto, University of Porto, Portugal
João Gama, INESC Porto, University of Porto, Portugal
Heitor Murilo Gomes, AI Institute, University of Waikato, New Zealand

Track Editorial .................................................................................................................................................. 449

Optimizing ADWIN for Steady Streams .......................................................................................................... 450
Hassan Moharram, Nile University, Egypt
Ahmed Awad, University of Tartu, Estonia and Nile University, Egypt
Passent M. El-Kafrawy, Nile University, Egypt

pi-Lisco: Parallel and Incremental Stream-Based Point-Cloud Clustering ....................................................... 460
Hannaneh Najdataei, Chalmers University of Technology, Sweden
Vincenzo Gulisano, Chalmers University of Technology, Sweden
Philippas Tsigas, Chalmers University of Technology, Sweden
Marina Papatriantafilou, Chalmers University of Technology, Sweden
Learning on Streaming Graphs with Experience Replay ........................................................................................................... 470
Massimo Perini, University of Edinburgh, UK
Giorgia Ramponi, ETH Zürich, Switzerland
Paris Carbone, KTH Royal Institute of Technology, Sweden
Vasiliki Kalavri, Boston University, USA

Theme: System Software and Security

EMBS - Embedded Systems Track

Track Co-Chairs: Jalil Boukhobza, ENSTA Bretange, France
Hung-Wei Tseng, University of California Riverside, USA
Chien-Chung Ho, National Chung-Kung University, Taiwan

Track Editorial ....................................................................................................................................................................................... 479

Improving CRPD Analysis for EDF Scheduling: Trading Speed for Precision ................................................................. 481
Fabien Bouquillon, Université de Lille and Université Polytechnique Hauts-de-France, France
Giuseppe Lipari, Université de Lille, France
Smail Niar, Université Polytechnique Hauts-de-France, France

Simulating Execution Time and Power Consumption of Real-Time Tasks on Embedded Platforms .............................................................. 491
Gabriele Ara, Scuola Superiore Sant'Anna, Italy
Tommaso Cucinotta, Scuola Superiore Sant'Anna, Italy
Agostino Mascitti, Scuola Superiore Sant'Anna, Italy

CETAS: A Cluster Based Energy and Temperature Efficient Real-Time Scheduler for Heterogeneous Platforms ........................................ 501
Yanshul Sharma, Indian Institute of Information Technology Guwahati, India
Sanjay Moulik, Indian Institute of Information Technology Guwahati, India

Detecting Return-Oriented Programming on Firmware-Only Embedded Devices Using Hardware Performance Counters ................................................................................................................... 510
Adebayo Omotosho, University of Passau, Germany
Gebrehiwet B. Welearegai, University of Passau, Germany
Christian Hammer, University of Passau, Germany

Towards Privacy Aware Deep Learning for Embedded Systems .................................................................................................. 520
Vasisht Duddu, University of Waterloo, Canada
Antoine Boutet, INSA Lyon, France
Virat Shejwalkar, University of Massachusetts Amherst, USA

Poster Papers

At-Scale Assessment of Weight Clustering for Energy-Efficient Object Detection Accelerators .................. 530
Martí Caro, Barcelona Supercomputing Center and Universitat Politècnica de Catalunya, Spain
Hamid Tabani, Barcelona Supercomputing Center, Spain
Jaume Abella, Barcelona Supercomputing Center, Spain

A Priority-Aware Multiqueue NIC Design for Real-Time IoT Devices ....................................................................................... 534
Ilja Behnke, Technische Universität Berlin, Germany
Phllipp Wiesner, Technische Universität Berlin, Germany
Robert Danicki, Technische Universität Berlin, Germany
Lauritz Thamsen, Technische Universität Berlin, Germany
**Theme: Information Systems**

**GIA - Geographical Information Analytics Track**

**Track Co-Chairs:** Gavin McArdle, University College Dublin, Ireland  
Eric Kergosien, University of LILLE, France  
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Bianca Schoen-Phelan, Technological University Dublin, Ireland

**Track Editorial** ................................................................................................................................................. 537

**Place Embedding across Cities in Location-Based Social Networks** ......................................................................................................................... 539  
Christophe Haikal, Tianjin University, China and Pôle Universitaire Léonard de Vinci, France  
Pegah Alizadeh, Pôle Universitaire Léonard de Vinci, France  
Christophe Rodrigues, Pôle Universitaire Léonard de Vinci, France  
Bi Chongke, Tianjin University, China

**An ETL-Like Platform for the Processing of Mobility Data** ......................................................................................................................... 547  
Maxime Masson, University of Pau and Pays Adour, France  
Cécile Cayéré, La Rochelle University, France  
Marie-Noëlle Bessagnet, University of Pau and Pays Adour, France  
Christian Sallaberry, University of Pau and Pays Adour, France  
Philippe Roose, University of Pau and Pays Adour, France  
Cyril Faucher, La Rochelle University, France

**Propagation Measure on Circulation Graphs for Tourism Behavior Analysis** ................................................................. 556  
Hugo Prevoteau, Tianjin University, China and Pôle Universitaire Léonard de Vinci, France  
Sonia Djebali, Pôle Universitaire Léonard de Vinci, France  
Zhao Laiping, Tianjin University, China  
Nicolas Travers, Pôle Universitaire Léonard de Vinci, France

**Poster Papers**

**Discovery of Tourists’ Movement Patterns in Venice from Public Transport Data** ......................................................... 564  
Héctor Cogollos Adrián, Universidad de Burgos, Spain  
Santiago Porras Alfonso, Universidad de Burgos, Spain  
Bruno Baruque Zanón, Universidad de Burgos, Spain  
Alessandra Raffaetà, Ca’ Foscari University of Venice, Italy  
Filippo Zanatta, Ca’ Foscari University of Venice, Italy

**Theme: Artificial Intelligence and Agents**

**GMLR - Graph Models for Learning and Recognition Track**

**Track Co-Chairs:** Donatello Conte, Universite de Tours, France  
Jean-Yves Ramel, Universite de Tours, France  
Giuliano Grossi, University of Milan, Italy  
Raffaella Lanzarotti, University of Milan, Italy  
Jianyi Lin, Università Cattolica del Sacro Cuore, Italy

**Track Editorial** ................................................................................................................................................. 568
SAGA-Net: Efficient Pointcloud Completion with Shape-Assisted Graph Attention
Neural Network .................................................................................................................................................. 569
Liuyue Xie, Carnegie Mellon University, USA
Tinglin Duan, University of Toronto, Canada
Kenji Shimada, Carnegie Mellon University, USA

Learning Football Player Features Using Graph Embeddings for Player Recommendation System .... 577
Öznur İlayda Yılmaz, Istanbul Technical University, Turkey
Şule Gündüz Öğüdüçü, Istanbul Technical University, Turkey

Deep Graph Neural Network for Video-Based Facial Pain Expression Assessment ........................................ 585
Sabrina Patania, University of Milan, Italy
Giuseppe Boccignone, University of Milan, Italy
Sathya Buršić, University of Milan, Italy
Alessandro D’Amelio, University of Milan, Italy
Raffaella Lanzarotti, University of Milan, Italy

Compact Graph Neural Network Models for Node Classification ................................................................. 592
Luca Pasa, Università Degli Studi di Padova, Italy
Nicolò Navarin, Università Degli Studi di Padova, Italy
Alessandro Sperduti, Università Degli Studi di Padova, Italy

SRC

Student Research Abstract: Continuous-Time Generative Graph Neural Network for Attributed
Dynamic Graphs .................................................................................................................................................. 600
Alice Moallemy-Oureh, University of Kassel, Germany

Student Research Abstract: Using Local Activity Encoding for Dynamic Graph Pooling in
Structural-Dynamic Graphs ............................................................................................................................. 604
Silvia Beddar-Wiesing, University of Kassel, Germany

Theme: Information Systems

HIBIO - Health Informatics and Bioinformatics Track
Track Co-Chairs: Anu Mary Chako, National Institute of Technology Calicut, India
Gopakumar G, National Institute of Technology Calicut, India

Track Editorial ...................................................................................................................................................... 608

A Fast Unsupervised Assignment of ICD Codes with Clinical Notes through Explanations ............... 610
Amit Kumar, Optum Global Advantage, India
Suman Roy, Optum Global Advantage, India
Sourabh Bhattacharjee, New York University, USA

