ELECTRICAL, ELECTRONICS AND COMMUNICATIONS ENGINEERING

CNR-IEIIT - Harnessing information and unleashing intelligence in Beyond 6G networks

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Context of the research activity	Design and evaluation of intelligent network services and applications for heterogeneous environments and user devices
Objectives	Beyond 6G networks will integrate a wide variety of technologies ranging from smart-radio environments to non-terrestrial networks such as drone swarms, airborne platforms and satellite constellations. Managing such a complexity will necessitate unprecedented level of intelligence as well as unprecedented efficiency. A key asset to meet these challenges is harnessing the information flow, by selecting the most appropriate information at the best locations in the network. To this end a model-oriented approach can be envisioned whereby artificial intelligence is combined with domain specific knowledge. This synergy between AI and expert insight will allow the development of solutions able to optimize next generation networks. The objectives of the PhD activity are: • Investigate the efficacy of combining AI with domain-specific knowledge through model-oriented approaches to solve complex network challenges. • Establish key performance metrics such as data rates, latency, reliability, energy efficiency, and bandwidth efficiency and evaluate the benefit they can get in the context of such model-oriented approaches. • Design and implement advanced AI solutions able to manage the complexity of beyond 6G networks, ensuring optimal performance, efficiency, and reliability by exploiting available information and expert knowledge.
Skills and competencies for the development of the activity	The candidate should be familiar with machine learning techniques, mobile networks, and also have good programming skills using tools such as Matlab and Python. Experience with machine-learning frameworks like PyTorch or TensorFlow is desirable.