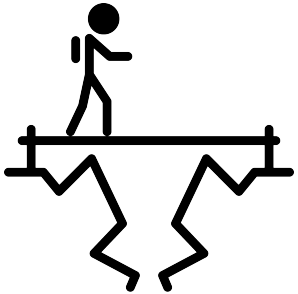
Challenges with Anomaly Detection

What are we going to learn?



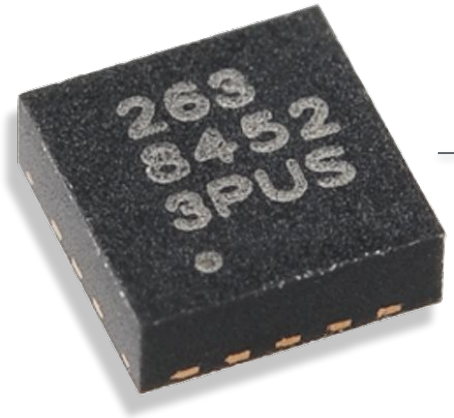
Challenges with an Anomaly Detection Application

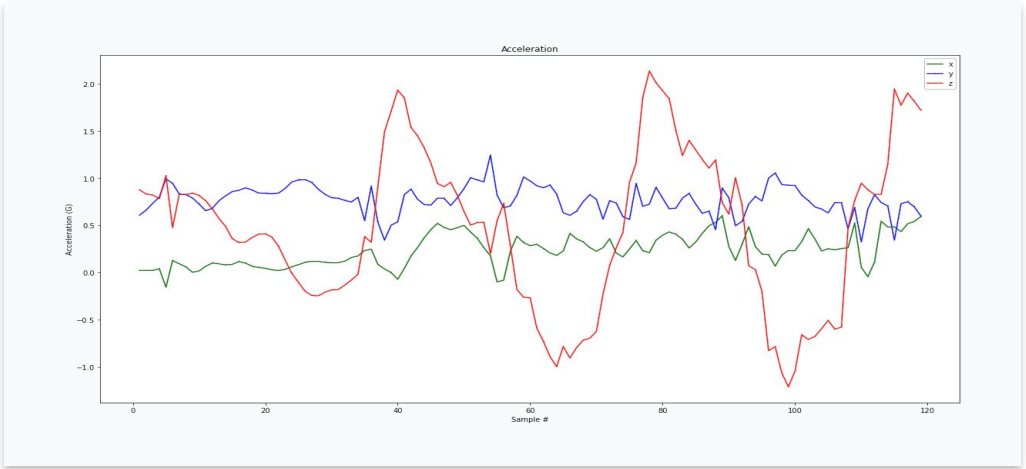
Anomaly Detection **ML Pipeline**

Training, Testing in Colab

Application: Factory machinery

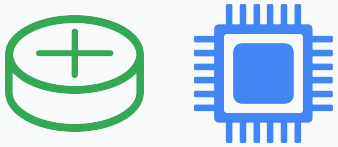