Improving Ligand Transport Trajectory within Flexible Receptor in CaverDock .................................. 619
Petra Němcová, Masaryk University, Czech Republic
Jana Hozzová, Masaryk University, Czech Republic
Jiří Filipovič, Masaryk University, Czech Republic
Configuring a Federated Network of Real-World Patient Health Data for Multimodal Deep Learning Prediction of Health Outcomes

Christian Haudenschild, University of Minnesota School of Medicine, USA
Louis Vaickus, Dartmouth Hitchcock Medical Center, USA
Joshua Levy, Dartmouth Hitchcock Medical Center, USA

Development of Biologically Interpretable Multimodal Deep Learning Model for Cancer Prognosis Prediction

Zarif L. Azher, Thomas Jefferson High School for Science and Technology, USA
Louis J. Vaickus, Dartmouth Hitchcock Medical Center, USA
Lucas A. Salas, Dartmouth College Geisel School of Medicine, USA
Brock C. Christensen, Dartmouth College Geisel School of Medicine, USA
Joshua J. Levy, Dartmouth Hitchcock Medical Center, USA

Disentangling Temporal and Amplitude Variations in ECG Synthesis Using Anchored GANs

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Bernd Freisleben, Philipps-Universität Marburg, Germany

A Hybrid Descriptor to Improve Kidney Pathologies Classification

Laiara Cristina da Silva, Universidade Federal do Piauí, Brazil
Vinicius Ponte Machado, Universidade Federal do Piauí, Brazil
Rodrigo de Melo Sousa Veras, Universidade Federal do Piauí, Brazil
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Semiramis Jamil Hadad do Monte, Universidade Federal do Piauí, Brazil
Nayze Lucena Sangreman Aldeman, Federal University of Delta do Parnaíba, Brazil

DAM-AL: Dilated Attention Mechanism with Attention Loss for 3D Infant Brain Image Segmentation

Dinh-Hieu Hoang, University of Science, John von Neumann Institute, and Vietnam National University, Vietnam
Gia-Han Diep, University of Science, John von Neumann Institute, and Vietnam National University, Vietnam
Minh-Triet Tran, University of Science, John von Neumann Institute, and Vietnam National University, Vietnam
Ngan T.H. Le, University of Arkansas, USA

CheReS: A Deep Learning-Based Multi-Faceted System for Similarity Search of Chest X-rays

Ashery Mbilinyi, University of Basel, Switzerland
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Poster Papers

Emotion Detection from Smartphone Keyboard Interactions: Role of Temporal vs Spectral Features

Salma Mandi, Indian Institute of Technology Kharagpur, India
Surjya Ghosh, BITS Pilani Goa, Indian
Pradipta De, Microsoft Corporation, USA
Bivas Mitra, Indian Institute of Technology Kharagpur, India
Data-Driven Depot Pre-positioning Model and Location-Routing Algorithm for Management of Disasters and Disease Outbreaks  .................................................................................................................................................. 681

Sampson E. Akwafuo, California State University, Fullerton, USA and Georgia State University, USA
Armin R. Mikler, Georgia State University, USA
Christopher Ibinegbu, University of Bonn, Germany

Theme: Information Systems

IAR - Information Access and Retrieval Track

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Track Editorial ................................................................................................................................................. 685

Collaborative Is Better than Adversarial: Generative Cooperative Networks for Topic Clustering ...... 688

Andrea Lenzi, Sapienza University of Rome, Italy
Paola Velardi, Sapienza University of Rome, Italy

Aspect Based Sentiment Analysis in Music: A Case Study with Spotify .................................................... 696

Giovanni Maria Biancofiore, Polytechnic University of Bari, Italy
Tommaso Di Noia, Polytechnic University of Bari, Italy
Eugenio Di Sciascio, Polytechnic University of Bari, Italy
Fedelucio Narducci, Polytechnic University of Bari, Italy
Paolo Pastore, Polytechnic University of Bari, Italy

Query-Relevant Sentiment Summarization Based on Facet Identification and Sentence Clustering ..... 704

Matthew Moulton, Brigham Young University, USA
Sophie Gao, Brigham Young University, USA
Yiu-Kai Ng, Brigham Young University, USA

Poster Papers

Towards Open Data Discovery: A Comparative Study ............................................................................... 713

Maria Helena Franciscatto, Federal University of Paraná, Brazil
Marcos Didonet Del Fabro, Universidade Federal do Paraná, Brazil
Celio Trois, Federal University of Santa Maria, Brazil
Hegler Tissot, Drexel University, USA

Assessing Health Misinformation in Online Content ................................................................................... 717

Stefano Di Sotto, University of Milano-Bicocca, Italy
Marco Viviani, University of Milano-Bicocca, Italy

Theme: Artificial Intelligence and Agents

IRMAS - Intelligent Robotics and Multi-Agent Systems Track

Track Chair: Rui P. Rocha, ISR – University of Coimbra, Portugal

Track Editorial ................................................................................................................................................. 721

Towards Fast Fiducial Marker with Full 6 DOF Pose Estimation ............................................................. 723

Jiří Ulrich, Czech Technical University in Prague, Czech Republic
Ahmad Alsayed, The University of Manchester, UK
Farshad Arvin, The University of Manchester, UK
Tomáš Krajnik, Czech Technical University in Prague, Czech Republic
Semi-supervised Learning for Image Alignment in Teach and Repeat Navigation .................................. 731
Zdeněk Rozvylálek, Czech Technical University in Prague, Czech Republic
George Broughton, Czech Technical University in Prague, Czech Republic
Pavel Linder, Czech Technical University in Prague, Czech Republic
Tomáš Rouček, Czech Technical University in Prague, Czech Republic
Keerthy Kusumam, University of Nottingham, UK
Tomáš Krajník, Czech Technical University in Prague, Czech Republic

Learning State-Variable Relationships for Improving POMCP Performance ........................................ 739
Maddalena Zuccotto, Università degli Studi di Verona, Italy
Alberto Castellini, Università degli Studi di Verona, Italy
Alessandro Farinelli, Università degli Studi di Verona, Italy

Learning Adaptive Control in Dynamic Environments Using Reproducing Kernel Priors with
Bayesian Policy Gradients ............................................................................................................................... 748
Apan Dastider, University of Central Florida, USA
Sayyed Jaffar Ali Raza, University of Central Florida, USA
Mingjie Lin, University of Central Florida, USA

Bootstrapped Learning for Car Detection in Planar Lidars ....................................................................... 758
George Broughton, Czech Technical University in Prague, Czech Republic
Jiří Janota, Czech Technical University in Prague, Czech Republic
Jan Blaha, Czech Technical University in Prague, Czech Republic
Tomas Krajník, Czech Technical University in Prague, Czech Republic

Poster Papers

Curriculum Learning for Safe Mapless Navigation ..................................................................................... 766
Luca Marzari, Università degli Studi di Verona, Italy
Davide Corsi, Università degli Studi di Verona, Italy
Enrico Marchesini, Università degli Studi di Verona, Italy
Alessandro Farinelli, Università degli Studi di Verona, Italy

Bounding Optimal Headings in the Dubins Touring Problem .................................................................... 770
Petr Vána, Czech Technical University in Prague, Czech Republic
Jan Faigl, Czech Technical University in Prague, Czech Republic

Realization of Adaptive System Transitions in Self-Adaptive Autonomous Robots ................................. 774
Ana Petrovska, Technical University of Munich, Germany
Julian Weick, CERN, Switzerland

Theme: Artificial Intelligence and Agents

KG - Knowledge Graphs Track

Track Co-Chairs: Feng Xia, Federation University, Australia
                Francesco Osborne, The Open University, UK
                Shuo Yu, Dalian University of Technology, China

GraphSPARQL: A GraphQL Interface for Linked Data ............................................................................ 778
Kevin Angele, University of Innsbruck and Onlim GmbH, Austria
Manuel Meitinger, University of Innsbruck, Austria
Marc Bußjäger, University of Innsbruck, Austria
Stephan Föhl, University of Innsbruck, Austria
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Relational Learning with Hierarchical Attention Encoder and Recoding Validator for Few-Shot Knowledge Graph Completion

