MULTI-AGENT GOAL-ORIENTED NETWORKING FOR INTERPRETABLE, SECURE, SAFE, AND SUSTAINABLE 6G

SNS-JU 2025 Stream B-01-01 — Advanced Architectures Systems and Technologies
Grant no. 101292933

Federico Chiariotti (University of Padova, MAGIC-6G Technical Coordinator)

Co-funded by the European Union

Consortium

- **Academic partners:** University of Padova (Italy, coordinator), King's College London (U.K.), Linköping University (Sweden)







- **Industrial partners:** Nokia Solutions and Networks (Germany and Finland), Wings ICT Solutions (Greece), Brainstorm 3D (Spain), Turkcell (Turkey)





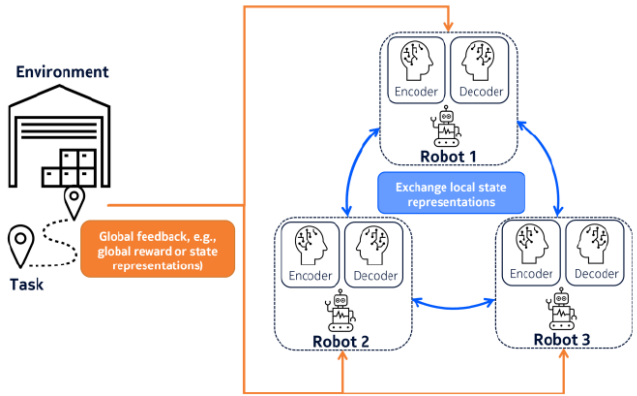


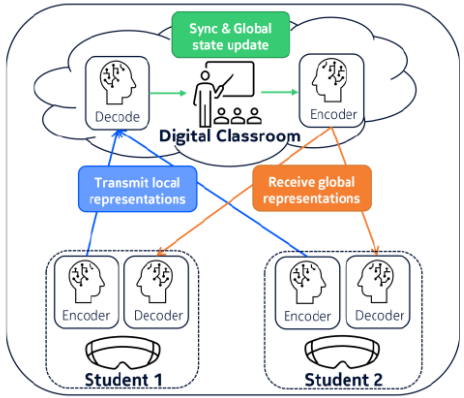


Project idea

In MAGIC-6G, we advocate a paradigm shift from Goal-Oriented Communication towards Goal-oriented Networking (GoN), where the network and applications running over it are seen as a distributed system of cooperating agents. We hence pursue the vision of 6G as an ecosystem where applications and network elements are co-designed to reach given goals, specified through context-aware interfaces.

Key technological enablers: AI/ML, Digital Twins





Project objectives

1. Design a modular, forward-compatible, and secure **system architecture** integrating GoN into the emerging 6G infrastructure

2. Develop a framework for multi-agent, multi-modal goal-oriented information **extraction, representation, and sharing**

3. Establish a theoretical GoN framework to **coordinate control, communication, and computing tasks** among multiple agents

4. Embed elements of **safety, security, and sustainability** as key goals and constraints in the GoN optimization

5. Implement **proofs of concept** in real use cases and integrate vertical applications in the GoN architecture