

ThinKIsense – Thin Edge Artificial Intelligence for Process Automation

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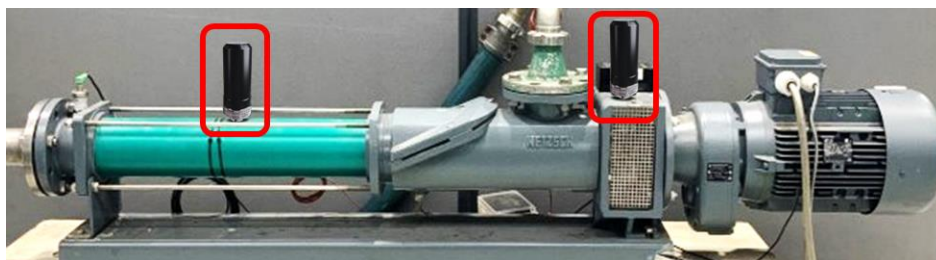
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In cooperation with NXP GmbH Hamburg, TU Darmstadt, FZI Karlsruhe, Netzsch GmbH Waldkraiburg

- Calculation of process variables like pressure, volume flow and turn speed out of pump vibration as well as an anomaly classification direct at the sensor microcontroller
- Comparison of different AI technologies including efficiency

1. Motivation

State of the art: Battery powered sensors collect structure-borne sound and air-borne sound, raw data is send to edge or cloud to process them using AI methods



Wireless transmission of
huge data sets



High energy demand



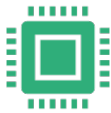
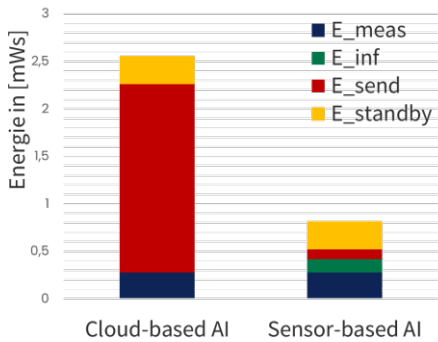
3 years battery lifetime

2. Targets

Processing of sensor data with AI directly in the multisensor, only KPIs are sent to the cloud. Resilience with end-to-end security from edge to cloud.

The battery life of the sensors is expected to be several years to be able to use them in complex systems with long maintenance intervals.

Simple and reliable fault detection is intended to enable plants to operate longer. Pumps without connection to an automation system are observable using implemented long range wireless network interface NB-IoT.



Wireless transmission of huge data sets



Enable detailed maintenance planning



8+ years battery lifetime

3. Test

Benchmark of 3 AI processors inside ThinkIIsens sensor: ARM, RISC-V extended and neuromorphic hardware. Battery lifetime versus prediction accuracy is tested at a pump flow rig.