Xu Yuan, Dalian University of Technology, China
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Peng Li, Dalian University of Technology, China
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**Poster Papers**

Query-Oriented Entity Spatial-Temporal Summarization in Fuzzy Knowledge Graph

Erhe Yang, Shaanxi Normal University, China
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Aziz Nasridinov, Chungbuk National University, Korea
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Effective Use of BERT in Graph Embeddings for Sparse Knowledge Graph Completion

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Houssam Razouk, Graz University of Technology, Austria
Roman Kern, Graz University of Technology, Austria

Attractiveness Based Conference Ranking

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Mujie Liu, Ningbo Tech University, China
Xiangjie Kong, Zhejiang University of Technology, China
Dongyu Zhang, Dalian University of Technology, China
Sardar M.N. Islam, Victoria University, Australia

Towards Diversity-Tolerant RDF-Stores

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Joseph G. Davis, The University of Sydney, Australia

Theme: Artificial Intelligence and Agents

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Track Editorial

Attention-Based Clinical Note Summarization

Neel Kanwal, University of Stavanger, Norway
Giuseppe Rizzo, Links Foundation, Italy

Linguistic Characterization of Answer Passages for Fact-Seeking Question Answering

Bahadorreza Ofoghi, Deakin University, Australia

Iterative Adversarial Removal of Gender Bias in Pretrained Word Embeddings

Yacine Gaci, University of Lyon, France
Boualem Benatallah, University of New South Wales, Australia
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Khalid Benabdeslem, University of Lyon, France
Hailemariam Mehari Yohannes, University of Tsukuba, Japan
Toshiyuki Amagasa, University of Tsukuba, Japan

Using Distributional Thesaurus to Enhance Transformer-Based Contextualized Representations for Low Resource Languages .......................................................................................................................... 845
Gopalakrishnan Venkatesh, International Institute of Information Technology Bangalore, India
Abhik Jana, Universität Hamburg, Germany
Steffen Remus, Universität Hamburg, Germany
Özge Sevgili, Universität Hamburg, Germany
Gopalakrishnan Srinivasaraghavan, International Institute of Information Technology Bangalore, India
Chris Biemann, Universität Hamburg, Germany

Practical and Efficient Out-of-Domain Detection with Adversarial Learning ......................... 853
Bo Wang, Kyushu University, Japan
Tsunenori Mine, Kyushu University, Japan

Leveraging Multimodal Content for Podcast Summarization ....................................................... 863
Lorenzo Vaiani, Politecnico di Torino, Italy
Moreno La Quatra, Politecnico di Torino, Italy
Luca Caglieri, Politecnico di Torino, Italy
Paolo Garza, Politecnico di Torino, Italy

Poster Papers

Question Answering over Logic Puzzles Using Theorem Proving .................................................. 871
Adrian Groza, Technical University of Cluj-Napoca, Romania
Cristian Nitu, Technical University of Cluj-Napoca, Romania

Effective Utilization of Labeled Data from Related Tasks Using Graph Contrastive Pretraining – Application to Disaster Related Text Classification ..................................................................................... 875
Samujjwal Ghosh, Indian Institute of Technology Hyderabad, India
Subhadeep Maji, Amazon, India
Maunendra Sankar Desarkar, Indian Institute of Technology Hyderabad, India

Context Matters! Identifying Argumentative Relations in Essays ................................................ 879
Gil Rocha, University of Porto, Portugal
Henrique Lopes Cardoso, University of Porto, Portugal

SRC

Student Research Abstract: Dual Architecture for Name Entity Extraction and Relation Extraction with Applications in Medical Corpora ................................................................. 883
Ernesto Quevedo Caballero, Baylor University, USA
Theme: Artificial Intelligence and Agents

KRR - Knowledge Representation and Reasoning Track
Track Co-Chairs: Stefano Bistarelli, Università degli Studi di Perugia, Italy
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                 Francesco Santini, Università degli Studi di Perugia, Italy
                 Carlo Taticchi, Università degli Studi di Perugia, Italy

Track Editorial ................................................................................................................................................. 887

Belief Selection through Argumentation ....................................................................................................... 889
Souhila Kaci, LIRMM, France
Yakoub Salhi, CRIL, France

Topological Semantics for Default Conditional Logic – Preliminary Report ............................................ 897
Costas D. Koutras, American University of the Middle East, Kuwait
Christos Nomikos, University of Ioannina, Greece

Computing Generalizations of Temporal $\mathcal{EL}$ Concepts with Next and Global ............................... 903
Satyadharma Tirtarasa, Technische Universität Dresden, Germany
Anni-Yasmin Turhan, Technische Universität Dresden, Germany

Poster Papers

Update Models for Lying and Misleading Announcements ......................................................................... 911
Loc Pham, New Mexico State University, USA
Tran Cao Son, New Mexico State University, USA
Enrico Pontelli, New Mexico State University, USA

Theme: Distributed Systems

MCANET - Mobile Computing and Applications and Networking Track
Track Co-Chairs: Hong Va Leong, The Hong Kong Polytechnic University, China
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                 Mario M. Freire, University of Beira Interior, Portugal
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                 Ivan Ganchev, University of Limerick, Ireland

Track Editorial ................................................................................................................................................. 914

CEMDA: Detecting Android Complex File Events to Infer the User’s Mental Model ................................. 917
Michael J. May, Asparna Research Center, Israel and Kinneret College on the Sea of Galilee, Israel
Yaakov Cohen, Kinneret College on the Sea of Galilee, Israel
Hovav Menachem, Kinneret College on the Sea of Galilee, Israel
Yogev Swissa, Kinneret College on the Sea of Galilee, Israel

An Automatic Approach to Detect Problems in Android Builds through Screenshot Analysis ................ 926
Lorena P. de Figueiredo, Sidia R&D Institute, Brazil
Jonathan P. Gomes, Sidia R&D Institute, Brazil
Flavia de S. Santos, Sidia R&D Institute, Brazil
Guilherme M. Queiroz, Sidia R&D Institute, Brazil
Felipe T. Giuntini, Sidia R&D Institute, Brazil
Juliano E. Sales, Sidia R&D Institute, Brazil
Estimating the Lifetime of Transient Context for Adaptive Caching in IoT Applications ....................... 933
Shakthi Weerasinghe, Deakin University, Australia
Arkady Zaslavsky, Deakin University, Australia
Seng W. Loke, Deakin University, Australia
Alexey Medvedev, Deakin University, Australia
Amin Abken, Deakin University, Australia

Pktpit: Separating Routing and Packet Transfer for Fast and Scalable Software Routers ..................... 943
Yukito Ueno, The University of Tokyo and NTT Communications, Japan
Ryo Nakamura, The University of Tokyo, Japan
Yohei Kuga, The University of Tokyo, Japan
Hiroshi Esaki, The University of Tokyo, Japan

OpenFlow Rule Placement in Carrier Networks for Augmented Reality Applications ........................... 952
Rafael George Amado, École de Technologie Supérieure, Canada
Kim-Khoa Nguyen, École de Technologie Supérieure, Canada
Mohamed Cheriet, École de Technologie Supérieure, Canada

Poster Papers

Statistical Verification Using Learned Usages for Evaluating Energy-Efficient Mobile Device Design ................................................................. 960
Jiyoung Song, KAIST, Korea
Youlim Jung, DelightRoom, Korea
Chiwoo Cho, Bluepoint Partners, Korea
Eunkyoung Jee, KAIST, Korea
Doo-Hwan Bae, KAIST, Korea

Generating Synthetic Mobility Data for Realistic Populations with RNNs to Improve Utility and Privacy ................................................................. 964
Alex Berke, MIT Media Lab, USA
Ronan Doorley, MIT Media Lab, USA
Kent Larson, MIT Media Lab, USA
Esteban Moro, MIT Media Lab, USA

Pairing-Free Secure-Channel Establishment in Mobile Networks with Fine-Grained Lawful Interception ................................................................. 968
Xavier Bultel, INSA Centre Val-de-Loire, France
Cristina Onete, Université de Limoges, France

Theme: Artificial Intelligence and Agents

MLA - Machine Learning and its Applications Track

Track Co-Chairs:  
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Keon Myung Lee, Chungbuk National University, Korea
Federico Divina, Pablo de Olavide University, Spain

