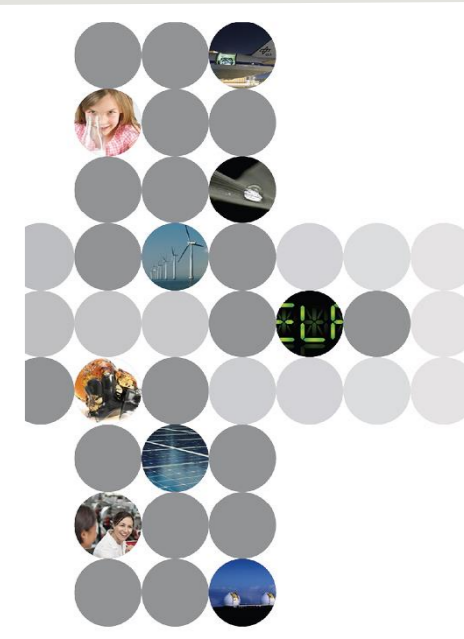


Bat on the production floor Condition based monitoring with ultrasound

Iason Kastanis¹, Mario Russi¹, Luca Biggio^{1,2}, Philipp A. E. Schmid¹

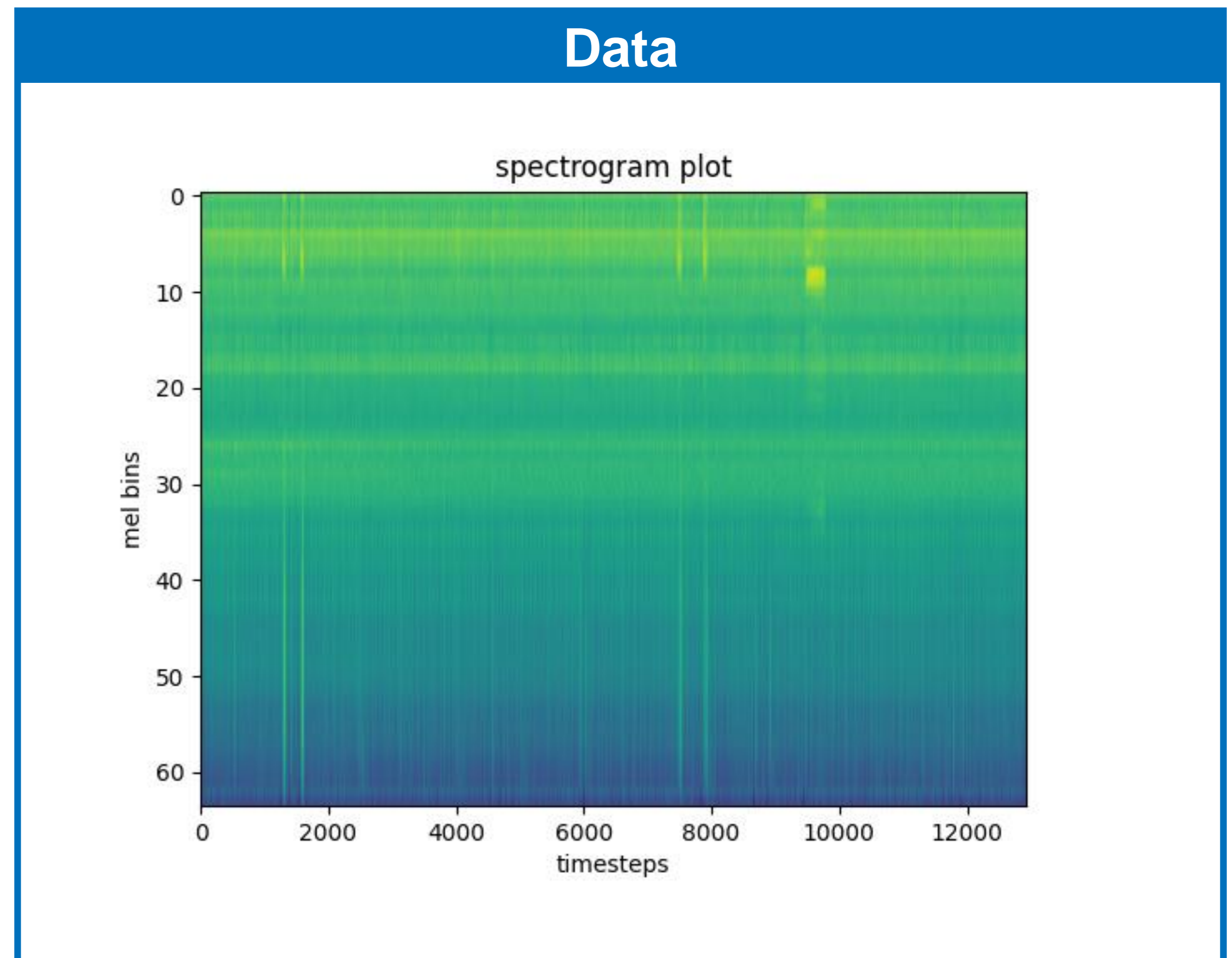
¹CSEM SA, Switzerland ²Data Analytics Lab, Institute of Machine Learning, Department of Computer Science, ETH Zürich, Switzerland



Friction, pressure loss, unexpected heat or vibration can all be indicators that the production is not running optimal, and a stop is in the horizon. To avoid quality issues and unnecessary breaks in the production CSEM developed a method to monitor the health of machine using an ultrasound sensor. A device that can listen in the same frequencies as a bat can. Taking advantage of this wide spectrum of information an Artificial Intelligence model that is trained only using normal condition data can recognize anomalies. Up to 80% of disturbances could be detected using only this one sensor on the experimental machine at CSEM.

Experimental machine

- Microfon: 0-150kHz
- Sampling frequency: 1MHz
- 10s log files
> 500GB of data



Anomaly detection

Threshold range exploration, correct_normal: 0.97, false_normal: 0.03, correct_abnormal: 0.91, false_abnormal: 0.09

Orange zone: Normal operation range

Green points: normal operation of the machine

Blue line: median filter on the timeseries

Red points: Defective operation of the machine