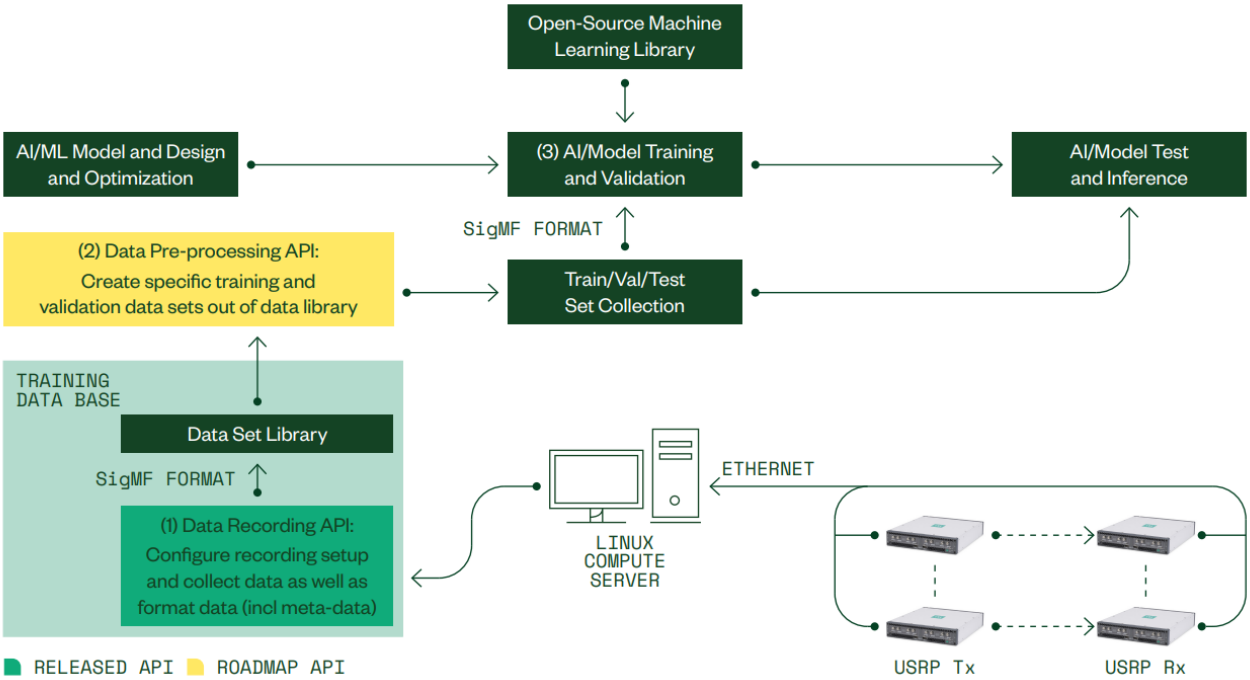
RF Data Recording for AI/ML in 5G/6G Research with the USRP

Unlock the full potential with AI/ML for next-generation wireless communication

System Overview



Solution Benefits

Free, open-source software based on Python in GitHub generates real-world data sets

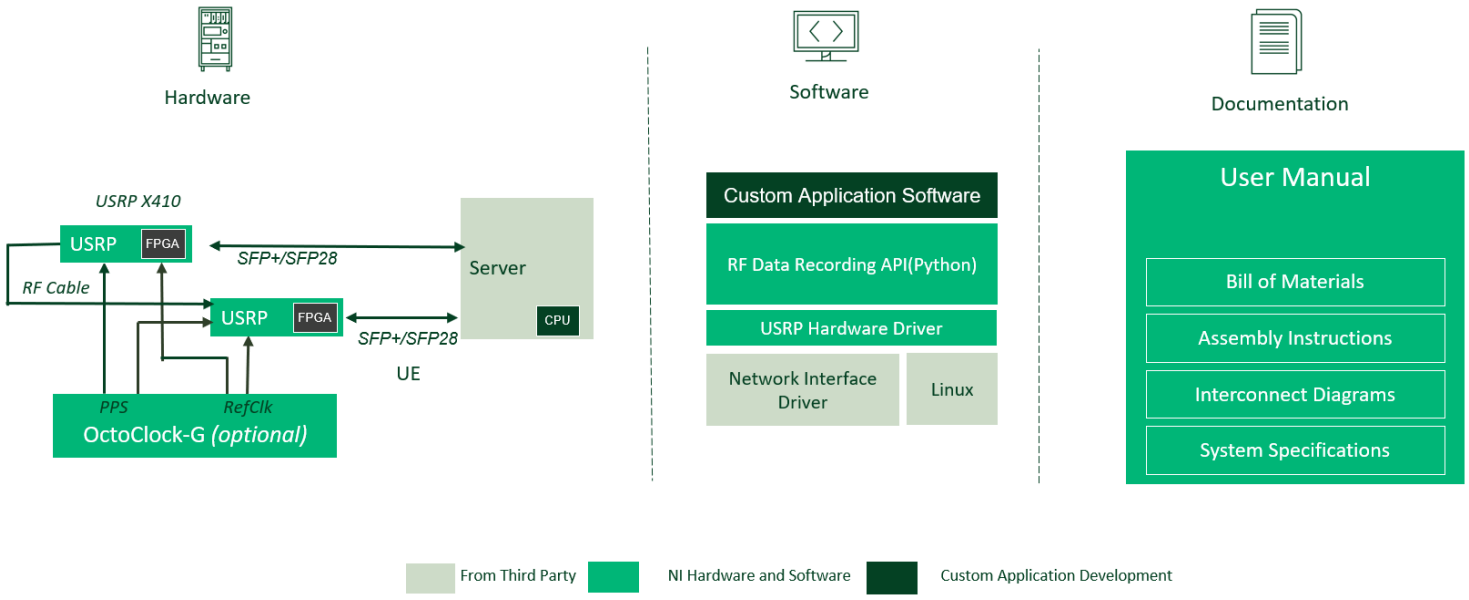
Easy-to-read JSON/YAML configuration file to automatically create datasets in SigMF format suitable for AI/ML applications

Hassle-free setup of NI's SDR hardware with step-by-step user manual to provide a higher starting point for researchers

What is RF Data Recording for AI/ML in 5G/6G Research?

Future 5G/6G networks will increasingly use artificial intelligence (AI) and machine learning (ML) principles. RF datasets play a pivotal role in training and testing AI/ML models for different wireless applications. However, researchers use different channel models and storage formats to generate the datasets, making it difficult to compare models and adopt broader data sets. Another challenge is the lack of effective tools to get real-world RF data sets to improve the algorithms. This requires:

- Large data sets with a standardized format and comprehensive scenario description
- High-quality data sets with representability of wide-range potential scenarios
- Real-world data sets with additional effects like RF impairments and channel properties to improve robustness



NI and Northeastern University are working together to offer a complete solution, RF Data Recording for AI/ML in 5G/6G Research with the NI Ettus USRP, that enables users to collect application-specific RF datasets in a standard format to optimize AI/ML algorithms for various purposes.

Key Advantages

- Open-source and freely available on GitHub
- Facilitate hassle-free setup for experimentation and data set collection
- Distributed testbed setups possible for data recording due to ETH connection of USRP devices
- Scalable transceiver stations with individual parameter configuration (e.g., frequency, bandwidths, Tx/Rx gains…)
- JSON or YAML-based single configuration file to define data recording campaign with the definition of parameter settings as single, list, or range of values
- Instant conversion of recorded IQ data to SigMF format proposed by the open-source group as standard for RF AI/ML datasets

Find out more

5G/6G Webpage

Application Note

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