VON DER FORSCHUNG AUF DIE BAUSTELLE: DER HILTI USE CASE

Michele Crabolu, Akis Mekikis
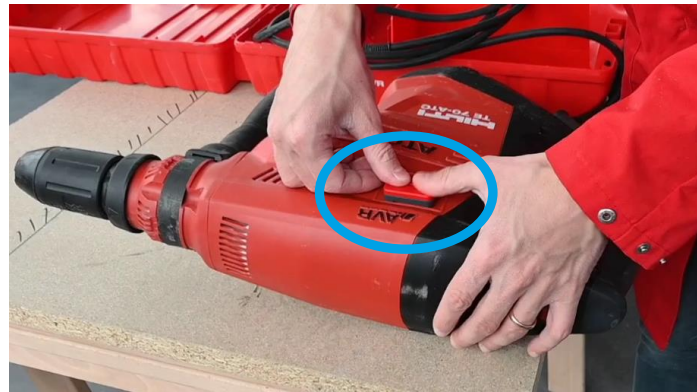**HILTI**

Tommaso Bendinelli
CSEM

Digital Liechtenstein, 26.09.2024

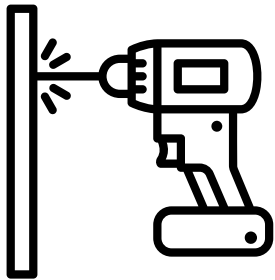# WE DEVELOPED A NEW ML SOLUTION FOR RECOGNIZING TOOL ACTIVITIES FROM VIBRATION DATA
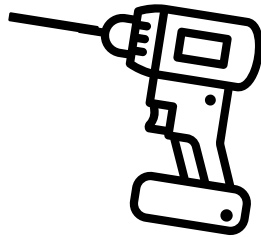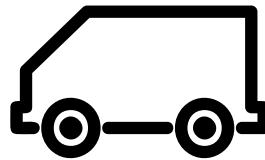
ETH zürich   HILTI   :: csem

Activity such as

For any tool or brand:

