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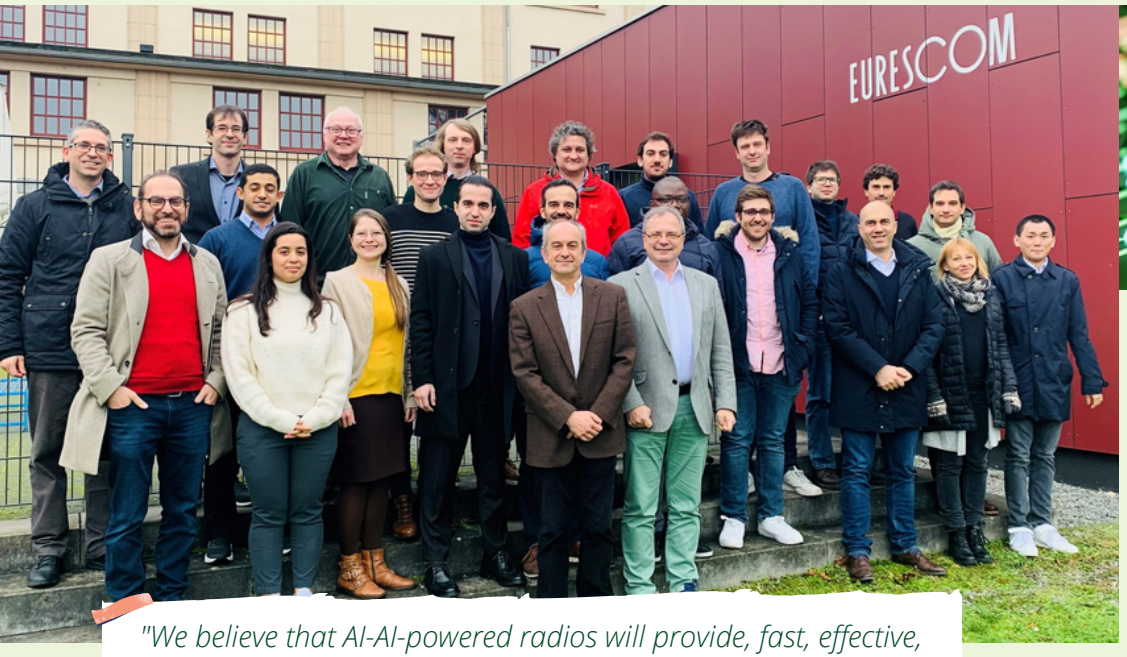
CENTRIC leverages AI techniques through a top-down, modular approach to wireless connectivity that puts the users' communication needs and environmental constraints at the center of the network stack design, yielding the **AI-enabled Air-Interface (AI-AI)**.



"We believe that AI-AI-powered radios will provide, fast, effective, and affordable ways of ensuring wireless connectivity services in an increasingly complex world."

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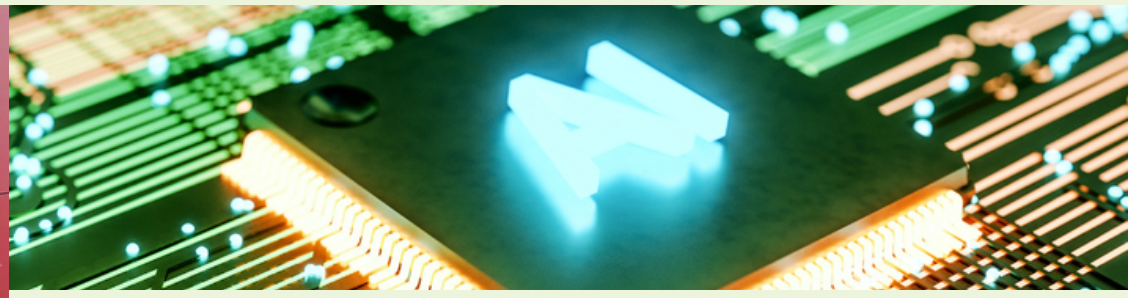
Towards an AI-Native User-Centric Air Interface for 6G Networks



