

A Real-time Predictive Maintenance use case - AI4DI project

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AI4DI – Artificial Intelligence for Digital Industry

Objective 2





Objective 3

Deployment plan showing how to develop and valorise the Al technology

Put AI in business

Objective 4

Al applications to be demonstrated under

conditions as close as

Use AI in real-life

possible to real-life

Objective 1

Build AI community in Europe which is complementary with others initiatives

Build AI ECO-system

Objective 5

Roadmaps, exploitation

Make Al useful

AI for Digital Industry

Distributed AI and ML from Cloud to edge

studies, business cases

Build and sustain dynamic AI technology eco systems in Europe ensuring Ethical clean and trusted AI for safety critical realtime applications

Al for safety critical systems

https://ai4di.eu

Collaborative Requirements from 5 different industrial sectors

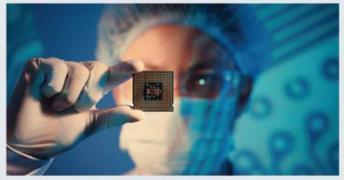


ΤΓΓech

industrial



Semiconductor-Industry



Beverage Industry & Agriculture



Transportation





SC1.2 - Real time Predictive Maintenance

- Partners: AVL (Lead), Brno University of Technology, Graz Technical University, TTTech Industrial Automation
- TRL Level: 4
- AI Methods: Reinforcement learning, Model based reasoning based on physical damage models
- AI Attributes: Trustworthy, Secure, Reliable, Resilient, Transparent
- Objectives and approach: development of real-time predictive maintenance algorithms using an approach based on machine learning and AI rule-based paradigms





SC1.2 - Real time Predictive Maintenance

What Development of a real-time predictive maintenance framework using an approach based on machine learning and AI rule-based paradigms.

How

The demonstrator is implemented on a test rig to demonstrate real-time processing of operation data **on the edge** for failure detection and prediction.

Real-time failure detection and handling increases system availability and safety.
Why In contrast to fixed maintenance intervals, RPM provides cost saving potential e.g., on unnecessary repairs or unexpected system breakdown.

Results

The capabilities for real-time failure detection and handling are demonstrated on an e-motor suitable for failure injection.

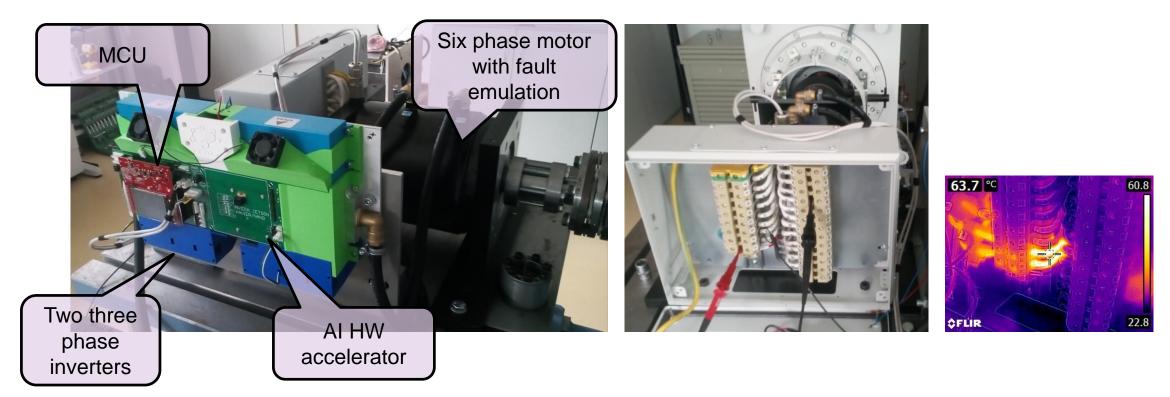




Predictive health-monitoring system for machines – Test setup

The test setup is composed from 50 kW dynamometer, 30 kW six phase motor with the possibility to emulate different kinds of short circuit faults, two three-phase inverters controlled by high-performance MCU linked with embedded nVIDIA hardware (Jetson Nano/Xavier) by SPI/Ethernet connection.

The aim is to implement real-time diagnostics using pre-trained AI NN.





