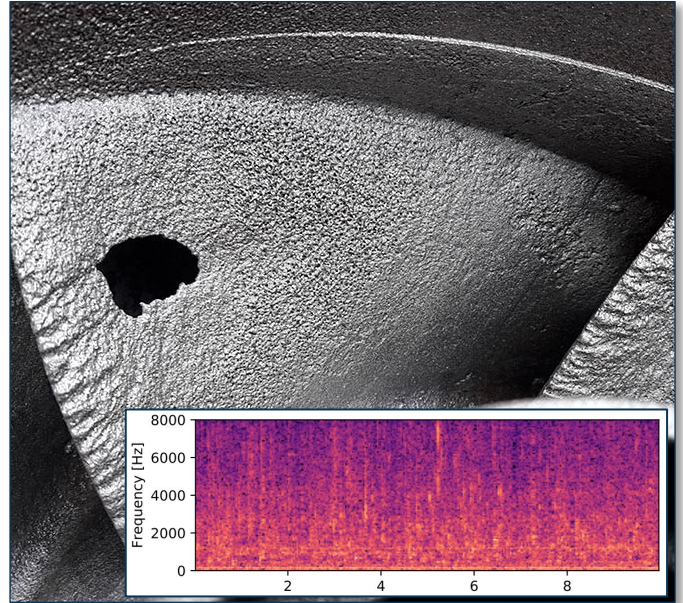


PREDICTIVE MAINTENANCE AND ANOMALY DETECTION FROM AUDIO AND VIBRATION

OVERVIEW

Skilled equipment operators are taught to detect and react to machine faults learned through years of experience. With SensiML AI algorithms, this same trained ear wisdom can be applied to 24/7 automated sensor endpoints as well. By detecting subtle changes in acoustics, AI-driven smart sensors can alert anywhere, anytime anomalous activity is found. With efficient edge algorithms that can run in low-power microcontrollers, SensiML has proven its edge AI tools can quickly generate algorithms with performance surpassing cloud AI analytics across a variety of models:

- Rotating pumps
- Fan and blowers
- Slide rails and linear bearings
- Conveyors and belt/pulley
- Hydraulic / pneumatic valves
- Custom processes and equipment



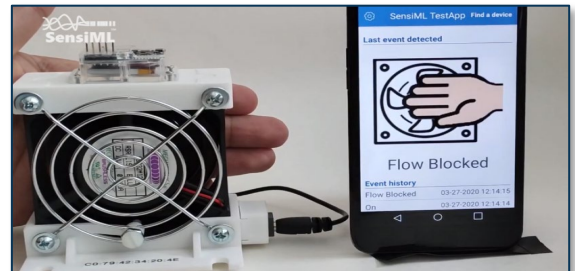
*Mining operation slurry pressure pump defect enlarged
Inset: Spectrogram of single pump audio sample
from Hitachi MIMII dataset*

(Source: <https://arxiv.org/pdf/1909.09347.pdf>)

SensiML SOLUTION

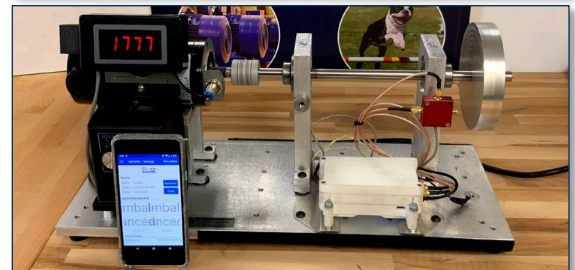
SensiML Analytics Toolkit

- Most comprehensive AI tool available for IoT edge devices
- No AI expertise required to use
- Binary, library, and source code AI algorithm output options
- Data Capture Lab: Easy, automated data collection & labeling
- Analytics Studio: Auto firmware creation from labeled data
- TestApp: AI model validation testing on target hardware



SensiML Knowledge Pack

- Self-contained learning interference model code
- Extremely compact algorithms: Kilobytes not megabytes
- Local processing minimizes network overhead (no raw sensor data streaming to the cloud required)
- Support for Arm Cortex-M/A, x86, ARC architectures



High sample rate vibration and microphone sensor streams serve as inputs to the SensiML Knowledge Pack machine learning firmware. ML recognition model provides real-time locally processed classification of machine state, faults, and undefined anomaly events.

SensiML Datasets and Custom Engineering Support

- Existing datasets and modeling in acoustic machinery
- Fast time-to-market from expertise and prior projects
- Knowledgeable embedded IoT data science team
- Optional ready-to-use sensor modules for quick project starts

<https://sensiml.com/solutions/industrial/>