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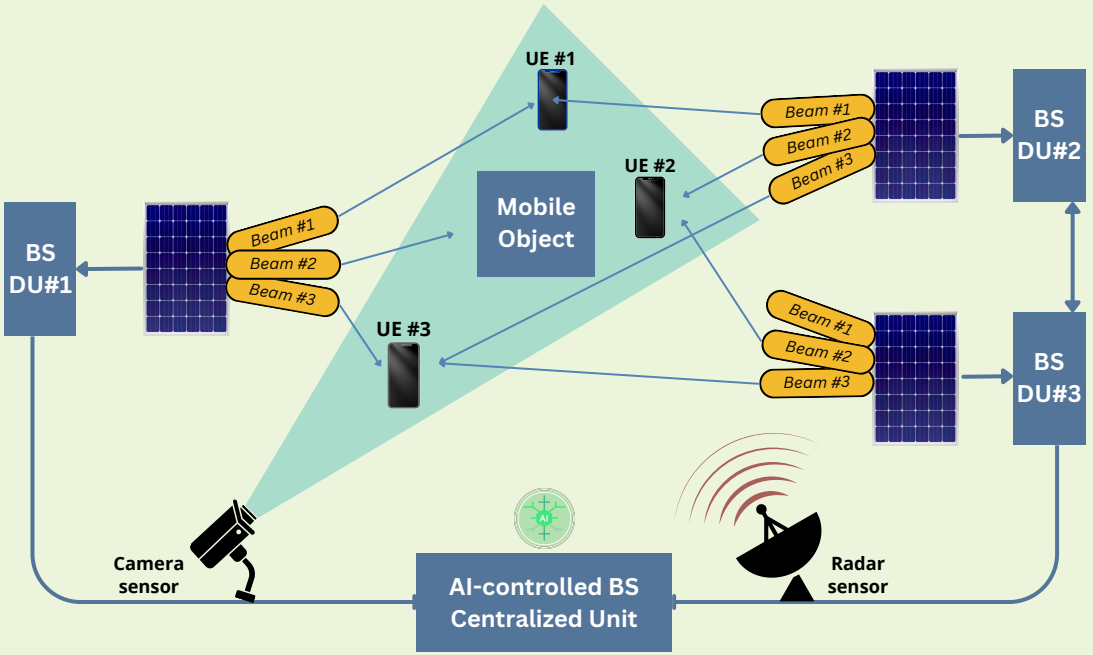
6GSNS

AI-controlled beam selection and tracking in mmWave networks using sensing information



The goal of beam management is selecting and retaining a proper beam pair between transmitter and receiver which can lead to a good connectivity. According to recent measurements, extreme low latency in 6G target use cases can be achieved through multiple paths received via cooperative relaying or via Base Station Distributed Units (BS DU) to create separate paths from the network to the target UEs. This process, however, may be disturbed by the presence of static and mobile objects in the propagation environment blocking some of the feasible paths.

CENTRIC will focus on beam tracking and prediction aided by sensing information to combat environment uncertainties, very high interference and possibly low SINR conditions. We will utilize centralized and distributed sensing capabilities to detect the best beam for both initial access and beam refinement between network and UE.

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PROJECT CHALLENGES

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- How to leverage the wealth of data in the PHY layer to design a 6g waveform?
- How to realize pratical MU-mMIMO transceivers through an E2E user-tailored PHY layer?
- How to explore application-optimized MAC protocols?
- How to incorporate energy efficiency targets into L1, L2 & RRM algorithms?
- How to keep EMF under control in novel network architectures and telecom paradigms?
- How to train and monitore the performance of AI telecom models?
- How to integrate of AI processing with hardware components?
- How to validate and test frameworks for AI-native communication technologies?

PROJECT OBJECTIVES

1. To develop AI methods for the discovery of novel and efficient waveforms
2. To develop AI methods for the discovery of novel and efficient transceivers
3. To develop AI methods for the discovery of customized lightweight communication protocols
4. To introduce novel end-to-end hardware co-design solutions for energy-efficient AI-native transceivers
5. To develop training and monitoring environments as enablers for AI-AI deployments
6. To validate user-centric AI-AI solutions in a lab setting
7. To demonstrate and disseminate AI-AI concepts

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