Enhanced Strawberry Image Classification Using Multi-Task Deep Neural Learning ............................ 971
Sandya De Alwis, School of Information Technology, Deakin University, Australia
Bahadorreza Ofoghi, School of Information Technology, Deakin University, Australia
Myung Hwan Na, Department of Mathematics and Statistics, Chonnam National University, Korea
Dual Hybridization Method for the Classification of Ultrasound Breast Tumors
Mingue Song, Towson University, USA
Yanggon Kim, Towson University, USA

Representation Learning via Consistent Assignment of Views to Clusters
Thalles Santos Silva, University of Campinas, Brazil
Adin Ramirez Rivera, Reykjavik University, Iceland

Leveraging N-gram Neural Embeddings to Improve Deep Learning DGA Detection
Christian Morbidoni, Università degli Studi G. d'Annunzio, Italy
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Automatic Disease Vector Mosquitoes Identification via Hierarchical Data Stream Classification
Eduardo Tieppo, Pontifícia Universidade Católica do Paraná, Brazil
Jean Paul Barddal, Pontifícia Universidade Católica do Paraná, Brazil
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A Comparison of Spatio-Temporal Prediction Methods: A Parking Availability Case Study
Claudio Lucchese, Ca’ Foscari University of Venice, Italy
Gianmarco Callegher, University Ca’ Foscari of Venice, Italy
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Silvia Dassiè, Humco S.r.L., Italy

PTD: Privacy-Preserving Human Face Processing Framework Using Tensor Decomposition
Jeongho Kim, Sungkyunkwan University, Korea
Shahroz Tariq, Sungkyunkwan University, Korea
Simon S. Woo, Sungkyunkwan University, Korea

Repairing Misclassifications in Neural Networks Using Limited Data
Patrick Henriksen, Imperial College London, UK
Francesco Leofante, Imperial College London, UK
Alessio Lomuscio, Imperial College London, UK

Visual Context Embeddings for Zero-Shot Recognition
Gunhee Cho, Hanyang University, Korea
Yong Suk Choi, Hanyang University, Korea

Correlation-Based Regularization for Fast and Energy-Efficient Spiking Neural Networks
Chan Sik Han, Chungbuk National University, Korea
Keon Myung Lee, Chungbuk National University, Korea

A New Reference-Based Algorithm Based on Non-Euclidean Geometry for Multi-Stakeholder Media Planning
Fodil Benali, Advanted Group, France
Damien Bodénès, Advanted Group, France
Cyril de Runz, University of Tours, France
Nicolas Labroche, University of Tours, France
A Motion-Based Approach for Real-Time Detection of Pornographic Content in Videos .................. 1066
Jhonatan Geremias, Pontifícia Universidade Católica do Paraná, Brazil
Eduardo K. Viegas, Pontifícia Universidade Católica do Paraná, Brazil
Alceu S. Britto Jr., Pontifícia Universidade Católica do Paraná, Brazil
Altair O. Santin, Pontifícia Universidade Católica do Paraná, Brazil

Run-of-Mine Stockyard Recovery Scheduling and Optimisation for Multiple Reclaimers ............... 1074
Hirad Assimi, University of Adelaide, Australia
Ben Koch, EKA Software Solutions, Australia
Chris Garcia, EKA Software Solutions, Australia
Markus Wagner, University of Adelaide, Australia
Frank Neumann, University of Adelaide, Australia

IA-BERT: Context-Aware Sarcasm Detection by Incorporating Incongruity Attention Layer for Feature Extraction ........................................................................................................................................ 1084
Ida Ayu Putu Ari Crisdayanti, Sungkyunkwan University, Korea
JinYeong Bak, Sungkyunkwan University, Korea
YunSeok Choi, Sungkyunkwan University, Korea
Jee-Hyong Lee, Sungkyunkwan University, Korea

A Classification and Review of Tools for Developing and Interacting with Machine Learning Systems ........................................................................................................................................... 1092
Eduardo Mosqueira-Rey, Universidade da Coruña, Spain
Elena Hernández-Pereira, Universidade da Coruña, Spain
David Alonso-Rios, Universidade da Coruña, Spain
José Bobes-Bascarán, Universidade da Coruña, Spain

Adjusting Inference Time for Power Efficiency in Neuromorphic Architectures ............................. 1102
Seungyeon Lee, Soongsil University, Korea
Jaeseop Kim, Soongsil University, Korea
Bongjae Kim, Chungbuk National University, Korea
Sung Y. Shin, South Dakota State University, USA
Juw Won Park, University of Louisville, USA
Jiman Hong, Soongsil University, Korea

CAIBAL – Cluster-Attribute Interdependency Based Automatic Labeler ........................................ 1109
Marcel Moura, Instituto Federal do Piauí, Brazil
Rodrigo Veras, Universidade Federal do Piauí, Brazil
Vinicius Machado, Universidade Federal do Piauí, Brazil

Cross-Silo Federated Learning Based Decision Trees ...................................................................... 1117
Saikishore Kalloori, ETH Zürich, Switzerland
Severin Klingler, ETH Zürich, Switzerland

Poster Papers

Feature Selection under Fairness Constraints ....................................................................................... 1125
Ginel Dorleon, IRIT, France
Imen Megdiche, IRIT, France
Nathalie Bricon-Souf, IRIT, France
Olivier Teste, IRIT, France
What Averages Do Not Tell – Predicting Real Life Processes with Sequential Deep Learning .......... 1128
István Ketykó, Eindhoven University of Technology, The Netherlands
Felix Mannhardt, Eindhoven University of Technology, The Netherlands
Marwan Hassani, Eindhoven University of Technology, The Netherlands
Boudewijn F. van Dongen, Eindhoven University of Technology, The Netherlands

A Similarity-Based Deep Feature Extraction Method Using Divide and Conquer for Image Classification ................................................................. 1132
Seunghui Jang, Towson University, USA
Yanggon Kim, Towson University, USA

Semi-supervised Clustering via Information-Theoretic Markov Chain Aggregation .................... 1136
Sophie Steger, Graz University of Technology, Austria
Bernhard C. Geiger, Know-Center GmbH, Austria
Marek Śmieja, Jagiellonian University, Poland

Improving Wheat Head Detection: A Data-Centric Approach by Domain Variance Reduction ....... 1140
Abhi Lad, Pandit Deendayal Energy University, India
Mehul S. Raval, Ahmedabad University, India

A Transfer Learning Approach to Predict Shipment Description Quality ........................................... 1144
Xi Chen, Open University of the Netherlands, The Netherlands
Stefano Bromuri, Open University of the Netherlands, The Netherlands
Marko Van Eekelen, Open University of the Netherlands, The Netherlands

A Novel Approach to Discover Numerical Association Based on the Coronavirus Optimization Algorithm ................................................................. 1148
C. Segarra-Martín, International University of Mendéndez Pelayo, Spain
M. Martínez-Ballesteros, University of Seville, Spain
A. Troncoso, Pablo de Olavide University, Spain
F. Martínez-Álvarez, Pablo de Olavide University, Spain

Similarity-Based Uncertainty Scores for Interpretable Deep Learning in Scientific Applications ...... 1152
Lillian Roelofs, University of Houston, USA
Claire Weissman, Whitman College, USA
Daniela Raicu, DePaul University, USA
Jacob Furst, DePaul University, USA
Roselyne Tchoua, DePaul University, USA

Theme: System Software and Security

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Hong Min, Gachon University, Korea
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A Framework for OS Portability: From Formal Models to Low-Level Code ................................. 1156
Renata Martins Gomes, Graz University of Technology, Austria
Marcel Baunach, Graz University of Technology, Austria
Enhanced Configurable Snapshot: Snapshot-Based Fast Booting on NAND Flash with Lifetime Control

Kyungsik Lee, LG Electronics, Korea
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DMAFV: Testing Device Drivers against DMA Faults

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R&R Tool for Android Applications Hiding Malicious Features

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Poster Papers

Copying Values v.s. References for Memory Page Compaction in Virtualized Systems

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An Efficient and Parallel File Defragmentation Scheme for Flash-Based SSDs

Guangyu Zhu, Chung-Ang University, Korea
Jeongeun Lee, Chung-Ang University, Korea
Yongseok Son, Chung-Ang University, Korea

Band Selection Techniques Using Discrete Ranges and MaxPooling Operations for Hyperspectral Image Pixel Classification

