

Problem Setting for Trajectory Planning and Cruise Control of Connected Autonomous Electric Buses in the Framework of the e-MATS Project

Radu-Emil Precup

*Department of Automation and Applied Informatics
Politehnica University of Timisoara
Center for Fundamental and Advanced Technical Research
Romanian Academy-Timisoara Branch
Timisoara, Romania
radu.precup@upt.ro*

GUEST LECTURE

Abstract—The lecture treats the following topics: short project presentation of the e-MATS project, details on our research group, problem setting, results obtained so far, general aspects of optimization and solving optimization problems using metaheuristic algorithms, and conclusions. The excellent cooperation with the team of the Chalmers University of Technology, Gothenburg, Sweden, especially with Dr. Kun Gao and Dr. Shaohua Cui, is highlighted.

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Keywords—evolving fuzzy models, incremental algorithms, Takagi-Sugeno-Kang fuzzy models, transportation applications

SHORT BIO

Radu-Emil Precup (M IEEE '03 - SM IEEE '07 - F IEEE '25) was born in Lugoj, Romania, in 1963. He received the Dipl.Ing. (Hons.) degree in automation and computers from the "Traian Vuia" Polytechnic Institute of Timisoara, Timisoara, Romania, in 1987, the Diploma in mathematics from the West University of Timisoara, Timisoara, in 1993, and the Ph.D. degree in automatic systems from the "Politehnica" University of Timisoara, Timisoara, in 1996.

From 1987 to 1991, he was with Infoservice S.A., Timisoara. He is currently with the Politehnica University of Timisoara, Romania, where he became a Professor in the Department of Automation and Applied Informatics, in 2000, and he is currently a Doctoral Supervisor of automation and systems engineering. From 2022, he is also a senior researcher (CS I) and the head of the Data Science and Engineering Laboratory of the Center for Fundamental and Advanced Technical Research, Romanian Academy – Timisoara Branch, Romania. From 2016 to 2022, he was an Adjunct Professor within the School of Engineering, Edith Cowan University, Joondalup, WA, Australia. He is currently the Director of the Automatic Systems Engineering Research Centre with the Politehnica University of Timisoara, Romania. From 1999 to 2009, he held research and teaching positions with the Université de Savoie, Chambéry and Annecy, France, Budapest Tech Polytechnical

Institution, Budapest, Hungary, Vienna University of Technology, Vienna, Austria, and Budapest University of Technology and Economics, Budapest, Hungary. He has been an Associate Editor of IEEE Transactions on Fuzzy Systems (2018-2022, Certificate of Commendation in 2022), Information Sciences (Elsevier, 2021-2024), Engineering Applications of Artificial Intelligence (Elsevier, 2021-2024), Applied Soft Computing (Elsevier, 2014-2024), Expert Systems with Applications (Elsevier, 2021-2024), Communications in Transportation Research (Elsevier, 2021-2024), Applied Artificial Intelligence (Taylor & Francis, 2022-2024), and Healthcare Analytics (Elsevier, 2021-2024), is the Editor-in-Chief of Romanian Journal of Information Science and Technology, and is an editorial board member of several prestigious journals including IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Cybernetics (IEEE SMC Best Associate Editor Award in 2025), IEEE Open Journal of the Computer Society, Evolving Systems (Springer Nature Editorial Contribution Award in 2025), Journal of Engineering-JOE (IET and Wiley), and Journal of Intelligent and Connected Vehicles (Tsinghua University Press, China, and IEEE).

He is the author or coauthor of more than 300 papers published in various scientific journals, refereed conference proceedings, and contributions to books. His research interests include mainly development and analysis of new control structures and algorithms (conventional control, fuzzy control, data-based control, sliding mode control, neuro-fuzzy control, etc.), theory and applications of soft computing, computer-aided design of control systems, modeling, optimization (including nature-inspired algorithms), and applications to mechatronic systems (including automotive systems and mobile robots), embedded systems, control of power plants, servo systems, electrical driving systems.

