

PhD Program in Computer Science and Mathematics



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Sala Consiglio – 7° floor
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Advanced Applications of Machine Learning in Embedded Systems

Abstract: This seminar focuses on advanced machine learning methods for embedded intelligence in energy-constrained IoT devices, where the main challenges arise from limited available energy and limited computational power. The expert part addresses adaptive control, parameter optimization, prediction, data reduction, and efficient transmission in energy-harvesting systems. It also presents three representative research directions: reinforcement learning for real-time self-learning energy management without the need for prior historical data or hardware redesign; a cloud-based digital twin concept for optimization of energy-management strategies and transmission of control parameters within low-data-rate IoT communication standards; and an edge-computing approach combining fuzzy rules with wavelet decomposition to prioritize information-rich data and reduce unnecessary communication while preserving the quality of monitoring outputs.

Short bio: Michal Prauzek was born in Ostrava, Czech Republic, in 1983. He obtained a bachelor's degree in Control and Information Systems, a master's degree in Measurement and Control Systems, and a PhD in Technical Cybernetics at VSB -- Technical University of Ostrava, Czech Republic. He has worked at the university's Department of Cybernetics and Biomedical Engineering since 2010 and is currently a full professor and deputy head of the department. He also worked as a research postdoc fellow at the University of Alberta, Canada in 2013-2014. He has authored more than 100 articles and conference papers and has more than 10 registered inventions. His research areas include embedded systems, data and signal analysis, control design, and machine learning. He is an IEEE senior member active in the Systems, Man and Cybernetics Society and the Engineering in Medicine and Biology Society.