

2024 IEEE 30th International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2024)

**Sokcho, South Korea
21-23 August 2024**



**IEEE Catalog Number: CFP24066-POD
ISBN: 979-8-3503-8796-4**

**Copyright © 2024 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:	CFP24066-POD
ISBN (Print-On-Demand):	979-8-3503-8796-4
ISBN (Online):	979-8-3503-8795-7
ISSN:	2325-1271

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2024 IEEE 30th International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA) **RTCSA 2024**

Table of Contents

Message from the General and Program Chairs	ix
Organizing Committee	x
Program Committee	xi
Steering Committee	xiii
Advisory Board	xiv
Sponsors	xv

Session 1: Best Paper Candidates

EarlyBird: Energy Belongs to Those Who Wake Up Early	1
<i>Hugo Reymond (Univ Rennes, Inria, CNRS, IRISA, France), Jean-Luc Béchennec (Nantes Université, École Centrale Nantes, CNRS, LS2N, France), Mikaël Briday (Nantes Université, École Centrale Nantes, CNRS, LS2N, France), Sébastien Faucou (Nantes Université, École Centrale Nantes, CNRS, LS2N, France), Isabelle Puaut (Univ Rennes, Inria, CNRS, IRISA, France), and Erven Rohou (Univ Rennes, Inria, CNRS, IRISA, France)</i>	
Improved Memory Contention Analysis for the 3-Phase Task Model	11
<i>Jatin Arora (CISTER Research Centre, ISEP, Portugal; VORTEX CoLab, Portugal), Syed Aftab Rashid (Hitachi Energy Research, Baden-Dättwil, Switzerland), Geoffrey Nelissen (Eindhoven University of Technology, the Netherlands), Claudio Maia (CISTER Research Centre, ISEP, Portugal), and Eduardo Tovar (CISTER Research Centre, ISEP, Portugal)</i>	
RTiL: Real-Time Inference of Large Language Models on Memory-Constrained GPU Devices	21
<i>Juxin Niu (City University of Hong Kong, Hong Kong SAR), Wei Zhang (Shandong University, China), Chun Jason Xue (Mohamed bin Zayed University of Artificial Intelligence, UAE), and Nan Guan (City University of Hong Kong, Hong Kong SAR)</i>	

Session 2: Sensor Data Fusion and Out-of-Distribution Detection

Timely Fusion of Surround Radar/Lidar for Object Detection in Autonomous Driving Systems	31
<i>Wenjing Xie (City University of Hong Kong, Hong Kong SAR), Tao Hu (City University of Hong Kong, Hong Kong SAR), Neiwen Ling (Yale University, USA), Guoliang Xing (The Chinese University of Hong Kong, Hong Kong SAR), Chun Jason Xue (Mohamed bin Zayed University of Artificial Intelligence, UAE), and Nan Guan (City University of Hong Kong, Hong Kong SAR)</i>	
Compressing VAE-Based Out-of-Distribution Detectors for Embedded Deployment	37
<i>Aditya Bansal (Nanyang Technological University, Singapore), Michael Yuhas (Nanyang Technological University, Singapore), and Arvind Easwaran (Nanyang Technological University, Singapore)</i>	
Improving the Reaction Latency Analysis of Message Synchronization in ROS	43
<i>Chenhao Wu (SKLCS, Institution of Software, Chinese Academy of Sciences, China), Ruoxiang Li (City University of Hong Kong, Hong Kong SAR), Naijun Zhan (Peking University, China; SKLCS, Institution of Software, Chinese Academy of Sciences, China), and Nan Guan (City University of Hong Kong, Hong Kong SAR)</i>	

Session 3: Autonomous Driving Systems

M-DRTA: A Distributed Runtime Monitoring and Assurance Framework for Multi-Vehicle Behavior Planning	49
<i>Yanfei Peng (Dalian University of Technology, China), Guozhen Tan (Dalian University of Technology, China), and Xiang Wang (Dalian University of Technology, China)</i>	
A Containerized Microservice Architecture for a ROS 2 Autonomous Driving Software: An End-to-End Latency Evaluation	57
<i>Tobias Betz (Technical University of Munich, Germany), Long Wen (Technical University of Munich, Germany), Fengjunjie Pan (Technical University of Munich, Germany), Gemb Kaljavesi (Technical University of Munich, Germany), Alexander Zuepke (Technical University of Munich, Germany), Andrea Bastoni (Technical University of Munich, Germany), Marco Caccamo (Technical University of Munich, Germany), Alois Knoll (Technical University of Munich, Germany), and Johannes Betz (Technical University of Munich, Germany)</i>	
A Formally Verified Leader Election Algorithm for Autonomous Driving Systems	67
<i>Ryuta Kambe (TIER IV, Inc., Japan), Benjamin Gilby (TIER IV, Inc., Japan), and Yuuki Takano (TIER IV, Inc., Japan)</i>	

