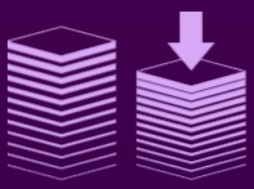


Lightscline

Data Reduction software

Data-reduction AI

Case studies

April 2023

Lightscline, State College, PA, USA

Lightscline overview

Lightscline's AI software enables engineering teams to achieve up to 90% cost reduction in sensor data analytics.

Current approaches collect all the raw data but discard most of it during analysis. Our counterintuitive approach collects 2-10x less data upfront, resulting in significant cost savings in the power, compute, storage, transmission, and latency in digital transformation applications.

Data-reduction AI for 7-10x better anomaly detection in industrial machines

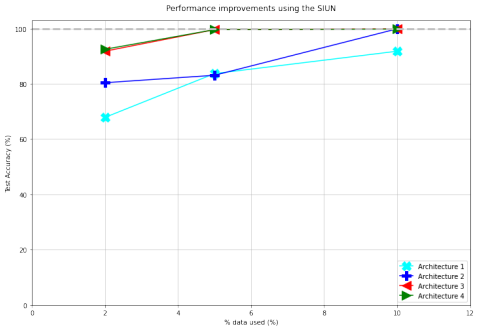
Introduction

In this whitepaper, we present the key improvements in sensor data analytics obtained by using Lightscline's AI software on two industrial anomaly detection use-cases. We quantify the cost savings throughout the pipeline, which comprises of edge computing power, compute, storage, transmission, and latency. Finally, we summarize the value added in two deployment scenarios and provide resources for further engagement.

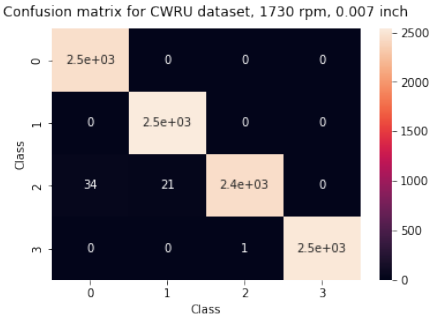
Use case 1: Up to 90% savings in analytics costs using data-reduction AI

This use-case gives 7-10x more analytics at the same cost.

1.1. 90+ % test accuracies on a multi-class classification problems using 7-10x less data pipeline resources (four class bearing fault detection)

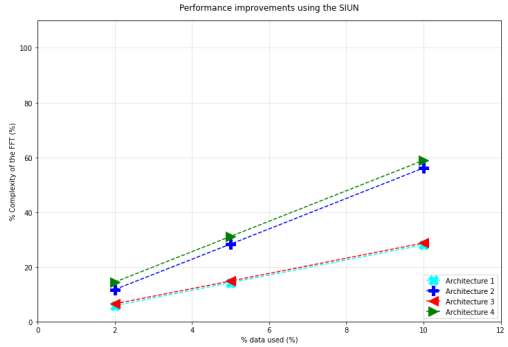


90+ % test accuracy with <10% data collection



Performance stability on multi-class classification problem

1.2. Performance metrics

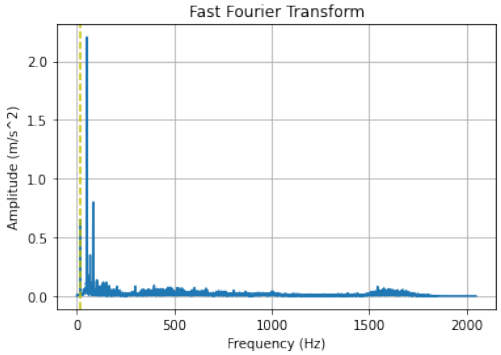


7x lower computational complexity than FFT

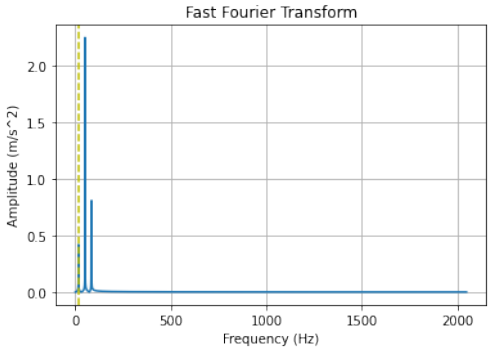
Use case 2: Anomaly detection with reconstruction guarantees

This use-case gives you reconstruction guarantees where you want to preserve the raw data for later use.

2.1. Reconstruction required for future analysis



FFT using 100% data



FFT using 10% of raw data (<10 peaks wanted, reduces noise)

2.2. Metrics for reconstruction guarantees

S.no.	Use-case name	Type of problem	Quantification of advantages
1.	Shaft unbalance detection	Signal reconstruction	All the values are directly proportional to the fraction of raw data collected. Using **10% data saves 90% on edge compute power, data volume, bandwidth, and storage.**
2.	Shaft unbalance detection	Anomaly detection / binary classification	
3.	Multi-class bearing fault	Multi-class classification	

Value added

1. By doing vibration-based anomaly detection using 7-10x less data, we are lowering the data pipeline costs by reducing the edge hardware costs ($1000s to $100s), power requirements (5-7x), and transmission issues (5-7x) for a heavy machinery manufacturer.
2. We are reducing the edge computing power and transmission issues for predictive analytics for a railway bearing and wheel monitoring company.

Resources

Try Lightscline's AI now, Product brochure, Video demo, Technical paper

Reach out @ info@lightscline.com for any queries.