2024 IEEE Vehicular Networking Conference (VNC 2024)

Kobe, Japan
29-31 May 2024

IEEE Catalog Number: CFP24VNC-POD
ISBN: 979-8-3503-6271-8

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:	CFP24VNC-POD
ISBN (Print-On-Demand):	979-8-3503-6271-8
ISBN (Online):	979-8-3503-6270-1
ISSN:	2157-9857

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

TABLE OF CONTENTS

A Framework of Use Cases, Scenarios, and Metrics for Evaluation of V2X Maneuver Coordination 1
Daniel Maksimovski, Christian Facchi, Andreas Festag

Wireless V2X Communication Testbed for Connected, Cooperative and Automated Mobility..... 9
Anja Dakic, Benjamin Rainer, Peter Priller, Guo Nan, Anamarija Momic, Xiaochun Ye, Thomas Zemen

NUMo: Nagoya Urban Mobility Scenario for City-Scale V2X Simulations 17
Takamasa Higuchi, Lei Zhong, Ryokichi Onishi

Time Synchronization in V2X Communications..... 25
Rodrigo Martins, Duarte Raposo, Rui Lopes, Pedro Rito, Susana Sargento

Toward Viable Security Solution for VRUs in V2X Communication 33
Takahito Yoshizawa, An Braeken, Bart Preneel

Secure Hierarchical Federated Learning in Vehicular Networks Using Dynamic Client Selection and Anomaly Detection 41
M. Saeid Haghighifard, Sinem Coleri

Cybersecurity Metrics for AI-Based In-Vehicle Intrusion Detection Systems 49
Mohammed Lamine Bouchouia, Hamza Khemissa, Elies Gherbi, Myriam Tami, Duncan Lopes, Natasha Alkhatib, Maxime Ayrault

A Framework for the Systematic Assessment of Anomaly Detectors in Time-Sensitive Automotive Networks 57
Philipp Meyer, Timo Häckel, Teresa Lübeck, Franz Korf, Thomas C. Schmidt

A Decentralized Coexistence Protocol for V2X and Wi-Fi in Unlicensed Bands 65
Ramin Yarinezhad, Eylem Ekici, Mohammad Irfan Khan, Takayuki Shimizu, Onur Altintas

Mitigating Latency Inflation in V2C Transactions Using Periodic Sidelink Communication..... 73
Seungmo Kang, Hojeong Lee, Hyogon Kim

Performance Comparison of IEEE 802.11p and LTE-V2X Through Field-Tests and Simulations 81
Joseba Gorospe, Daniel Garcia, Erislandy Mozo, Shahriar Hasan, Arrate Alonso Gómez, Elisabeth Uhlemann

Influence of Network Latency on Collective Perception Aggregation in V2X Networks..... 89
Mateus Martinez De Lucena, Alexey Vinel, Antônio Augusto Fröhlich

ColosSUMO: Evaluating Cooperative Driving Applications with Colosseum 97
Gabriele Gemmi, Pedram Johari, Paolo Casari, Michele Polese, Tommaso Melodia, Michele Segata

Mobile Networks on the Move: Optimizing Moving Base Stations Dynamics in Urban Scenarios 101
Laura Finarelli, Falko Dressler, Marco Ajmone Marsan, Gianluca Rizzo

Manipulating the Rainbow in Vehicular Relay Networks Using DRL: Beyond Beam Sweeping..... 105
Dohyun Kim, Miguel R. Castellanos, Robert W. Heath

V2X Service Provisioning with 5G V2N2V Communications with Cross-Stakeholder Information Sharing 109
B. Coll-Perales, M. C. Lucas-Estañ, O. Altintas, J. Gozalvez, M. I. Khan, M. Sepulcre

Open RAN-Empowered V2X Architecture: Challenges, Opportunities, and Research Directions.....113
Francesco Linsalata, Eugenio Moro, Maurizio Magarini, Umberto Spagnolini, Antonio Capone

Enhancing Sidelink V2X Communication in 6G Networks: Power-Domain NOMA-Based Priority Message Transmission Approach 117
Annu, P. Rajalakshmi

Improving NR-V2X Autonomous Mode Through Resource Re-Evaluation..... 125
Vittorio Todisco, Zhuofei Wu, Alessandro Bazzi

Multihoming in Software Defined Vehicular Networks 132
Nuno Ferreira, Miguel Luís, Pedro Rito, Rodrigo Rosmaninho, Susana Sargento

Impact of Antenna Position and Radiation Patterns on Target Detection in a Highway Environment Utilizing ICAS Extended Model 140
Aamir Ullah Khan, Nandan Dutta Chaudhury, Syed Najaf Haider Shah, Christian Schneider, Joerg Robert

Security Protocols for Ethernet-Based In-Vehicle Communication 148
Timm Lauser, Daniel Zelle, Dustin Kern, Christoph Krauß, Lars Völker