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Jungsoo Lee, Hansung University, Korea
Byunghyun Jeong, Hansung University, Korea
Junyoung Heo, Hansung University, Korea
**Theme: System Software and Security**

**PDP - Privacy by Design in Practice Track**

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Christoph Sorge, Saarland University, Germany

**Track Editorial** ........................................................................................................................................... 1216

**Can Blockchains and Data Privacy Laws Be Reconciled? A Fundamental Study of How Privacy-Aware Blockchains Are Feasible**  .......................................................... 1218

Christoph Stach, University of Stuttgart, IPVS, Germany  
Clémentine Gritti, University of Canterbury, New Zealand  
Dennis Przytarski, University of Stuttgart, IPVS, Germany  
Bernhard Mitschang, University of Stuttgart, IPVS, Germany

**Ensuring Privacy in the Application of the Brazilian General Data Protection Law (LGPD)** ............... 1228

Evandro Thalles Vale de Castro, University of Brasilia, Brazil  
Geovana R.S. Silva, University of Brasilia, Brazil  
Edna Dias Canedo, University of Brasilia, Brazil

**Mitigation Lost in Translation: Leveraging Threat Information to Improve Privacy Solution Selection** ................................................................................................................................. 1236

Ala'a Al-Momani, Ulm University, Germany  
Christoph Bösch, Ulm University, Germany  
Kim Wuyts, KU Leuven, Belgium  
Laurens Sion, KU Leuven, Belgium  
Wouter Joosen, KU Leuven, Belgium  
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**Theme: Software Design and Development**

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Rajeev R. Raje, Indiana University-Purdue University-Indianapolis, USA

**Track Editorial** ........................................................................................................................................... 1246

**Synchronous Semantics of Multi-Mode Multi-Periodic Systems** ............................................................ 1248

Frédéric Fort, Université de Lille, France  
Julien Forget, Université de Lille, France

**Constraint-Logic Object-Oriented Programming on the Java Virtual Machine** ......................................... 1258

Hendrik Winkelmann, University of Münster, Germany  
Herbert Kuchen, University of Münster, Germany

**Condition-Based Synchronization in Data-Centric Concurrency Control** .............................................. 1268

David Neves, Universidade NOVA de Lisboa, Portugal  
Hervé Paulino, Universidade NOVA de Lisboa, Portugal

**Poster Papers**

**Model-Driven Customizing of ERP Systems: A Case Study** ........................................................................ 1276

Jonathan Neugebauer, University of Münster, Germany  
Herbert Kuchen, University of Münster, Germany
Differential Testing of Simulation-Based VM Generators: Automatic Detection of VM Generator Semantic Gaps between Simulation and Generated VMs ................................................................. 1280
Pierre Misse-Chanabier, Inria, France
Guillermo Polito, Université de Lille, France
Stéphane Ducasse, Inria, France
Noury Bouraqadi, IMT Nord Europe, France
Luc Fabresse, IMT Nord Europe, France
Pablo Tesone, Inria, France

Synchronization Operator for Communication Privacy ................................................................. 1284
Bogdan Aman, Alexandru Ioan Cuza University, Romania
Gabriel Ciobanu, Alexandru Ioan Cuza University and Romanian Academy, Institute of Computer Science, Romania

Theme: Software Design and Development

RE - Requirements Engineering Track
Track Co-Chairs: Julio Cesar Sampaio Prado Leite, Pontifical Catholic Univ. of Rio de Janeiro, Brazil
Maria Lencastré, Universidade de Pernambuco, Brazil
Miguel Goulão, Universidade Nova de Lisboa, Portugal

Track Editorial ............................................................................................................................................... 1288

A Survey on Requirements Notations in Software Engineering Research ................................. 1291
Larissa Mangolim Amaral, Universidade de São Paulo, Brazil
Fábio Levy Siqueira, Universidade de São Paulo, Brazil
Anarosa Alves Franco Brandão, Universidade de São Paulo, Brazil

Requirements Engineering for Autonomous Vehicles: A Systematic Literature Review .......... 1299
Quelita A.D.S. Ribeiro, Universidade Federal de Pernambuco, Brazil
Moniky Ribeiro, Universidade Federal de Pernambuco, Brazil
Jaelson Castro, Universidade Federal de Pernambuco, Brazil

Studying Industry Practices of Accessibility Requirements in Agile Development ..................... 1309
Darliane Miranda, Universidade NOVA de Lisboa, Portugal
João Araujo, Universidade NOVA de Lisboa, Portugal

Elicitation of Adaptive Requirements Using Creativity Triggers: A Controlled Experiment ....... 1318
Fabian Kneer, Dortmund University of Applied Sciences and Arts, Germany
Erik Kamsties, Dortmund University of Applied Sciences and Arts, Germany
Klaus Schmid, University of Hildesheim, Germany

A Bayesian Network-Based Model to Understand the Role of Soft Requirements in Technology Acceptance: The Case of the NHS COVID-19 Test and Trace App in England and Wales .......... 1327
Luis H. Garcia Paucar, Aston University, UK
Nelly Bencomo, Durham University, UK
Alistair Sutcliffe, Durham University, UK
Peter Sawyer, Aston University, UK

Poster Papers

Impact of Korean Culture on the Selection of RE Elicitation Methods ........................................ 1337
Alexander Uder, University of Applied Sciences Wuerzburg-Schweinfurt, Germany and Ajou University, Korea
Isabel John, University of Applied Sciences Wuerzburg-Schweinfurt, Germany
Seok-Won Lee, Ajou University, Korea
A User-Centric Threat Model and Repository for Cyber Attacks ............................................................ 1341
Prerit Datta, Texas Tech University, USA
Sara Sartori, Texas Tech University, USA
Luis Felipe Gutiérrez, Texas Tech University, USA
Faranak Abri, Texas Tech University, USA
Akbar Siambi Namin, Texas Tech University, USA
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Theme: System Software and Security
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Panagiotis Symeonidis, Free University of Bozen-Bolzano, Italy

Track Editorial ............................................................................................................................................... 1345

Predicting Links in a Social Network Based on Recognised Personalities ................................................. 1347
Andrew Aquilina, University of Malta, Malta
Charlie Abela, University of Malta, Malta

Rating Consistency Is Consistently Underrated: An Exploratory Analysis of Movie-Tag Rating Inconsistency ...................................................................................................................................... 1355
Denis Kotkov, University of Helsinki, Finland
Alan Medlar, University of Helsinki, Finland
Umesh Raj Satyal, Åbo Akademi University, Finland
Alexandr Maslov, Åbo Akademi University, Finland
Mats Neovius, Åbo Akademi University, Finland
Dorota Glowacka, University of Helsinki, Finland

Shap-Enhanced Counterfactual Explanations for Recommendations .......................................................... 1365
Jinfeng Zhong, Université Paris-Dauphine, France
Elsa Negre, Université Paris-Dauphine, France

GAN-Based Matrix Factorization for Recommender Systems ........................................................................ 1373
Ervin Dervishaj, ContentWise and Politecnico di Milano, Italy
Paolo Cremonesi, Politecnico di Milano, Italy

IPreMom: A Continual Learning-Based Image Rating Framework for Infant Precious Moments Capturing ....................................................................................................................................... 1382
Yu Huang, National Yang Ming Chiao Tung University, Taiwan
Ju-Hui Tseng, National Yang Ming Chiao Tung University, Taiwan
Ching-Jui Hsiao, Compal Electronics, Taiwan
Hui-Mei Hung, Compal Electronics, Taiwan
Vincent S. Tseng, National Yang Ming Chiao Tung University, Taiwan

F2VAE: A Framework for Mitigating User Unfairness in Recommendation Systems ............................... 1391
Rodrigo Borges, Tampere University, Finland
Kostas Stefanidis, Tampere University, Finland
Poster Papers

On the Impact of Data Sampling on Hyper-Parameter Optimisation of Recommendation Algorithms .......................................................... 1399
Matteo Montanari, Politecnico di Milano, Italy
Cesare Bernardis, Politecnico di Milano, Italy
Paolo Cremonesi, Politecnico di Milano, Italy

Bias Disparity in Graph-Based Collaborative Filtering Recommenders ................................................................. 1403
Georgios Boltsis, University of Ioannina, Greece
Evaggelia Pitoura, University of Ioannina, Greece

