

TinyML and Novel AI Workflow Enables Smarter Wireless Low Power Sensors Managed and Deployed at Large Scale at the Far Edge

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Significant challenges prevent large scale deployment of sensors at the far edge in utilities, industry, energy production, transportation/infrastructure, and many other applications. For example, nearly half a billion motors are unmonitored due to challenges such as large upfront equipment cost, labor intensive installation, ease of access to power, and cost-effective wide area communications.

Advances in ML, low power microcontrollers, battery technology, and narrowband IoT cellular communications have opened the door to address these large markets. Over the next few years, the combination of TinyML, low power MCUs, long battery life, and narrowband cellular IoT networks will lead to an explosion in deployment of smarter sensors at the far edge providing greater insights enabling predictive maintenance and process improvements.

We will present an end-to-end architecture & market ready Industrial AI+IoT solution, which includes:

- Peel & Stick sensors, with 5 year battery life which utilizes TinyML running on ARM M4 MCU to detect and classify conditions at the far edge and communicate important events using built-in narrowband cellular modem.
- IoT Cloud platform for management and deployment of a large scale network of sensors.
- Novel TinyML AI Workflow to train, build, deploy, and adapt TinyML models at scale to millions of sensors with tiny MCUs

TinyML is critical for achieving 5+ years battery life and to significantly reduce cellular communication. The local intelligence drastically reduces the need to transmit a large amount of raw data to cloud. The cloud AI workflow allows ML engineers to easily develop, simulate, test, deploy, and integrate models into their far-edge devices without having to write any embedded code.

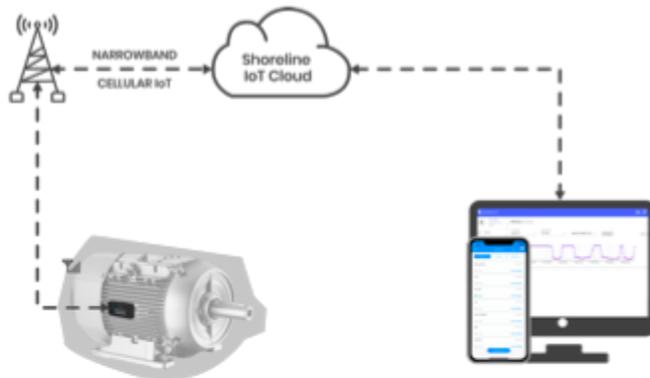
Categories: Hardware, Applications, Systems

Additional information to abstract:

If permitted as part of the poster session or a speaker slot, Shoreline will show a live demonstration of this entire end-to-end TinyML-based Industrial AI+IoT solution. Pls see preview of this demo from Google keynote at TensorFlow World -

<https://www.youtube.com/watch?v=BniTiSJE52Y>

This preview only shows sensor part of the demo. At TinyML summit, we can bring and demonstrate entire end-to-end solution (see figure below), which will be launched nationwide in Q2, 2019 by a major wireless carrier in North America.



Real-time Anomalies Detected w/ TinyML

- Bearings wear out
- Shaft misalignment
- Noise from binding, bushing and bearings
- Over temperature, Flow variance, Air Leaks