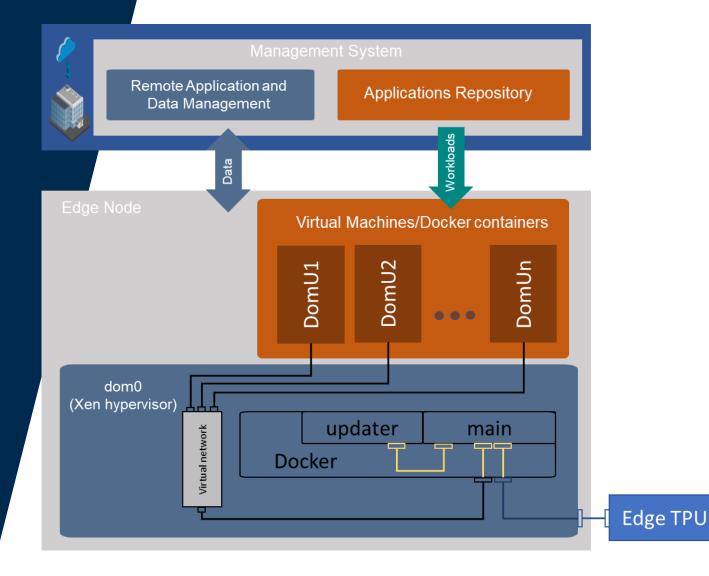
Edge/Cloud platform

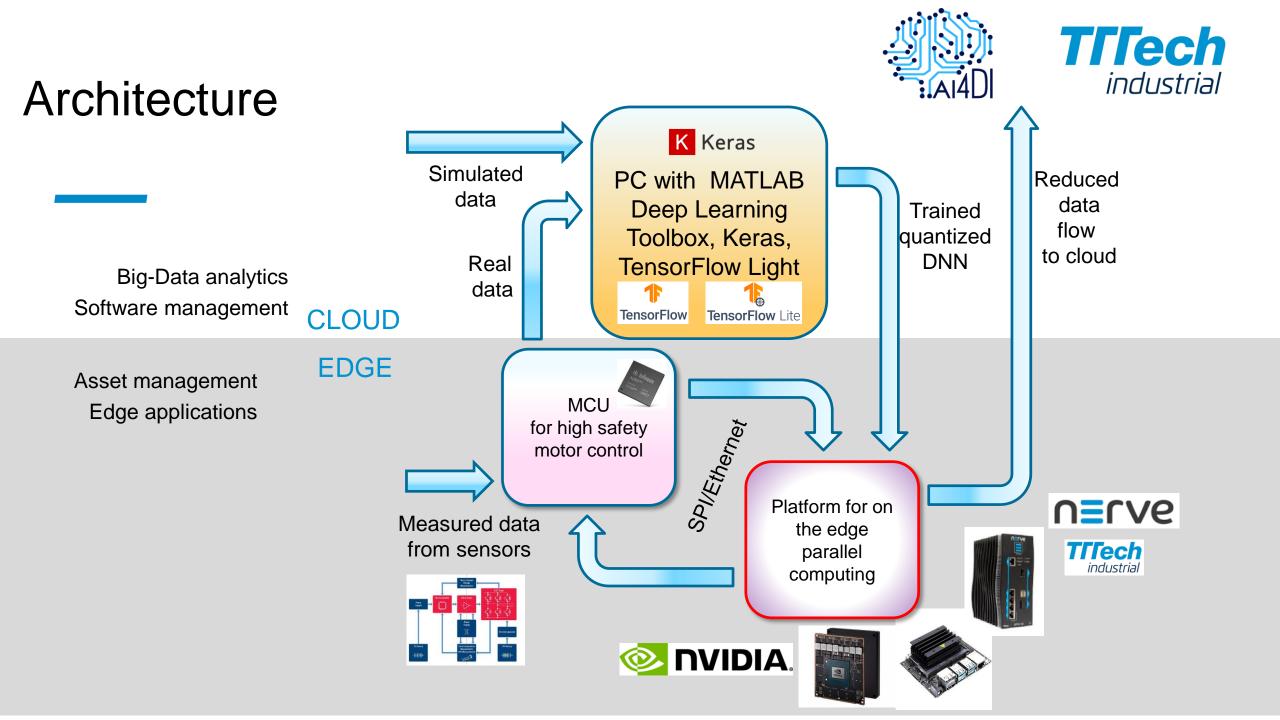
Al application

 Virtualisation of AI/ML acceleration hardware based on client/server model. The application can service multiple client requests for accelerated execution of AI/ML model and shall be able to switch between models during runtime and support update of its default model.

Client/Server approach

- Processing the inferencing requests from clients using the AI accelerator
- Updating of default AI model after any active inference process
- Results are sent back to clients for visualization/decision making





Thank you!



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