Prof. Precup is an IEEE Fellow, in the 2025 class of fellows, "for contributions to fuzzy and data-driven control of servo systems", a corresponding member of The Romanian Academy, a member of the US National Academy of Artificial Intelligence - NAAI, a Fellow of the Asia-Pacific Artificial Intelligence Association, a Doctor Honoris Causa of the Óbuda University, Budapest, Hungary, a Doctor

Honoris Causa of the Széchenyi István University, Győr, Hungary, a member of the Task Force on Autonomous Learning Systems within the Neural Networks Technical Committee (TC) of the Institute of Electrical and Electronics Engineers (IEEE) Computational Intelligence Society, the TCs on Computational Cybernetics, and Cyber-Medical Systems of the IEEE Systems, Man, and Cybernetics Society, the Task Force on Adaptive and Evolving Fuzzy Systems within the Fuzzy Systems TC of the IEEE Computational Intelligence Society, the TCs on Data-Driven Control and Monitoring, and Control, Robotics and Mechatronics of the IEEE Industrial Electronics Society, the International Federation of Automatic Control (IFAC) TC on Computational Intelligence in Control (previously named Cognition and Control), the IFAC TC on Linear Control Systems, the Working Group WG 12.9 on Computational Intelligence of the Technical Committee TC12 on Artificial Intelligence of the International Federation for Information Processing (IFIP), the European Society for Fuzzy Logic and Technology (EUSFLAT), the Hungarian Fuzzy Association, and the Romanian Society of Control Engineering and Technical Informatics. He founded in 2015 and is the chair of the IEEE Systems, Man, and Cybernetics Society Romania Chapter. He has been the chair of the Timisoara Branch of the Robotics Society of Romania since 2020.

He was the recipient of the Elsevier Scopus Award for Excellence in Global Contribution (2017), the "Henri Coandă" prize in the Engineering Sciences category, awarded at the Romanian Research Gala 2024, the "Tudor Tănăsescu" Prize from the Romanian Academy for data-driven controller tuning techniques (2020), the "Grigore Moisil" Prize from the Romanian Academy, two times, in 2005 and 2016, for his contribution on fuzzy control and the optimization of fuzzy systems, the Spiru Haret Award from the National Grand Lodge of Romania in partnership with the Romanian Academy in 2016 for education, environment and IT, the Excellency Diploma of the International Conference on Automation, Quality & Testing, Robotics AQTR 2004 (THETA 14, Cluj-Napoca, Romania), two Best Paper Awards in the Intelligent Control Area of the 2008 Conference on Human System Interaction HSI 2008, Krakow (Poland), the Best Paper Award of 16th Online World Conference on Soft Computing in Industrial Applications WSC16 (Loughborough University, UK) in 2011, the Certificate of Appreciation for the Best Paper in the Session TT07 1 Control Theory of 39th Annual Conference of the IEEE Industrial Electronics Society IECON 2013 (Vienna, Austria), a Best Paper Nomination at 12th International Conference on Informatics in Control, Automation and Robotics ICINCO 2015 (Colmar, France), a Best Paper Award at 7th International Conference on Information Technology and Quantitative Management ITQM 2019 (Granada, Spain), a Best Paper Award at 8th International Conference on Information Technology and Quantitative Management ITQM 2020 & 2021 (Chengdu, China), was named a 2022 academic data leader by Chief Data Officer (CDO) Magazine, and was listed as one of the top 10 researchers in Artificial Intelligence and Automation (according to IIoT World as of July 2017). He is in the top half of the 1% Best Electronics and Electrical Engineering Scientists list and 1st in the National Ranking (Romania) according to Research.com, and in the 3% best Engineering & Technology / Electrical & Electronic Engineering rankings according to AD Scientific Index. Included in the list since 2020, he is currently ranked in the top 0.5% (2192nd out of 458615 researchers in Artificial Intelligence & Image

Processing worldwide in 2025) according to the "Top 2% Scientists" Stanford University's list, and has 16 highly cited papers.

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