

7th International Conference on Internet of Things, Big Data and Security (IoT BDS 2022)

Online
22 - 24 April 2022

Editors:

**Denis Bastieri
Gary Wills**

**Peter Kacsuk
Victor Chang**

ISBN: 978-1-7138-5300-8

Printed from e-media with permission by:

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



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

Copyright© (2022) by SCITEPRESS – Science and Technology Publications, Lda.
All rights reserved.

Printed with permission by Curran Associates, Inc. (2022)

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

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

Phone: +351 265 520 185

Fax: +351 265520 186

info@scitepress.org

Additional copies of this publication are available from:

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

CONTENTS

INVITED SPEAKERS

KEYNOTE SPEAKERS

Machine Learning for Decision Support in Complex Environments <i>Jie Lu</i>	5
Event Detection and Classification in Big IoT Networks from Scarce and Imprecise Labels <i>Zoran Obradovic</i>	7
Neoteric Frontiers in Cloud and Edge Computing <i>Rajkumar Buyya</i>	9
Ecosystems of Social Digital Twins for Future IoT Network <i>Antonio Iera</i>	11

PAPERS

FULL PAPERS

A Real-time Explainable Anomaly Detection System for Connected Vehicles <i>Duc Cuong Nguyen, Kien Dang Nguyen and Simy Chacko</i>	17
A Two-level Integrated Approach for Assigning Trust Metrics to Internet of Things Devices <i>Evandro L. C. Macedo, Flavia C. Delicato, Luís F. M. De Moraes and Giancarlo Fortino</i>	26
PhilaeX: Explaining the Failure and Success of AI Models in Malware Detection <i>Zhi Lu and Vrizlynn L. L. Thing</i>	37
Reliability Estimation of a Smart Metering Architecture using a Monte Carlo Simulation <i>Tobias Altenburg, Matthias Volk, Daniel Staegemann and Klaus Turowski</i>	47
SIMBioTA-ML: Light-weight, Machine Learning-based Malware Detection for Embedded IoT Devices <i>Dorottya Papp, Gergely Ács, Roland Nagy and Levente Buttyán</i>	55
BRAIN-IoT Architecture and Platform for Building IoT Systems <i>Salim Chehida, Saddek Bensalem, Davide Conzon, Enrico Ferrera and Xu Tao</i>	67
Shifting towards Antifragile Critical Infrastructure Systems <i>Hind Bangui, Barbora Buhnova and Bruno Rossi</i>	78

SHORT PAPERS

Threat Modelling with the GDPR towards a Security and Privacy Metrics Framework for IoT Smart-farm Application <i>Steph Rudd and Hamish Cunningham</i>	91
Efficient Lightweight Cryptography Algorithm in IoT Devices with Real-time Criteria <i>Paul D. Rosero-Montalvo and Vanessa E. Alvear-Puertas</i>	103
Real-Time Object Detection with Intel NCS2 on Hardware with Limited Resources for Low-power IoT Devices <i>Jurij Kuzmic, Patrick Brinkmann and Günter Rudolph</i>	110
An Authenticated Accumulator Scheme for Secure Master Key Access in Microservice Architectures <i>Hannes Salin and Dennis Fokin</i>	119
Constructing High Quality Bilingual Corpus using Parallel Data from the Web <i>Sai Man Cheok, Lap Man Hoi, Su-Kit Tang and Rita Tse</i>	127
Machine Learning and Feature Engineering for Detecting Living off the Land Attacks <i>Tiberiu Boros, Andrei Cotaie, Antrei Stan, Kumar Vikramjeet, Vivek Malik and Joseph Davidson</i>	133
A Failure Prediction Platform for Internet of Things Applications <i>Daniel Del Gaudio, Amil Imeri and Pascal Hirmer</i>	141
Common Cybersecurity Requirements in IoT Standards, Best Practices, and Guidelines <i>Rauli Kaksonen, Kimmo Halunen and Juha Rönning</i>	149
An Information Security Model for an IoT-enabled Smart Grid <i>Abeer Akkad, Gary Wills and Abdolbaghi Rezaazadeh</i>	157
Provisioning Security in a Next Generation Mobility as a Service System <i>Tope Omitola, Ben Waterson, Niko Tsakalakis, Richard Gomer, Sophie Stalla-Bourdillon, Tom Cherrett and Gary Wills</i>	166
An Approach to Privacy-Preserving Distributed Intelligence for the Internet of Things <i>Tariq Alsbouii, Hussain Al-Aqrabi, Richard Hill and Shamaila Iram</i>	174
Internet-of-Things Management of Medical Chairs and Wheelchairs <i>Chelsea Yeh, Alexander W. Lee, Hudson Kaleb Kalaw Dy and Karin C. Li</i>	183
Towards a Digital Twin Framework for Connected Vehicles <i>Jan Gerhards, Tim Schneider and Pascal Hirmer</i>	189
Using Environmental Data for IoT Device Energy Harvesting Prediction <i>Mansour Alzahrani, Alex S. Weddell and Gary B. Wills</i>	197
Reference Architecture for IoT Platforms towards Cloud Continuum based on Apache Kafka and Orchestration Methods <i>Zoltán Farkas and Róbert Lovas</i>	205
The Concept of Identifiability in ML Models <i>Stephanie von Maltzan</i>	215
Improving Developer Productivity on Internet of Things using JavaScript <i>Fernando L. Oliveira, Rafael R. Parizi and Júlio C. B. Mattos</i>	223

Automating Security in a Continuous Integration Pipeline <i>Sohrab Chalishhafshejani, Bao Khanh Pham and Martin Gilje Jaatun</i>	231
Implementing Test Driven Development in the Big Data Domain: A Movie Recommendation System as an Exemplary Case <i>Daniel Staegemann, Matthias Volk, Priyanka Byahatti, Nihilkumar Italiya, Suhas Shantharam, Apoorva Byaladakere Chandrashekar and Klaus Turowski</i>	239
A Semantic Security Model for Cyber-Physical Systems to Identify and Evaluate Potential Threats and Vulnerabilities <i>Andreas Aigner and Abdelmajid Khelil</i>	249
Putting Chaos into Perspective: Evaluation of Statistical Test Suite Implementations on Isolated Sequences of Arbitrary Length <i>Pol Hölzmer, Manuel Koschuch and Matthias Hudler</i>	258
Energy Consumption of a Hexspider Robot-o as Function of Footwear and Underground: Experimental Investigations <i>Bernhard Heiden, Christian A. Koren, Volodymyr Alieksieiev and Bianca Tonino-Heiden</i>	267
Factors Influencing LoRa Communication in IoT Deployment: Overview and Experience Analysis <i>Thierry Antoine-Santoni, Bastien Poggi, David Araujo and Chabi Babatounde</i>	274
Seen to Unseen: When Fuzzy Inference System Predicts IoT Device Positioning Labels That Had Not Appeared in Training Phase <i>Han Xu, Zheming Zuo, Jie Li and Victor Chang</i>	281
A Framework for Seamless Offloading in IoT Applications using Edge and Cloud Computing <i>Himesh Welgama, Kevin Lee and Jonathan Kua</i>	289
Performance Analysis of Machine Learning Algorithms in Storm Surge Prediction <i>Vai-Kei Ian, Rita Tse, Su-Kit Tang and Giovanni Pau</i>	297
Advanced Lightweight Cryptography for Automotive Security: Surveys, Challenges and Solutions <i>Phuc Tran and Duc Cuong Nguyen</i>	304
AUTHOR INDEX	313