Drilling

Tool off

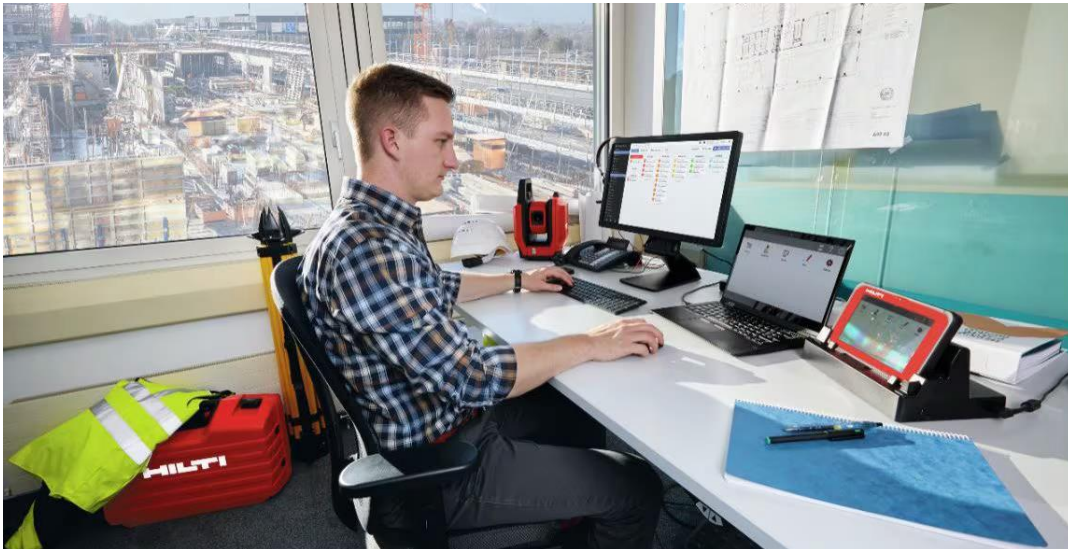Transportation

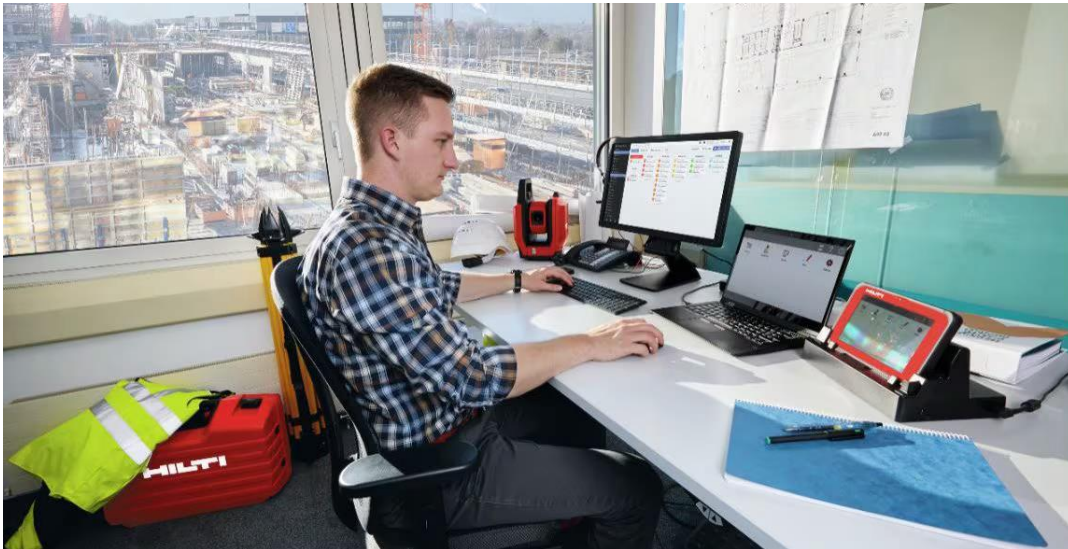# BUILDING CONSTRUCTION MONITORING IS CHALLENGING

Questions:

- Is the construction going according to plan?
- What materials/tools are needed?

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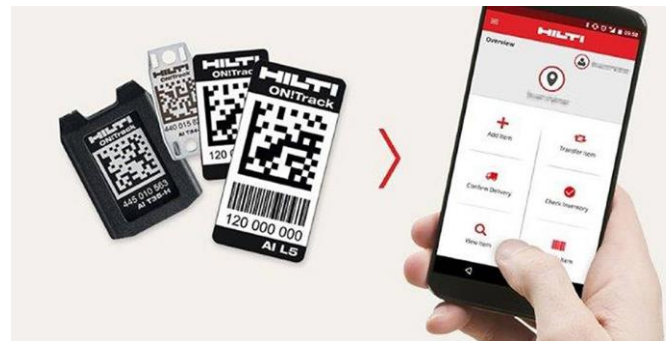- What materials/tools are needed?

HILTI'S ON!TRACK IS THE FIRST CRUCIAL STEP FOR INVENTORY AND ASSET MANAGEMENT

- Find equipment and assets
- Track consumables
- It alerts you when:
  - tools need maintenance
  - tools need calibration
  - it is time to renew training or certification
- An important assistant towards building construction monitoring

