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"Internet of Robotic Things Intelligent Connectivity and Platforms." The Autonomous Intelligent Nexus: Internet of Robotic Things Embedding Edge AI, Connectivity, and Platforms

Internet of Robotic Things (IoRT) is a concept that integrates edge artificial intelligence (AI), combining the Internet of Things (IoT), AI, edge computing and immersive technologies with autonomous systems, such as robotics and autonomous vehicles. The presentation examines the transformative impact of edge AI on the IoRT, advancing a new paradigm of intelligent, autonomous, and collaborative systems, highlighting how the IoRT is evolving beyond simple connectivity into a dynamic ecosystem powered by next-generation AI. A key advancement is the integration of edge AI, which facilitates real-time data processing directly on mobile IoRT devices operating in fleets or swarms, while minimising latency and enhancing security, enabling real-time, informed decision-making in dynamic environments without constant reliance on centralised computing infrastructure. The deployment of generative AI, particularly through efficient language models, is enhancing human-robot interaction. The presentation further explores the concept of agentic AI, where IoRT devices function as autonomous agents. This autonomy is amplified through intrinsic or extrinsic and swarm intelligence, decentralised approaches where fleets or groups of autonomous mobile systems collaborate to solve problems and perform tasks collectively. Edge AI symbiosis with IoRT is built upon a foundation of robust sensor integration, hardware and software platforms, intelligent connectivity, edge AI frameworks, algorithms, datasets and data analytics. By examining the synergy between IoRT, advancements in edge AI, agentic AI, the integration of robotic operating system (ROS), the architecture elements developed in software- and AI-defined vehicles (SDVs/AIDVs), connectivity and platforms, the presentation will emphasise the future of automation, where interconnected IoRT devices can learn, adapt, and work together with efficiency and intelligence.

Keywords
edge AI , IoRT, agentic AI, autonomus systems, ROS, AIDVs

Biography
Dr. Ovidiu Vermesan holds a PhD degree in microelectronics and a Master of International Business (MIB) degree. He is Chief Scientist at SINTEF, Oslo, Norway and received SINTEF's 2003 award for research excellence for implementing an intelligent biometric system. He works on projects addressing nanoelectronics, edge AI, agentic AI, integrated sensor/actuator systems, generative edge AI, communication and autonomous systems. He published over 100 technical articles and conference papers. He is a member of the Alliance for AI, IoT and Edge Continuum Innovation (AIOTI) board. He is the coordinator of the Edge AI Technologies for Optimised Performance Embedded Processing (EdgeAI) project.

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