Sensor: **Accelerometer**





Constraints for **on-device computing**

Latency



Limited Devices

Accuracy

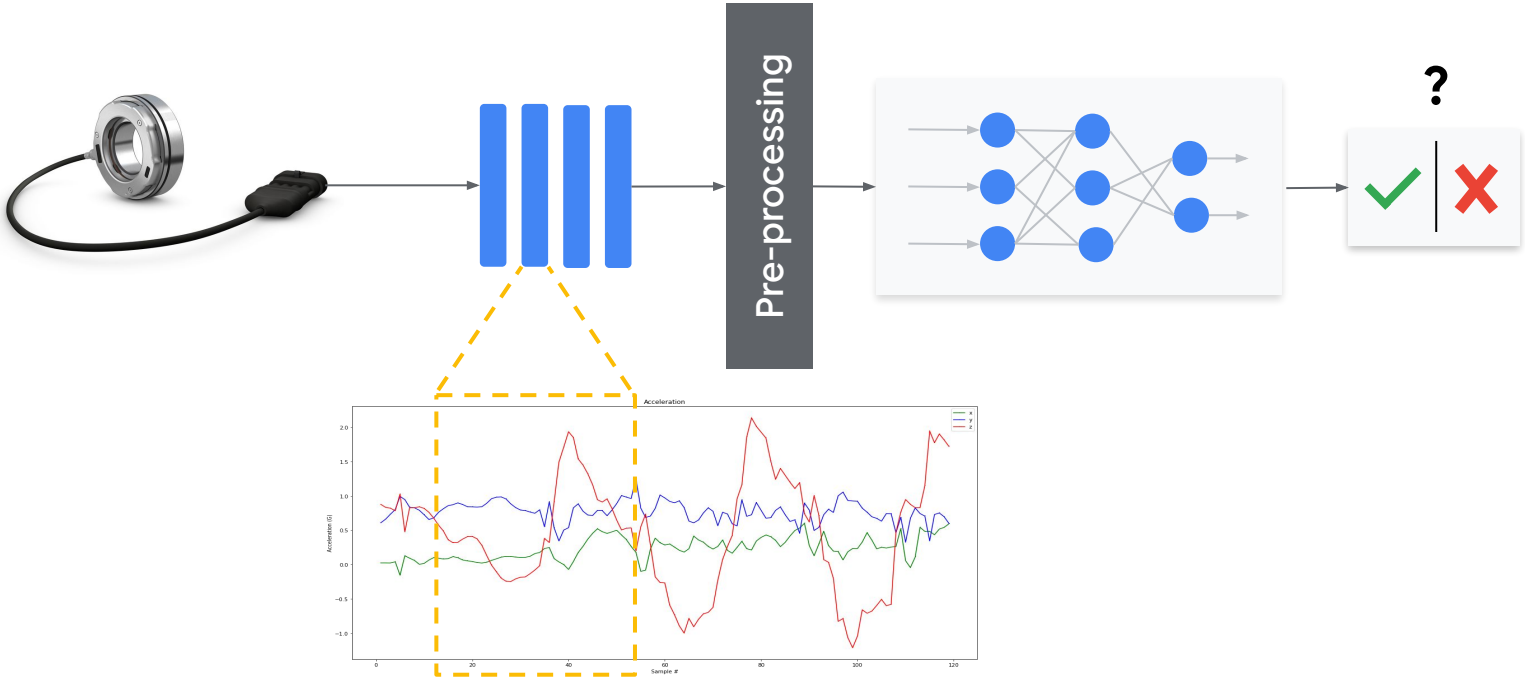
Constraints for **on-device computing**

Latency

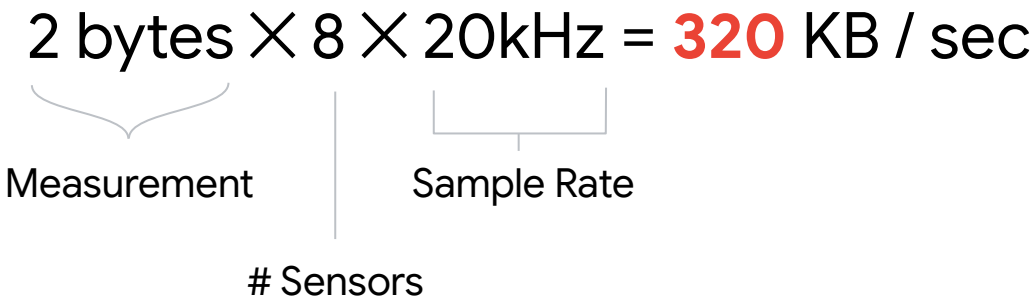
Limited Devices

Accuracy

Real Time Constraint



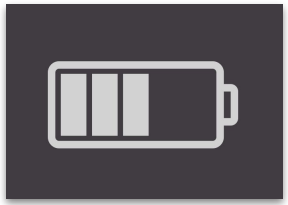
It's **too expensive** to stream to the cloud