TOOL UTILISATION

Week 10 of 2024

🕐 0 hours
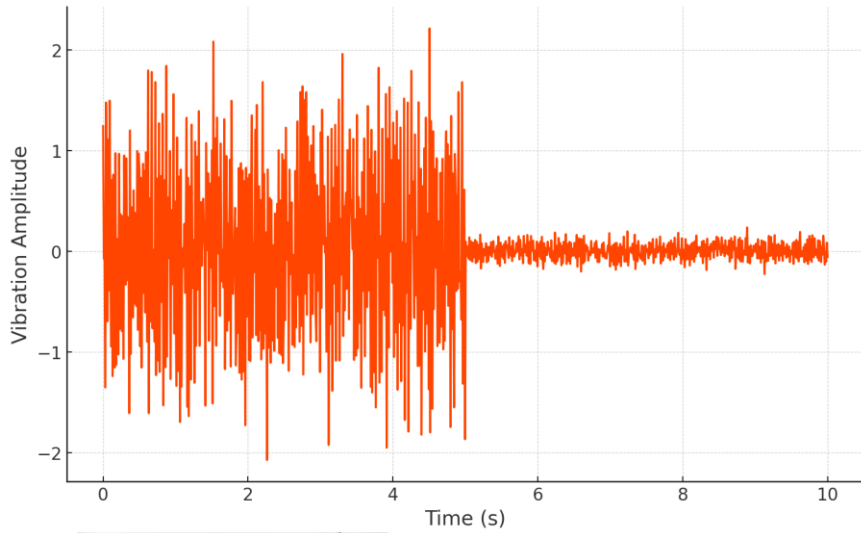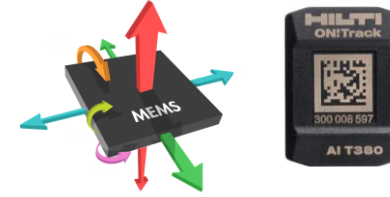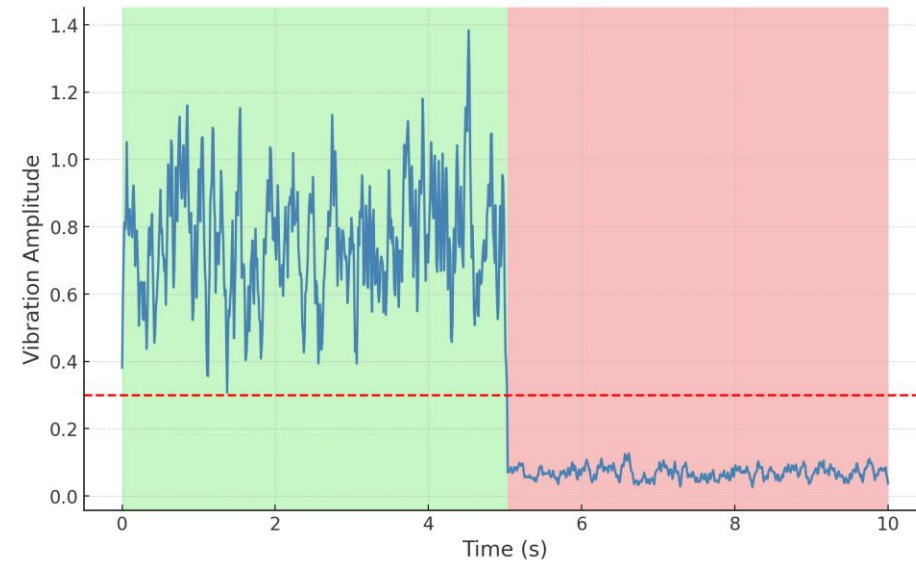
🕐 5 hours

