

# **2021 XI Brazilian Symposium on Computing Systems Engineering (SBESC 2021)**

**Virtual Conference  
22 – 25 November 2021**



**IEEE Catalog Number: CFP2197R-POD  
ISBN: 978-1-6654-4312-8**

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP2197R-POD
ISBN (Print-On-Demand):	978-1-6654-4312-8
ISBN (Online):	978-1-6654-4311-1
ISSN:	2324-7886

**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  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

USING MACHINE LEARNING TO ESTIMATE LATENCY AND DELIVERED PACKETS IN HYBRIDS NOCS.....	1
<i>Samuel Da Silva Oliveira, Monica Magalhães Pereira, Márcio Eduardo Kreutz, Bruno Motta De Carvalho</i>	
MIGRATION-BASED SYNCHRONIZATION.....	8
<i>Stefan Reif, Phillip Raffeck, Luis Gerhorst, Wolfgang Schröder-Preikschat, Timo Hönig</i>	
PERFORMANCE MONITORING FEATURES IN EPOS.....	16
<i>Leonardo Passig Horstmann, José Luís Conradi Hoffmann, Antônio Augusto Fröhlich</i>	
TRIPP: TRANSPARENT RESOURCE PROVISIONING FOR MULTI-TENANT CPU-GPU BASED CLOUD ENVIRONMENTS.....	24
<i>Julio Costella Vicenzi, Tiago Knorst, Michael G. Jordan, Guilherme Korol, Antonio Carlos Schneider Beck, Mateus Beck Rutzig</i>	
ON THE SELECTION OF RELEVANT HARDWARE EVENTS FOR EXPLAINING EXECUTION TIME BEHAVIOR.....	32
<i>Tadeu Nogueira C. Andrade, George Lima, Veronica Maria Cadena Lima, Yasmina Abdeddaïm, Liliana Cucu Grosjean</i>	
USING GEM5 SIMULATOR TO SUPPORT DESIGN SPACE EXPLORATION TARGETING ARM ARCHITECTURE.....	40
<i>Iago De Oliveira Silvestre, Antonio Carlos Beck Filho, Leandro Buss Becker</i>	
CRYPTOGRAPHY ON UNTRUSTWORTHY CLOUD STORAGE FOR HEALTHCARE APPLICATIONS: A PERFORMANCE ANALYSIS.....	48
<i>Lúcio H. A. Reis, Marcela T. De Oliveira, James Bowden, Dagmar Krefting, Silvia D. Olabarriaga, Diogo M. F. Mattos</i>	
IMPLEMENTATION AND EVALUATION OF ADAPTIVE CACHE INSERTION POLICIES FOR REAL-TIME SYSTEMS.....	56
<i>Bruna Arruda Araujo, Giovanni Gracioli, Tomasz Kloda, Denis Hoornaert, Marco Caccamo</i>	
ETCF – ENERGY-AWARE CPU THREAD THROTTLING AND WORKLOAD BALANCING FRAMEWORK FOR CPU-FPGA COLLABORATIVE ENVIRONMENTS.....	64
<i>Tiago Knorst, Michael G. Jordan, Arthur F. Lorenzon, Mateus Beck Rutzig, Antonio Carlos Schneider Beck</i>	
LIGHTWEIGHT DUAL MODULAR REDUNDANCY THROUGH APPROXIMATE COMPUTING.....	72
<i>Gabriel L. Nazar, Pedro H. Kopper, Marcos T. Leipnitz, Ben Juurlink</i>	
BACE: BLOCKCHAIN-BASED ACCESS CONTROL AT THE EDGE FOR INDUSTRIAL CONTROL DEVICES OF INDUSTRY 4.0.....	80
<i>Charles Tim Batista Garrocho, Karine Nogueira Oliveira, David José Sena, Carlos Frederico Marcelo Da Cunha Cavalcanti, Ricardo Augusto Rabelo Oliveira</i>	
VERIFYING SECURITY VULNERABILITIES FOR BLOCKCHAIN-BASED SMART CONTRACTS.....	88
<i>Nedas Matulevicius, Lucas C. Cordeiro</i>	

ORCA RT-BENCH: A REFERENCE ARCHITECTURE FOR REAL-TIME SCHEDULING SIMULATORS .....	96
<i>Anderson R. P. Domingues, João Benno, Alexandre M. Amory, Fernando Gehm Moraes</i>	
A MULTISITE CHARACTERIZATION STUDY ON FAILURE CAUSES IN SYSTEM AND APPLICATIONS SOFTWARE .....	102
<i>Caio A. R. Dos Santos, Rivalino Matias, Kishor S. Trivedi</i>	
DEEP-LEARNING-BASED EMBEDDED ADAS SYSTEM .....	110
<i>Frederico Luiz Martins De Sousa, Mauricio José Da Silva, Ricardo Creonte Câmara De Meira Santos, Mateus Coelho Silva, Ricardo Augusto Rabelo Oliveira</i>	
A PARALLEL SOFTWARE-DEFINED ULTRA-LOW-POWER RECEIVER FOR A SATELLITE MESSAGE FORWARDING SYSTEM.....	118
<i>Raffael S. C. G. De Lima, José Marcelo L. Duarte, Diego V. Cirilo Do Nascimento, Reinaldo A. De Souza Filho, Samuel Xavier-De-Souza</i>	
PERFORMANCE ANALYSIS OF MACHINE LEARNING-BASED SYSTEMS FOR DETECTING DEFORESTATION .....	126
<i>Michel De Araújo, Ermeson Andrade, Fumio Machida</i>	
A NEW AUTOMATED ENERGY METER FRAUD DETECTION SYSTEM BASED ON ARTIFICIAL INTELLIGENCE .....	134
<i>João Pedro Klock, Jhonatan Corrêa, Miguel Bessa, Janier Arias-Garcia, Felipe Barboza, Carmo Meinertz</i>	
MACHINE LEARNING FOR IDENTIFICATION AND CLASSIFICATION OF CROPS AND WEEDS .....	142
<i>David Rutherford Armstrong, Marcelo Götz, Vitor Camargo Nardelli, Victor Emmanuel De Oliveira Gomes</i>	
ASSISTED COUNTEREXAMPLE-GUIDED INDUCTIVE OPTIMIZATION FOR ROBOT PATH PLANNING .....	149
<i>Mengze Li, Lucas Cordeiro</i>	
AN OPTIMIZATION APPROACH FOR EMERGENCY VEHICLES DISPATCHING AND TRAFFIC LIGHTS ADJUSTMENTS IN RESPONSE TO EMERGENCIES IN SMART CITIES.....	157
<i>Elielton O. Rangel, Daniel G. Costa, Maycon M. L. Peixoto</i>	
IMPLEMENTING OBJECT TRACKING FOR SEEDING QUALITY ON ANDROID DEVICES.....	165
<i>Lucas Eduardo Fischer Mülling, Marcio Seiji Oyamada</i>	
AN OPEN SOURCE CUSTOM K-MEANS GENERATOR FOR AWS CLOUD FPGA ACCELERATORS.....	172
<i>Lucas Bragança, Michael Canesche, Jeronimo Penha, Westerley Carvalho, Giovanni Comarela, José Augusto M. Nacif, Ricardo Ferreira</i>	
USE OF MEASUREMENTS IN WORST-CASE EXECUTION TIME ESTIMATION FOR REAL-TIME SYSTEMS.....	180
<i>Jessica Junia Santillo Costa, Rômulo Silva De Oliveira, Luís Fernando Arcaro</i>	

**Author Index**