Theme: Software Design and Development

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

Track Co-Chairs: Matteo Camilli, Free University of Bozen-Bolzano, Italy
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Track Editorial ............................................................................................................................................... 1407

Software Layer Recovery through Ego Network Analysis ................................................................. 1410
Sanjay B. Thakre, Dr. Babasaheb Ambedkar Technological University, India
Arvind W. Kiwelekar, Dr. Babasaheb Ambedkar Technological University, India

HYGAR: A Hybrid Genetic Algorithm for Software Architecture Recovery ........................................ 1417
Milad Elyasi, Ozyegin University, Turkey
Muhammed Esad Simitcioglu, Ozyegin University, Turkey
Abdullah Saydemir, Ozyegin University, Turkey
Ali Ekici, Ozyegin University, Turkey
Hasan Sozer, Ozyegin University, Turkey

Continuous Evaluation of Software Architectures: An Overview of the State of the Art .......... 1425
Rodrigo C. Soares, University of São Paulo, Brazil
Vinicius dos Santos, University of São Paulo, Brazil
Elisa Yumi Nakagawa, University of São Paulo, Brazil

A Federated Machine Learning Approach to Detect International Revenue Share Fraud on the 5G Edge ................................................................. 1432
Luis Ferreira, University of Minho, Portugal
Leopoldo Silva, University of Minho, Portugal
Diana Pinho, University of Minho, Portugal
Francisco Morais, CCG, Portugal
Carlos Manuel Martins, WeDo Technologies, Portugal
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Henry Muccini, University of L’Aquila, Italy
Karthik Vaidhyanathan, University of L’Aquila, Italy

Poster Papers

X-IoT: A Model-Driven Approach for Cross-Platform IoT Applications Development ......................... 1448
Flavio Corradini, University of Camerino, Italy
Arianna Fedeli, University of Camerino, Italy
Fabrizio Fornari, University of Camerino, Italy
Andrea Polini, University of Camerino, Italy
Barbara Re, University of Camerino, Italy

DevOps and Microservices in Scientific System Development: Experience on a Multi-Year Industry Research Project ............................................................................................................................ 1452
Maximilien de Bayser, IBM Research, Brazil
Vinicius Segura, IBM Research, Brazil
Leonardo G. Azevedo, IBM Research, Brazil
Leonardo P. Tizzei, IBM Research, Brazil
Raphael Thiago, IBM Research, Brazil
Elton Soares, IBM Research, Brazil
Renato Cerqueira, IBM Research, Brazil

Estimating the Energy Consumption of Software Components from Size, Complexity and Code Smells Metrics ................................................................................................................................................ 1456
Daniel Guamán, Universidad Politécnica de Madrid, Spain and Universidad Técnica Particular de Loja, Ecuador
Jenifer Pérez, Universidad Politécnica de Madrid, Spain
Priscila Valdiviezo-Diaz, Universidad Técnica Particular de Loja, Ecuador
Norberto Cañas, Universidad Politécnica de Madrid, Spain

SRC

Student Research Abstract: Microservices-Based Systems Visualization .................................................. 1460
Amr S. Abdelfattah, Baylor University, USA

Theme: Software Design and Development

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

Track Editorial ............................................................................................................................................... 1464

A Longitudinal Study of Hacker Behaviour ................................................................................................ 1465
Thomas Walshe, University of Oxford, UK
Andrew Simpson, University of Oxford, UK
Evolution of a Haskell Repository and Its Use of Monads: An Exploratory Study of Stackage ........................................ 1475
Paul Leger, Universidad Católica del Norte, Chile
Felipe Ruiz, Universidad Católica del Norte, Chile
Nicolás Sepúlveda, Universidad Católica del Norte, Chile
Ismael Figueroa, Pragmatics Lab, Chile

Are Tags ‘It?’: Analysis of the Impact of Tags on StackOverflow Questions ......................................................... 1483
Von Ihipathachai, East Carolina University, USA
Maral Azizi, East Carolina University, USA

Automating the Measurement of Heterogeneous Chatbot Designs ................................................................. 1491
Pablo C. Cañizares, Universidad Autónoma de Madrid, Spain
Sara Pérez-Soler, Universidad Autónoma de Madrid, Spain
Esther Guerra, Universidad Autónoma de Madrid, Spain
Juan de Lara, Universidad Autónoma de Madrid, Spain

Constraint-Logic Object-Oriented Programming for Test Case Generation ....................................................... 1499
Hendrik Winkelmann, University of Münster, Germany
Laura Troost, University of Münster, Germany
Herbert Kuchen, University of Münster, Germany

How Does the First Buggy File Work Well for Iterative IR-Based Bug Localization? .................................. 1509
Misoo Kim, Sungkyunkwan University, Korea
Youngkyoung Kim, Sungkyunkwan University, Korea
Eunseok Lee, Sungkyunkwan University, Korea

Fighting Evil Is Not Enough When Refactoring Metamodels: Promoting the Good Also Matters ........... 1517
Oussama Ben Sghaier, University of Montreal, Canada
Houari Sahraoui, University of Montreal, Canada
Eugene Syriani, University of Montreal, Canada

Investigating Technological Risks and Mitigation Strategies in Software Projects ........................................ 1527
Emanuel Dantas, Universidade Federal do Paraíba, Brazil
Ademar Sousa Neto, Universidade Federal de Campina Grande, Brazil
Dalton Valadares, Federal Institute of Pernambuco, Brazil
Mirko Perkusich, Universidade Federal de Campina Grande, Brazil
Felipe Ramos, Universidade Federal do Paraíba, Brazil
Hyggo Almeida, Universidade Federal de Campina Grande, Brazil
Angelo Perkusich, Universidade Federal de Campina Grande, Brazil

Feature Assortment for Deep Learning-Based Bug Localization with a Program Graph ...................... 1536
Youngkyoung Kim, Sungkyunkwan University, Korea
Misoo Kim, Sungkyunkwan University, Korea
Eunseok Lee, Sungkyunkwan University, Korea

Design Patterns Mining Using Neural Sub-graph Matching ........................................................................ 1545
Pasquale Ardimento, University of Bari Aldo Moro, Italy
Lerina Aversano, University of Sannio, Italy
Mario Luca Bernardi, University of Sannio, Italy
Marta Cimitile, University of Rome Unitelma Sapienza, Italy
RepCoder: An Automated Program Repair Framework for Probability-Based Program Synthesis ......................................................................................................................................... 1554
Suhwan Ji, Kangwon National University, Korea
Sang-Min Choi, Yonsei University, Korea
Sang-Ki Ko, Kangwon National University, Korea
Dohyung Kim, Kangwon National University, Korea
Hyeonseung Im, Kangwon National University, Korea

Metrics to Quantify Software Developer Experience: A Systematic Mapping ................................................................. 1562
Renata Brasil-Silva, Escola Politécnica da Universidade de São Paulo, Brazil
Fábio Levy Siqueira, Escola Politécnica da Universidade de São Paulo, Brazil

Optimized Flight Safety Event Detection in the National General Aviation Flight Information Database ................................................................. 1570
Aidan P. LaBella, Rochester Institute of Technology, USA
Joshua A. Karns, Rochester Institute of Technology, USA
Farhad Akhbardeh, Rochester Institute of Technology, USA
Travis Desell, Rochester Institute of Technology, USA
Andrew J. Walton, Liberty University, USA
Zechariah Morgan, University of North Dakota, USA
Brandon Wild, University of North Dakota, USA
Mark Dusenbury, University of North Dakota, USA

How Do Developers Deal with Security Issue Reports on GitHub? ................................................................. 1580
Noah Bühlmann, University of Bern, Switzerland
Mohammad Ghafari, University of Auckland, New Zealand

Learning to Characterize Performance Regression Introducing Code Changes ..................................................... 1590
Deema AlShoaibi, Rochester Institute of Technology, USA
Hiten Gupta, Rochester Institute of Technology, USA
Max Mendelson, Rochester Institute of Technology, USA
Ilyes Jenhani, Prince Mohammad Bin Fahd University, KSA
Ali Ben Mrad, University of Sfax, Tunisia
Mohamed Wiem Mkaouer, Rochester Institute of Technology, USA