Penetration Testing of In-Vehicle Infotainment Systems in Connected Vehicles 156
Hannah Wieser, Thomas Schäfer, Christoph Krauß

SANE: An Integrated Systematic Framework for Automotive In-Vehicle Network Emulation..... 164
Yonglin Wu, Haiyong Xie, Yong Liao

Cross-Validating Open Source In-Vehicle TSN Simulation Models with a COTS Hardware Testbed..... 172
Darinela Andronovici, Ion Turcanu, Jannusch Bigge, Christoph Sommer

Can Platoons Form on Their Own? 180
Lorenzo Ghiro, Renato Lo Cigno, Elena Tonini, Stefano Fontana, Michele Segata

Cooperative Adaptive Cruise Control Based on Intent Sharing Messages and Reinforcement Learning 188
Lahiri Kanipakam, Ahmed Hamdi Sakr, Sergei S. Avedisov, Ahmadreza Moradipari

Benefits of Intent Sharing in Cooperative Platooning 195
Ahmadreza Moradipari, Sergei S. Avedisov, Hongsheng Lu

Maneuver Coordination Using V2I to Improve Traffic Efficiency at Intersections 203
Lorenzo Farina, Marco Rapelli, Barbara Maví Masini, Claudio Casetti, Alessandro Bazzi

Characterization of In-Vehicle Network Sensor Data Traffic in Autonomous Vehicles 211
L. Lusvarghi, B. Coll-Perales, J. Gozalvez, K. Aghababaiyan, M. Almela, M. Sepulcre

Security-Focused Training Model of Reinforcement Learning in Autonomous Vehicles 215
Takahito Yoshizawa, Alireza Aghabagherloo, Árpád Huszák, Csongor Ujvárosi, Dave Singelée, Bart Preneel

A Multi-Lane Platooning Paradigm with ETSI DCC 219
Huy Nguyen, Suryansh Sharma, R Venkatesha Prasad, Falko Dressler

Data Synchronization with Artificial Delay in Cooperative Adaptive Cruise Control Based on One-Vehicle Look-Ahead Communication 223
Ahmet Yavuz, Ryogo Kubo

A Co-Simulation Platform for V2X-Based Cooperative Driving Automation Systems 227
Mohannad Jooriah, Daryna Datsenko, João Almeida, Ana Sousa, João Silva, Joaquim Ferreira

Poster: Multi-Vehicle Identification and Tracking Using 3D Markers 231
Keita Shinohara, Takemaru Kudo, Ryoichi Shinkuma, Gabriele Trovato

Poster: Platooning Revisited: What is the Personal Benefit Compared to ACC and Human Driving? 233
Julian Heinovski, Doganalp Ergenç, Falko Dressler

Poster: Scenario-Based Functional Evaluation of Autonomous Vehicle Using C-V2X and Data Overlap 235
Tae Hyeong Kim, Jae Ho Seong, Se Yeong Kim, Hyeong Seok Yun, Bong Seob Kim, Kyung Su Yun

Poster: Drone Assisted Vehicular Communication (DAVN) 237
Muhammad Naeem Tahir, Marcos Katz, Ari Pouttu

Poster: Disolv - Dataflow-Centric Integrated Simulation of Large-Scale VANETs 239
Nagacharan Teja Tangirala, Christoph Sommer, Alois Knoll

Poster: Evaluating the Potential of Mode 2(b) Resource Allocation in NR V2X Sidelink 241
Saleh Nikooroo, Juan Estrada-Jimenez, Aurel Machalek, Jerome Harri, Thomas Engel, Ion Turcanu

Poster: α Fair Resource Allocation for RIS-Assisted NOMA V2X Systems with Imperfect Phase Compensation 243
Swaraj Srivastava, Yoghitha Ramamoorthi, Abhinav Kumar, Tomoki Murakami, Tomoaki Ogawa, Yasushi Takatori

Poster: Virtual Platoon Considering Connected Human-Driven Vehicles at Unsignalized Intersection 245
Maho Kitatani, Yuuri Iwashina, Hiroshi Shigeno

Poster: Delay-Resilient Cooperative Velocity Control for Mitigating Congestion Based on Machine Learning 247
Ryota Hachimine, Hiroaki Morino

Poster: Risk and Redundancy-Based Object Selection Method for Collective Perception Messages in Cellular-V2X 249
Yuki Miyata, Yuuri Iwashina, Hiroshi Shigeno

Poster: Multi-Camera Interoperable Emulation Framework Using Embedded Edge-Cloud AI Computing for Autonomous Vehicle Driving 251
Hyunjoong Lee, Daejin Park

Poster: Adaptive Astar Algorithm for Calculation Time Reduction of Autonomous Vehicle's Pathfinding 253
Yeongwon Jeon, Daejin Park

