AI assisted EMC interference suppression

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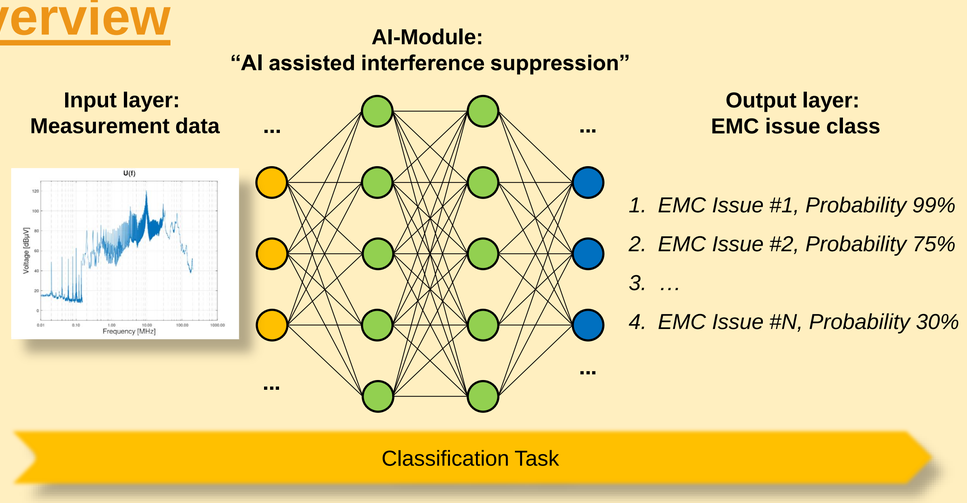
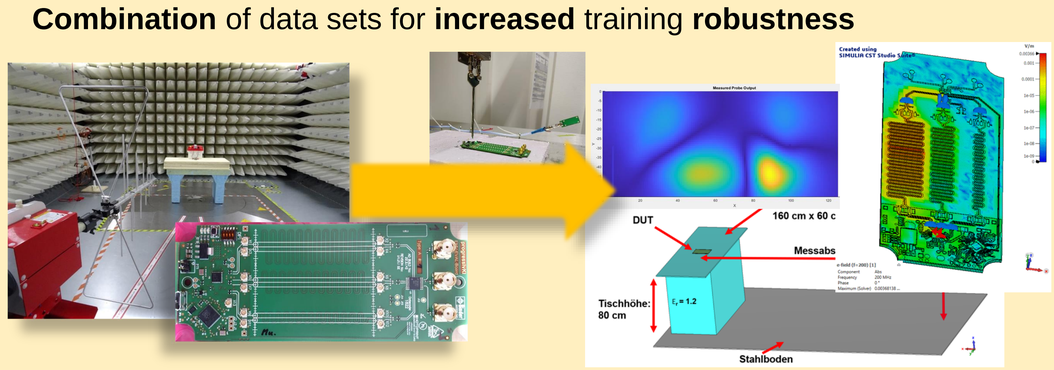
Overview



- **EMC measurements,** e.g. within the framework of product development
- Up-to-date approaches like **virtual prototyping** are **not profitable for KMU**
- Conversion of the EMC result analysis into a **classification task**
- **Reduction of time and cost requirements**

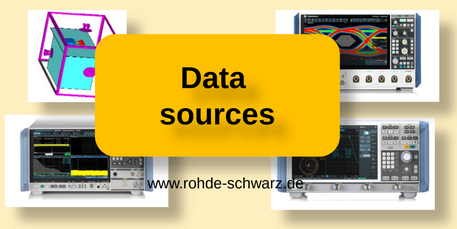
Data Generation

- **Cost- and time-consuming** generation of data by **real measurements**
- **Hybrid approach**: Measurement and simulation
- Transfer of the measurement environment into CST
- **Data generation** by field simulation, EMC measurement and near-field-scans
- **Acceleration** by usage of **GPU-based** High-Performance-Computing (**HPC**)
- **Combination** of data sets for **increased** training **robustness**



Data Annotation, Processing and Filtering

- **Different output data** formats of EMC measurement and simulation systems
- Need for **standardization** for AI processing pipeline



System-specific file format

Annotation of filename information | **Data Parser** | **Annotation of file content information**

Standardized file format

Knowledge-based Pre-Filtering

Modular data filters

Connector to AI-Pipeline

Local or cloud-based

- Setup of a **connector to the AI pipeline**, e.g. S3 storage or local solution
- Setup **information** often included in **filename and header**
- **Annotation scheme needed** for extraction of setup information
- Tool for **semi-automated** annotation, processing and provision of measurement and simulation **data sets**
- Provision of **knowledge-based pre-filtering** options might increase AI quality

AI Pipeline

Pre-Processing → **Data Combination** → **Dimensionality Reduction** (PCA, Auto Encoders)

Split (80% / 20%) → **Train** → **Test**

Package Model → **Deploy Cloud or On-Premise** → **UI or Rest-Api**

Gitlab + MinIO + NVIDIA Cuda + Docker

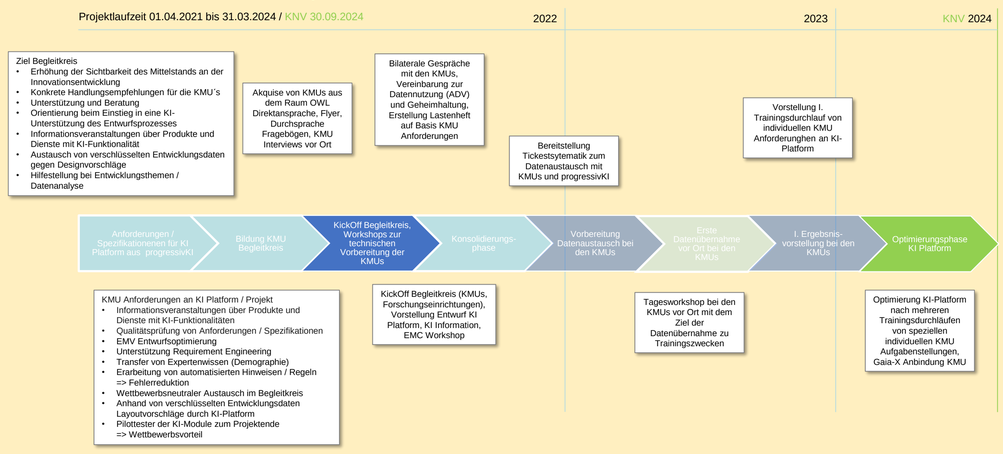
Service Platform Tools + Local + Remote

Streamlit

Tool-Integration
Chatbot

End User / KMU Input

Technische KMU-Unterstützung zur Einführung KI-basierter Entwurfsprozesse



Addressed Core Innovations of progressivKI

- IE.2: Development of a modular and flexible usable part of the AI platform (including connectors to data sources, annotation and AI workflow)
- IE.3: Provision of connectors for cloud based processing (here: S3 storage) and/or local connectors / download options for models
- IE.4: Portability of AI models to individual processes
- IE.6: Usage and adaption of open source AI software for increased value gain
- IE.7: AI access for KMU
- IE.13/14: Quantification of AI training success and quality by visualization of metrics

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