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NEWSLETTER 5/2025

TALON PROJECT



TALON

Autonomous and self-organised artificial intelligent
orchestrator for a greener industry 5.0

talon-project.eu

EDITORIAL

This newsletter presents a summary of the primary dissemination outcomes of the project, which include organization of events and technological developments. Specifically, one (1) publication and one (1) demonstration in a Conference.

Stylianos Trevlakis, InnoCube

EXCITING NEWS FROM IEEE ICMLCN 2025!



We're thrilled to share that **InnoCube P.C.** successfully presented our cutting-edge demonstration at the 2025 IEEE International Conference on Machine Learning for Communication and Networking!

🚀 Our Demo: "A Digital Twin Based Reconfigurable Intelligent Surface Phase Adaptation Using Spiking Reinforcement Learning Policy Optimization"

Our team showcased an innovative digital twin system for reconfigurable intelligent surfaces (RIS) that leverages Spiking Reinforcement Learning (SRL) for optimal phase adaptation. This groundbreaking approach demonstrates significant advantages over conventional Deep Reinforcement Learning methods across multiple key metrics:

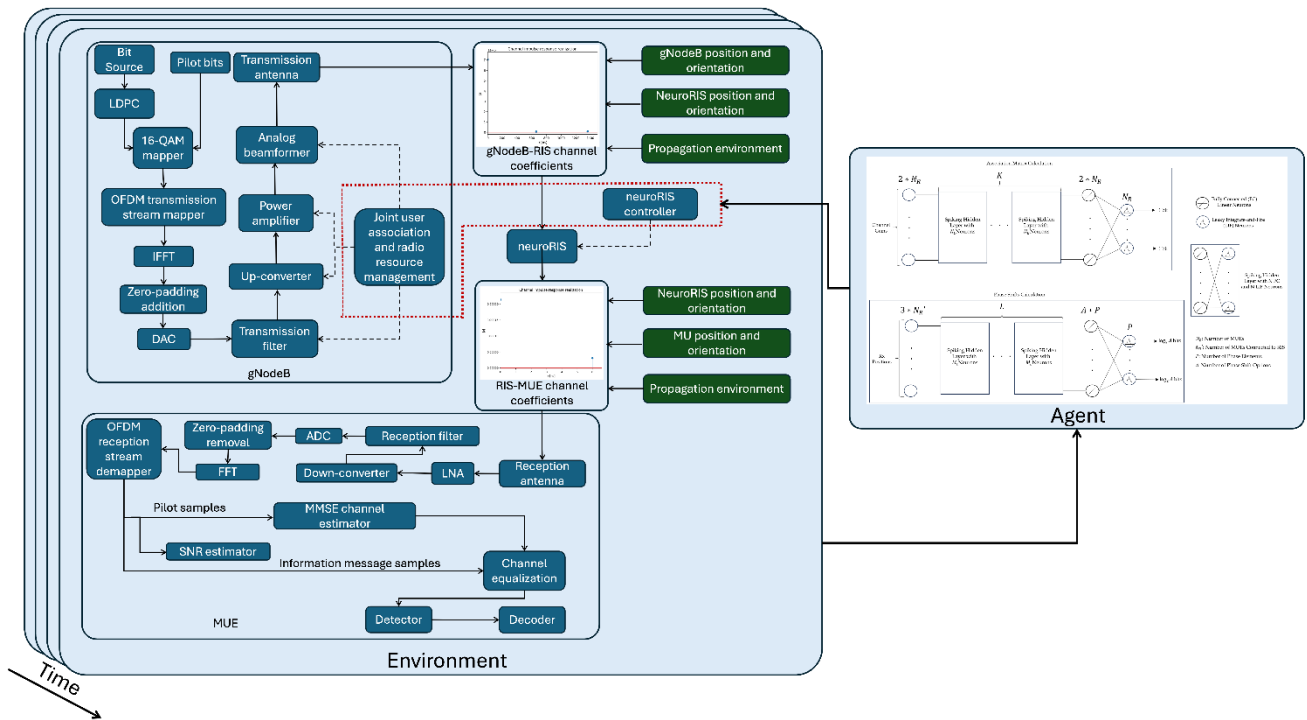
- ✅ Enhanced energy efficiency
- ✅ Reduced training latency
- ✅ Lower outage probability
- ✅ Improved bit error rates

The live demonstration allowed attendees to interact with our digital twin system and witness firsthand the transformative impact of combining RIS technology with advanced SRL approaches on wireless communication performance.

The future of intelligent wireless systems is here, and the TALON project is proud to be at the forefront of this technological revolution! 🌐

A DIGITAL TWIN BASED RECONFIGURABLE INTELLIGENT SURFACE PHASE ADAPTATION USING SPIKING REINFORCEMENT LEARNING POLICY OPTIMIZATION

Abstract: This demo presents a digital twin of a reconfigurable intelligent surface-empowered wireless system that employs spiking reinforcement learning (SRL) optimization policy for phase adaptation in order to maximize the network coverage, while minimizing the energy consumption at both the microcontroller and transmission related processes. The demo assesses the efficiency of SRL against conventional deep reinforcement learning approaches in terms of (i) energy consumption, (ii) reduction of training latency, (iii) probability of outage, and (iv) bit error rate.



Ilias Cryovergis, Stylianos E. Trevlakis, Dimitris Kleitsas, Alexandros-Apostolos A Boulogeorgos, Theodoros A. Tsiftsis, and Dusit Niyato, "A Digital Twin Based Reconfigurable Intelligent Surface Phase Adaptation Using Spiking Reinforcement Learning Policy Optimization", IEEE International Conference on Machine Learning for Communication and Networking, May, 2025.



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