Poster: Multi-Agent Transformer for Dynamic Allocation of Distributed Applications on the Edge 255
Ryota Matsumoto, Patrick Finnerty, Chikara Ohta, Tomio Kamada

Poster: Vehicular Communications Testing in 5G Networks 257
Muhammad Naeem Tahir, Marcos Katz, Ari Pouttu

Poster: Heterogeneous Data for Enhanced Traffic Services (HDETS) 259
Muhammad Naeem Tahir, Marcos Katz, Ari Pouttu

Demo: Towards a Conversational LLM-Based Voice Assistant for Transportation Applications 261
Sasan Jafarnejad, Abigail Berthe-Pardo, Raphaël Frank

Poster: Remote Visualization of LiDAR Data Via Application-Level Network 263
Kenshiro Naito, Kuon Akiyama, Ryoichi Shinkuma, Gabriele Trovato

Poster: Decentralized Framework for Measuring End-To-End Performance in 5G Networks 265
Niladri Mondal, Mario Niggemeyer, Simon Welzel, Florian Klingler

Demo: Interactive Off-The-Shelf In-Car TSN Testbed 267
Darinela Andronovici, Damien Nicolas, Ion Turcanu, Christoph Sommer

Poster: Cyber Resiliency Metrics for AI-Based In-Vehicle Intrusion Detection Systems 269
Hamza Khemissa, Mohammed Lamine Bouchouia, Elies Gherbi

Poster: Identifying Multipath in Phase-Based Ranging Measurements Using Channel Sounding 271
Elin Eriksson, Walter Bronzi, Leah Strand, Alois Knoll

Demo: Hardware-In-the-Loop Testing in V2X Simulation Environment 273
Mohannad Jooriah, Daryna Datsenko, João Almeida, Ana Sousa, João Silva, Joaquim Ferreira

Demo: A Vehicular-Network Based Speed-Bump Detection Approach 275
Xiaofei Cao, Yashar Zeiynali Farid, Seyhan Ucar, E. Akin Sisbot, Kentaro Oguchi

Poster: Digital Twins for Personalized and Safer Automated Driving 277
Claudia Campolo, Nadia Mammone, Antonella Molinaro, Bruno Pizzimenti, Gurtaj Singh, Domenico Mario Zappalà

Demo: Responding to an Unsafe Maneuver of Approaching Vehicles 279
Seyhan Ucar, Obasi Mba, Chunghan Lee, E. Akin Sisbot, Kentaro Oguchi

Poster: A Simple Deep Learning Based V2X Channel Estimation Scheme Using Denoising Autoencoder 281
Kang-Hyun Oh, Chang Hyun Kim, Sungmook Lim, Changick Song

Vehicular Intelligence at the Edge: A Decentralized Federated Learning Approach for Technology Recognition 283
Hojjat Navidan, Merkebu Girmay, Mohamed Seif, H. Vincent Poor, Ingrid Moerman, Adnan Shahid

Deep Learning Based Handover for High-Speed Connected Vehicles in Ultra-Dense Networks 290
Zhi Zhang, Yun Hou, Pang-Sik Hui, Chunhua Sun

Vanetza-NAP: Vehicular Communications and Services in MicroServices Architectures 297
Rodrigo Rosmaninho, Andreia Figueiredo, Pedro Almeida, Pedro Rito, Duarte Raposo, Susana Sargento

Obstacle Shadowing in Vehicle-To-Satellite Communication: Impact of Location, Street Layout, Building Height, and LEO Satellite Constellation 305
Mario Franke, Christoph Sommer

A Multi-Layered Framework for Informing V2I Deployment Decisions Using Commercial Hardware-in-the-Loop Testing of RSUs 313
Bryson Schiel, Sam Swindler, Alek Farmer, Daniel Sharp, Anup Hassan Murali, Brielle Corry, Philip Lundrigan

Analysis of Vulnerable Road User Awareness Message Generation Rules for Pedelecs 321
Nico Ostendorf, Keno Garlichs, Lars C. Wolf

A Data-Driven Analysis of Vulnerable Road User Safety in Interaction with Connected Automated Vehicles 329
Edmir Xhoxhi, Vincent Albert Wolff

Understanding Vulnerable Road Users Awareness Messages Generation Dynamics: The Case of e-Bikes 336
Claudia Campolo, Antonella Molinaro, Bruno Pizzimenti, Maximilian Schrapel, Alexey Vinel, Domenico Mario Zappalà

ETSI-Compliant Protection of Connected Vulnerable Road Users: Simulation and Field Trial 343
Alessandro Genovese, Marco Rapelli, Francesco Raviglione, Claudio Casetti

Vulnerable Road User Clustering for Collective Perception Messages: Efficient Representation Through Geometric Shapes 351
Edmir Xhoxhi, Vincent Albert Wolff, Yao Li, Florian Alexander Schiegg

Author Index