Towards Automated Library Migrations with Error Prone and Refaster ............................................................. 1598
Rick Ossendrijver, University of Amsterdam, The Netherlands
Stephan Schroovers, Picnic Technologies, The Netherlands
Clemens Greleck, University of Amsterdam, The Netherlands

Poster Papers

A New Scrum and CMMI Level 2 Compatible Model for Small Software Firms in Order to Enhance Their Software Quality ......................................................................................................................................... 1607
Sabir Saheel, Independent University, Bangladesh
Labib Bin Rahman, Independent University, Bangladesh
Fairuz Humaira, Independent University, Bangladesh
Farzana Sadia, Daffodil International University, Bangladesh
Mahady Hasan, Independent University, Bangladesh
A Comparative Study of Name Entity Recognition Techniques in Software Engineering Texts .......... 1611
Michelle Y. Chew, University of Wisconsin - Eau Claire, USA
Yi J. Cheng, University of Wisconsin - Eau Claire, USA
Oliver Mahan, University of Wisconsin - Eau Claire, USA
Md Rakibul Islam, University of Wisconsin - Eau Claire, USA

SRC

Student Research Abstract: Bridging the Gap between Source Code and High-Level Concepts in Static Code Analysis ................................................................. 1615
Micah Schiewe, Baylor University, USA

Student Research Abstract: On Language-Agnostic Abstract Syntax Trees ........................................... 1619
Jacob Curtis, Baylor University, USA

Theme: System Software and Security

SEC - Computer Security Track
Track Co-Chairs: Giampaolo Bella, Università di Catania, Italy
Saša Radomirović, Heriot-Watt University, UK

Track Editorial ............................................................................................................................................... 1623

CHORS: Hardening High-Assurance Security Systems with Trusted Computing ......................... 1626
Wojciech Ozga, IBM Research Europe - Zurich, Switzerland and TU Dresden, Germany
Rasha Faqeh, TU Dresden, Germany
Do Le Quoc, Huawei Research, Germany
Franz Gregor, Scontain, Germany
Silvio Dragone, IBM Research Europe - Zurich, Switzerland
Christof Fetzer, TU Dresden, Germany

Generative Adversarial Networks for Subdomain Enumeration ..................................................... 1636
Luca Degani, University of Trento and IIT CNR, Italy
Francesco Bergadano, Università degli Studi di Torino, Italy
Seyed Ali Mirheidari, University of Trento, Italy
Fabio Martinelli, IIT CNR, Italy
Bruno Crispo, University of Trento, Italy

The Dawn of a Text-Dependent Society: Deepfakes as a Threat to Speech Verification Systems .... 1646
Anton Firc, Brno University of Technology, Czech Republic
Kamil Malinka, Brno University of Technology, Czech Republic

Strategic Selection of Data Sources for Cyber Attack Detection in Enterprise Networks: A Survey and Approach ................................................................................................. 1656
Manuel Kern, Austrian Institute of Technology, Austria
Florian Skopik, Austrian Institute of Technology, Austria
Max Landauer, Austrian Institute of Technology, Austria
Edgar Weippl, University of Vienna, Austria
MARSHAL: Messaging with Asynchronous Ratchets and Signatures for Faster HeALing ........................................ 1666
Olivier Blazy, Institut Polytechnique de Paris, France
Pierre-Alain Fouque, IRISA, France
Thibaut Jacques, Orange Labs, France
Pascal Lafourcade, Université Clermont-Auvergne, France
Cristina Onete, XLIM, France
Léo Robert, Université Clermont-Auvergne, France

Towards Effective Preservation of Robust Safety Properties .................................................................................... 1674
Matteo Busi, University of Pisa, Italy
Pierpaolo Degano, IMT School for Advanced Studies and University of Pisa, Italy
Letterio Galletta, IMT School for Advanced Studies, Italy

ANUBIS: A Provenance Graph-Based Framework for Advanced Persistent Threat Detection ............................... 1684
Md. Monowar Anjum, National Research Council, Canada
Shahrear Iqbal, National Research Council, Canada
Benoit Hamelin, Tutte Institute for Mathematics and Computing, Canada

Hardening the Security Analysis of Browser Extensions ............................................................................................. 1694
Benjamin Eriksson, Chalmers University of Technology, Sweden
Pablo Picazo-Sanchez, Chalmers University of Technology, Sweden
Andrei Sabelfeld, Chalmers University of Technology, Sweden

Effective TLB Thrashing – Unveiling the True Short Reach of Modern TLB Designs .............................................. 1704
Andrés R. Hernández C., University of Texas at San Antonio, USA
Wei-Ming Lin, University of Texas at San Antonio, USA

Security Risks of Porting C Programs to WebAssembly ............................................................................................... 1713
Quentin Stiévenart, Vrije Universiteit Brusel, Belgium
Coen De Roover, Vrije Universiteit Brusel, Belgium
Mohammad Ghafari, University of Auckland, New Zealand

Poster Papers

Mauro Conti, University of Padua, Italy
Eleonora Losiouk, University of Padua, Italy
Alessandro Visintin, University of Padua, Italy

Deriving Optimal Deep Learning Models for Image-Based Malware Classification .................................................. 1727
Rikima Mitsuhashi, The University of Tokyo, Japan
Takahiro Shinagawa, The University of Tokyo, Japan

Theme: Information Systems

SONAMA - Social Network and Media Analysis Track
Track Co-Chairs: Sang-Wook Kim, Hanyang University, Korea
Yunyong Ko, Hanyang University, Korea

An Architecture for Data Integrity in Untrustworthy Social Networks ............................................................................. 1732
Carlos Eduardo da Silva, Sheffield Hallam University, UK
Angus Young, Sheffield Hallam University, UK
User Awareness and Defenses Against Sockpuppet Friend Invitations in Facebook

Sajedul Talukder, Southern Illinois University, USA
Nestor Hernandez, The MathWorks, Inc., USA
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Combining Clutter Reduction Methods for Temporal Network Visualization

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POSLAN: Disentangling Chat with Positional and Language Encoded Post Embeddings

Bhashithe Abeysinghe, Georgia State University, USA
Dhara Shah, Georgia State University, USA
Chris Freas, Georgia State University, USA
Robert Harrison, Georgia State University, USA
Rajshekhar Sunderraman, Georgia State University, USA

Incremental Communication Patterns in Blockchain Online Social Media

Barbara Guidi, Università di Pisa, Italy
Andrea Michienzi, Università di Pisa, Italy
Laura Ricci, Università di Pisa, Italy

D-FEND: A Diffusion-Based Fake News Detection Framework for News Articles Related to COVID-19

Soeun Han, Hanyang University, Korea
Yunyoung Ko, Hanyang University, Korea
Yushim Kim, Arizona State University, USA
Seong Soo Oh, Hanyang University, Korea
Heejin Park, Hanyang University, Korea
Sang-Wook Kim, Hanyang University, Korea

Group Oriented Trust-Aware Location Recommendation for Location-Based Social Networks

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Pınar Karagoz, Middle East Technical University, Turkey

Poster Papers

Characterizing the Impact of Fact-Checking on the COVID-19 Misinformation Combat

Cefas García Pereira, Pontifical Catholic University of Minas Gerais, Brazil
Humberto Torres Marques-Neto, Pontifical Catholic University of Minas Gerais, Brazil

A Comparison of Online Hate on Reddit and 4chan: A Case Study of the 2020 US Election

Fatima Zahrah, University of Oxford, UK
Jason R.C. Nurse, University of Kent, UK
Michael Goldsmith, University of Oxford, UK

Cluster Boosting and Data Discovery in Social Networks

Maria Tomasso, Texas State University, USA
Lucas J. Rusnak, Texas State University, USA
Jelena Tešić, Texas State University, USA
A Diversity Personalization Approach towards Recommending POIs for Jeju Island .................. 1804
Jongsoo Lee, Hanyang University, Korea
Jung Ah Shin, Columbia University, USA
Dong-Kyu Chae, Hanyang University, Korea

Theme: Software Design and Development

SVT - Software Verification and Testing Track
Track Co-Chairs: Erika Abraham, RWTH Aachen University, Germany
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Summarization of Branching Loops ................................................................. 1808
Martin Blicha, Charles University, Czech Republic and Università della Svizzera italiana, Switzerland
Jan Kofroň, Charles University, Czech Republic
William Tatarko, Charles University, Czech Republic