Session 4: Cache, Middleware, and Synchronization

On the Integration of DDS and AFDX Standards	73
<i>Hector Perez (Universidad de Cantabria, España) and J. Javier Gutiérrez (Universidad de Cantabria, España)</i>	
Duration-Based Instruction Cache Locking	85
<i>Wafic Lawand (University of Waterloo, Canada) and Rodolfo Pellizzoni (University of Waterloo, Canada)</i>	

PTP-Synchronized Tri-Level Sync Generation for Networked Multi-Sensor Systems	91
<i>Christoph Riggers (Leibniz University Hannover, Germany), Jens Schleusner (Leibniz University Hannover, Germany), Oliver Renke (Leibniz University Hannover, Germany), and Holger Blume (Leibniz University Hannover, Germany)</i>	

Session 5: Multi-core Embedded Systems

A Compact Real-Time Thermal Imaging System Based on Heterogeneous System-on-Chip	97
<i>Hyun Woo Oh (Hanwha Systems, Republic of Korea), Cheol-Ho Choi (Hanwha Systems, Republic of Korea), Jeong Woo Cha (Hanwha Systems, Republic of Korea), Hyunmin Choi (Hanwha Systems, Republic of Korea), Jung-Ho Shin (Hanwha Systems, Republic of Korea), and Joon Hwan Han (Hanwha Systems, Republic of Korea)</i>	
Optimal Real-Time Task Allocation in Heterogeneous Multi-Core Embedded Systems	108
<i>David Doose (ONERA, France), Youcef Bouchebaba (ONERA, France), and Alfonso Mascarenas Gonzalez (ONERA, France)</i>	

Session 6: Networks

Real-Time Beamforming Testbed and Tracking Relay for mmWave Applications	114
<i>Lorenzo Bisulli (Politecnico di Milano, Italy), Davide Scazzoli (Politecnico di Milano, Italy), Francesco Linsalata (Politecnico di Milano, Italy), Maurizio Magarini (Politecnico di Milano, Italy), Marouan Mizmizi (Politecnico di Milano, Italy), Christian Mazzucco (Politecnico di Milano, Italy), and Umberto Spagnolini (Politecnico di Milano, Italy)</i>	
Coordinator-Based Proxy Mobile IPv6 for Group Mobility Management in CoAP-Based WBAN Networks	N/A
<i>Muhammad Mahdi (Bahria University, Pakistan), Moneeb Gohar (Bahria University, Pakistan), and Seok-Joo Koh (Kyungpook National University, South Korea)</i>	
Optimising for Dense Deployments in Commercial Ambient Human Sensing with WiFi CSI	124
<i>Glenn Forbes (Robert Gordon University, Scotland) and Stewart Massie (Robert Gordon University, Scotland)</i>	

Poster Presentations

Cooperative Network-Computation Load Balancing Simulator for Vehicular Edge Computing	130
<i>Juho Song (DGIST, Republic of Korea), BaekGyu Kim (DGIST, Republic of Korea), Jeongho Kwak (DGIST, Republic of Korea), Ji-Woong Choi (DGIST, Republic of Korea), and Hoon Sung Chwa (DGIST, Republic of Korea)</i>	
One-Shot Sparse Neural Architecture Search for Resource-Constrained Devices	132
<i>Shenghui Song (Kyung Hee University, South Korea), Jan-Nico Zaech (INSAIT, Sofia University, Bulgaria), and Seonyeong Heo (Kyung Hee University, South Korea)</i>	

Preliminary Approach to Parallelizing Autonomous Driving Applications Using High-Performance Many-Core Processor	134
<i>Xuankeng He (Saitama University, Japan) and Takuya Azumi (Saitama University, Japan)</i>	
Preliminary Modeling of Energy-Aware Integrated Allocations in Robotic Mobile Fulfillment Systems	136
<i>Kyujin Kyung (DGIST, Republic of Korea), Deepak Gangadharan (IIIT Hyderabad, India), and Baekgyu Kim (DGIST, Republic of Korea)</i>	
Task-Level Thermal Modeling for Temperature Management of Edge TPU	138
<i>Changhun Han (Ajou University, Republic of Korea) and Sangeun Oh (Ajou University, Republic of Korea)</i>	
Author Index	141