**A Real-Time Compressed Sensing-Based Platform for Data-Efficient Machine Monitoring**

**ID# 2021-5326**

**Technology Summary**

This technology leverages compressed sensing and random sampling to monitor industrial machines using less data than what is used in contemporary data acquisition and analysis. This technique is a combination of novel experimental and data analysis. The building blocks comprise edge computing hardware, software-on-the-edge, and software-on-the-cloud, all written in an open-source language and using COTS-based sensors and single-board computers. Conventional signal processing algorithms are included as modules on the cloud for other data analysis applications.

**Application & Market Utility**

This innovation solves the problems caused by ‘big data’ in industrial machine monitoring. Through the utilization of novel insights from compressed sensing theory and random sampling, a fraction of all data is used in this technology to reconstruct the original signal (~10-30% for some implementations). This data savings has significant business and engineering benefits, such as savings and cost and complexity of developing and deploying IoT-based sensor systems. Another implementation involves using low-dimensional representations to solve certain types of problems pertinent to machine monitoring. A machine monitoring system (hardware and software) is an example of a product resulting from this technology, which will provide industrial asset insight.

**Next Steps**

The research team is seeking to further commercialize this technology through licensing and investments.

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**Figure 1. Developed platform for real-time compressed-sensing based data-efficient machine monitoring**

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**Technology Readiness Level**

4

**Seeking**

Investment | Licensing |

**Keywords**

- Industrial big data
- Data analysis
- Compressed-sensing
- Open-source language
- COTS-based sensors
- End-to-end data acquisition

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