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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-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

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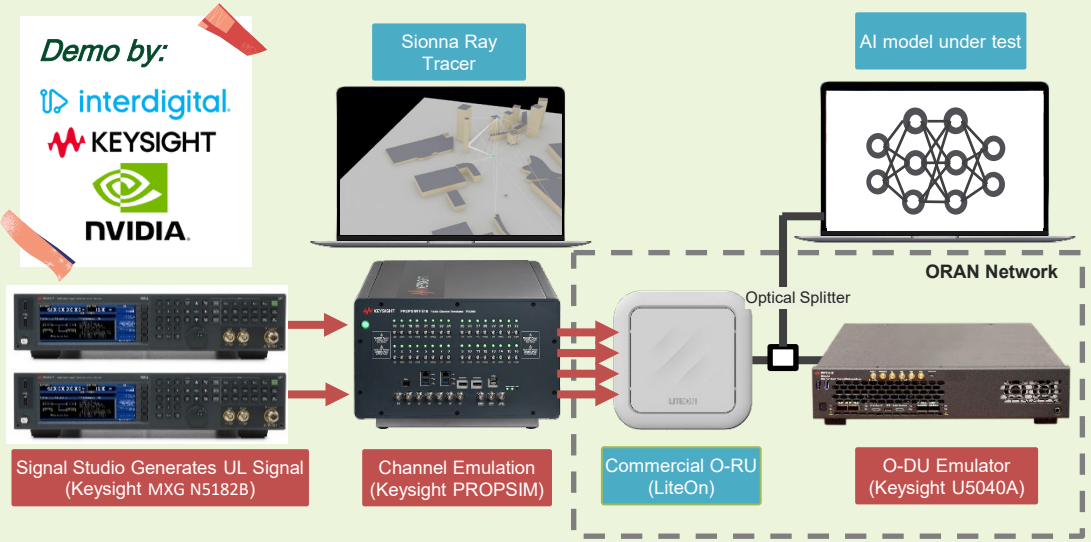
An Evaluation of AI-RAN Techniques based on Network Digital Twin with Hardware-in-the-Loop

Demo by:

interdigital.
KEYSIGHT
NVIDIA



We present a testbed to experimentally evaluate the use of artificial intelligence and machine learning techniques in the physical layer of future mobile networks. The testbed relies on the use of a digital twin of the propagation environment which, via ray-tracing, is used to generate realistic
channel responses tied to a particular (digital) deployment site. Arbitrary waveform generators are used to create standard compliant 5G radiofrequency signals whose convolution with the channel is emulated with Keysight's radio channel emulator PROPSIM. After channel convolution, the signal is processed by a commercial O-RAN radio unit by LiteOn, which
delivers the digitized samples to a server for AI processing.

Two use cases are demonstrated:

1. *a **neural receiver developed by NVIDIA**, capable of multi-user MIMO detection and decoding*
2. *an **AI system for activity detection and classification by InterDigital** using RF signals.*

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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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