Verifying Opacity by Abstract Interpretation .................................................. 1817
Isabella Mastroeni, Università degli Studi di Verona, Italy
Michele Pasqua, Università degli Studi di Verona, Italy

Leveraging Hardware-Dependent Knowledge Extraction with Multiple Program Analysis Techniques ............................................................. 1827
Thuy Nguyễn, Japan Advanced Institute of Science and Technology, Japan
Takashi Tomita, Japan Advanced Institute of Science and Technology, Japan
Junpei Endo, AISIN SOFTWARE Co., Ltd., Japan
Geon-ung Kang, AISIN SOFTWARE Co., Ltd., Japan
Toshiaki Aoki, Japan Advanced Institute of Science and Technology, Japan

A Lightweight Approach for Sound Call Graph Approximation .................. 1837
Aharon Abadi, WhiteSource, Israel
Bar Makovitzki, The Open University of Israel, Israel
Ron Shemer, WhiteSource, Israel
Shmuel Tyszberowicz, Afeka Academic College of Engineering, Israel

Poster Papers

Model Sketching by Abstraction Refinement for Lifted Model Checking ........... 1845
Aleksandar S. Dimovski, Mother Teresa University, Macedonia

Verifying Redundant-Check Based Countermeasures: A Case Study ................ 1849
Thibault Martin, Université Paris-Saclay, France
Nikolai Kosmatov, Thales Research and Technology, France
Virgile Prevosto, Université Paris-Saclay, France

A Simple Proof of Data-Race Freedom and Data Coherence for Simpson’s 4-Slot Algorithm .......... 1853
Xu Wang, East China Normal University, China
Qiwen Xu, University of Macau, China

Capturing Program Models with BISM ......................................................... 1857
Chukri Soueidi, Université Grenoble Alpes and Inria, France
Yliès Falcone, Université Grenoble Alpes and Inria, France
Theme: Information Systems

SWA - Semantic Web and Applications Track

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Track Editorial .............................................................................................................................................................. 1861

Predicting the Category of Customers’ Next Product to Buy in Web Shops ....................................................... 1862
Laura Rekasiute, Erasmus University Rotterdam, The Netherlands  
Alvaro Jose Jimenez Palenzuela, Erasmus University Rotterdam, The Netherlands  
Nijole Salnaite, Erasmus University Rotterdam, The Netherlands  
Ramon Carrera Cuenca, Erasmus University Rotterdam, The Netherlands  
Flavius Frasincar, Erasmus University Rotterdam, The Netherlands

Could Jamstack Be the Future of Web Applications Architecture? An Empirical Study .............................. 1872
Dragana Markovic, Mälardalen University, Sweden  
Milic Scekic, Mälardalen University, Sweden  
Alessio Bucaioni, Mälardalen University, Sweden  
Antonio Cicchetti, Mälardalen University, Sweden

Knowledge Graph Enhanced Multi-Task Learning between Reviews and Ratings for Movie Recommendation ........................................................................................................... 1882
Yun Liu, Tokyo Institute of Technology, Japan  
Jun Miyazaki, Tokyo Institute of Technology, Japan  
Qiong Chang, Tokyo Institute of Technology, Japan

Generalized Graph Pattern Discovery in Linked Data with Data Properties and a Domain Ontology ........................................................................................................................................... 1890
Tomas Martin, Université du Québec à Montréal, Canada  
Victor Fuentes, Université du Québec à Montréal, Canada  
Petko Valtchev, Université du Québec à Montréal, Canada  
Abdoulaye Baniré Diallo, Université du Québec à Montréal, Canada  
René Lacroix, LactaNet, Canada

A Blockchain-Based Framework for Drug Traceability: ChainDrugTrac ....................................................... 1900
Eddy Kiomba Kambilo, CY Cergy Paris Université, France  
Hajer Baazaoui Zghal, CY Cergy Paris Université, France  
Chirine Ghedira Guegan, Université Jean Moulin Lyon III, France  
Vlado Stankovski, University of Ljubljana, Slovenia  
Petar Kochovski, University of Ljubljana, Slovenia  
Dan Vodislav, CY Cergy Paris Université,

EABlock: A Declarative Entity Alignment Block for Knowledge Graph Creation Pipelines .......................... 1908
Samaneh Jozashoori, Leibniz University of Hannover, Germany  
Ahmad Sakor, Leibniz University of Hannover, Germany  
Enrique Iglesias, Leibniz University of Hannover, Germany  
Maria-Esther Vidal, Leibniz University of Hannover, Germany
**v-TCM: Vertical-Aware Transformer Click Model for Web Search** ................................................................. 1917
Kritarth Bisht, Delhi Technological University, India
Seba Susan, Delhi Technological University, India

**5D-IoT, a Semantic Web Based Framework for Assessing IoT Data Quality** .................................................. 1921
Shubham Mante, International Institute of Information Technology Hyderabad, India
Nathalie Hernandez, University of Toulouse, France
Aftab M. Hussain, International Institute of Information Technology Hyderabad, India
Sachin Chaudhari, International Institute of Information Technology Hyderabad, India
Deepak Gangadharan, International Institute of Information Technology Hyderabad, India
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**Theme: Distributed Systems**

**WCN - Wireless Communications and Networking Track**

**Track Chair:** Dongkyun Kim, Kyungpook National University, Korea

**UAV-VANET Authentication for Real-Time Highway Surveillance** ............................................................... 1925
Otto B. Piramuthu, University of Illinois Urbana-Champaign, USA
Matthew Caesar, University of Illinois Urbana-Champaign, USA

**Cluster-Based AUV Communication for Delay-Sensitive Vulnerability Detection Using NDN** ............... 1932
Junho Seo, Kyungpook National University, Korea
Ayesha Siddiqa, Kyungpook National University, Korea
Muhammad Ashar Tariq, Kyungpook National University, Korea
Malik Muhammad Saad, Kyungpook National University, Korea
Dongkyun Kim, Kyungpook National University, Korea

**A Reinforcement Learning-Based Path Planning for Collaborative UAVs** .................................................. 1938
Shahnila Rahim, Kyungpook National University, Korea
Mian Muaz Razaq, Kyungpook National University, Korea
Shih Yu Chang, San Jose University, USA
Limei Peng, Kyungpook National University, Korea

**On Hybrid Front-Haul for 5G NR mmWave Indoor Coverage** ................................................................. 1944
Syed Hassan Raaz Naqvi, University of Waterloo, Canada
Pin-Han Ho, University of Waterloo, Canada

**A Meta-Policy Approach for Learning Suitable Caching Replacement Policies in Information-Centric Networks** ..................................................................................................................... 1950
Stéfani Pires, Federal University of Bahia, Brazil
Adriana Ribeiro, Federal University of Bahia, Brazil
Leobino Sampaio, Federal University of Bahia, Brazil

**Multi-Antenna Covert Communications in Random Wireless Networks with Full-Duplex Relay** ............ 1960
Yan Liu, Future University Hakodate, Japan
Huihui Wu, Tsinghua University, China
Yulong Shen, Xidian University, China
Xiaohong Jiang, Future University Hakodate, Japan
Optimization of IoT Slices in WiFi Enterprise Networks  ................................................................. 1967
Foroutan Fami, École de Technologie Supérieure, Canada
Nessrine Hammami, École de Technologie Supérieure, Canada
Chuan Pham, École de Technologie Supérieure, Canada
Kim-Khoa Nguyen, École de Technologie Supérieure, Canada

Poster Papers

Lightweight VANET Authentication Protocols .......................................................................................... 1975
Otto B. Piramuthu, University of Illinois Urbana-Champaign, USA
Matthew Caesar, University of Illinois Urbana-Champaign, USA

GPGPU Wide-Area Calculations for Estimation of Electromagnetic Field Human Exposure Levels ............................................................................................................................................. 1979
Dariusz P. Więcek, National Institute of Telecommunications, Poland
Jacek W. Wroński, National Institute of Telecommunications, Poland

An Intelligent Blockchain Application for Emergency Medical Services ................................................. 1983
Thomas Lavigne, INSA Centre Val de Loire, France
Bacem Mbarek, Masaryk University, Czech Republic
Tomáš Pitner, Masaryk University, Czech Republic