It's **too expensive** to stream to the cloud

2 bytes ✕ 8 ✕ 20kHz = **320** KB / sec

It's **too expensive** to stream to the cloud



2 bytes × 8 × 20kHz = **320** KB / sec

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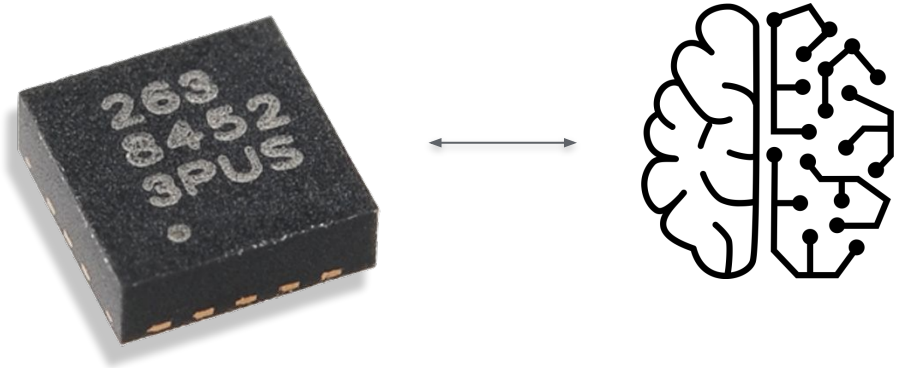
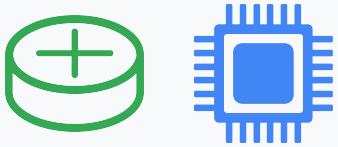
30 KB / sec

Need “**intelligence**” *close* **to sensors**



Constraints for **on-device computing**

Latency

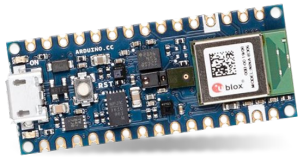


Limited Devices

Accuracy

Very Small (Tiny) Devices

- Cost ($) ✓
- Power (W) ✓
- Eng. Effort ✓



Our board [Course 3 Kit] only has **256KB** of RAM (memory)

Constraints for **on-device computing**

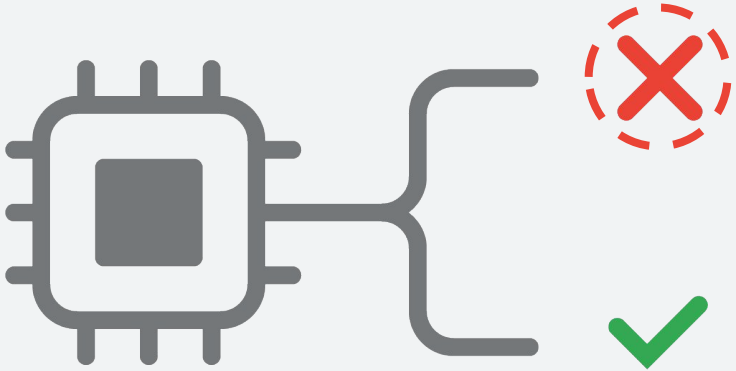
Latency

Limited Devices

Accuracy

False Negative

Catastrophic impact

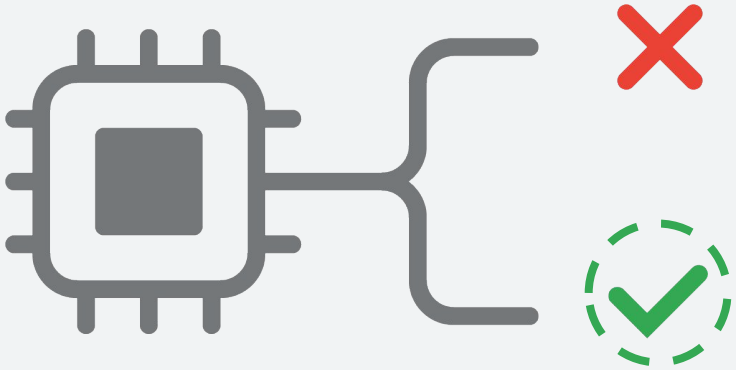


REAL

ERROR

False Positive

False alarm, **cost** impact



REAL

ERROR