🕐 3 hours

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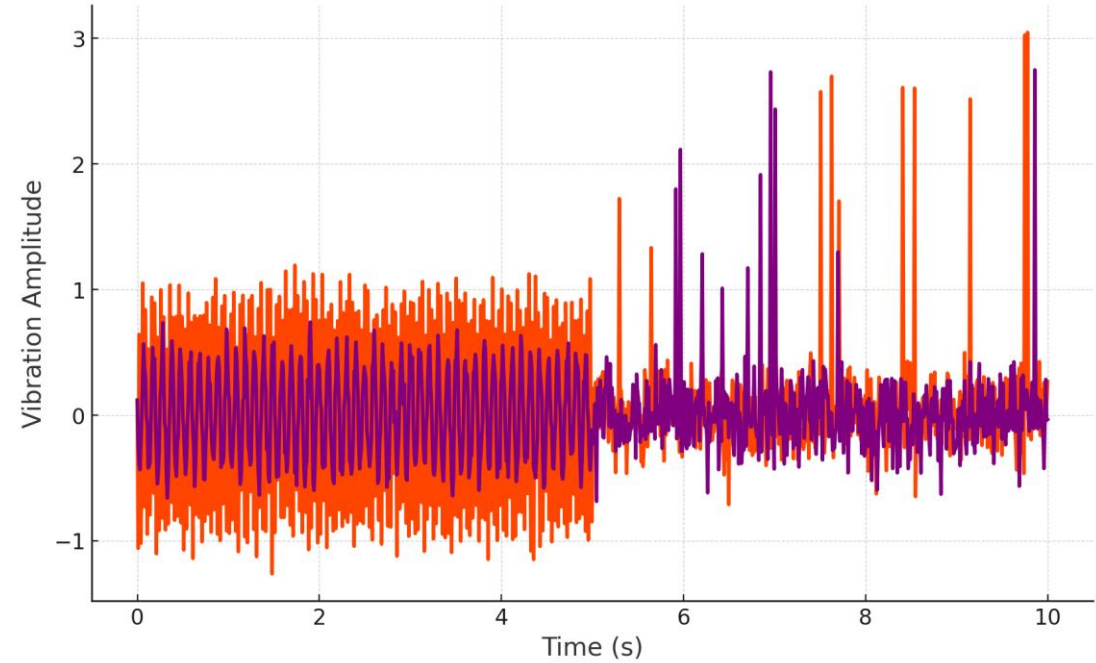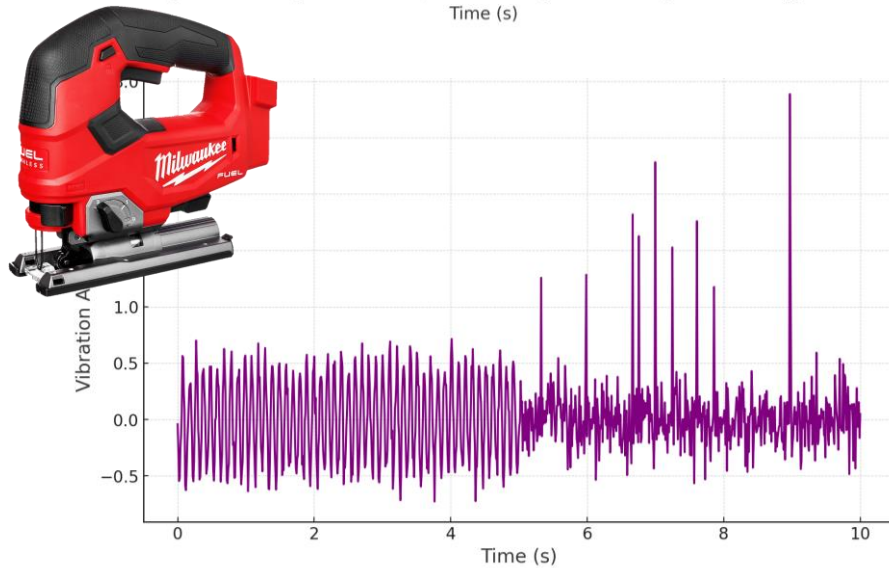# TOOL UTILIZATION CAN BE INFERRED FROM VIBRATIONS

Could we just apply a standard signal processing + threshold?
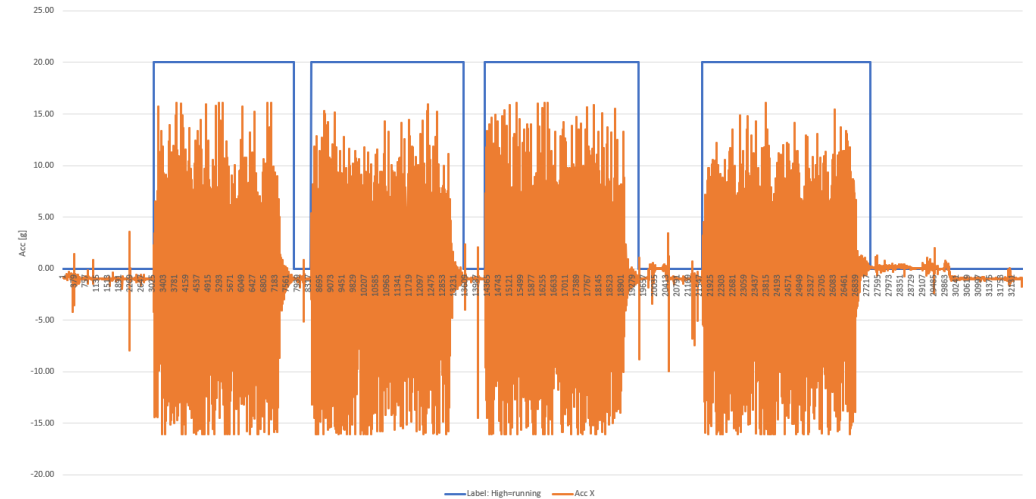

Signal
Processing
+
Threshold

DIFFERENT TOOLS DIFFERENT FREQUENCIES

WHAT DID WE DO?
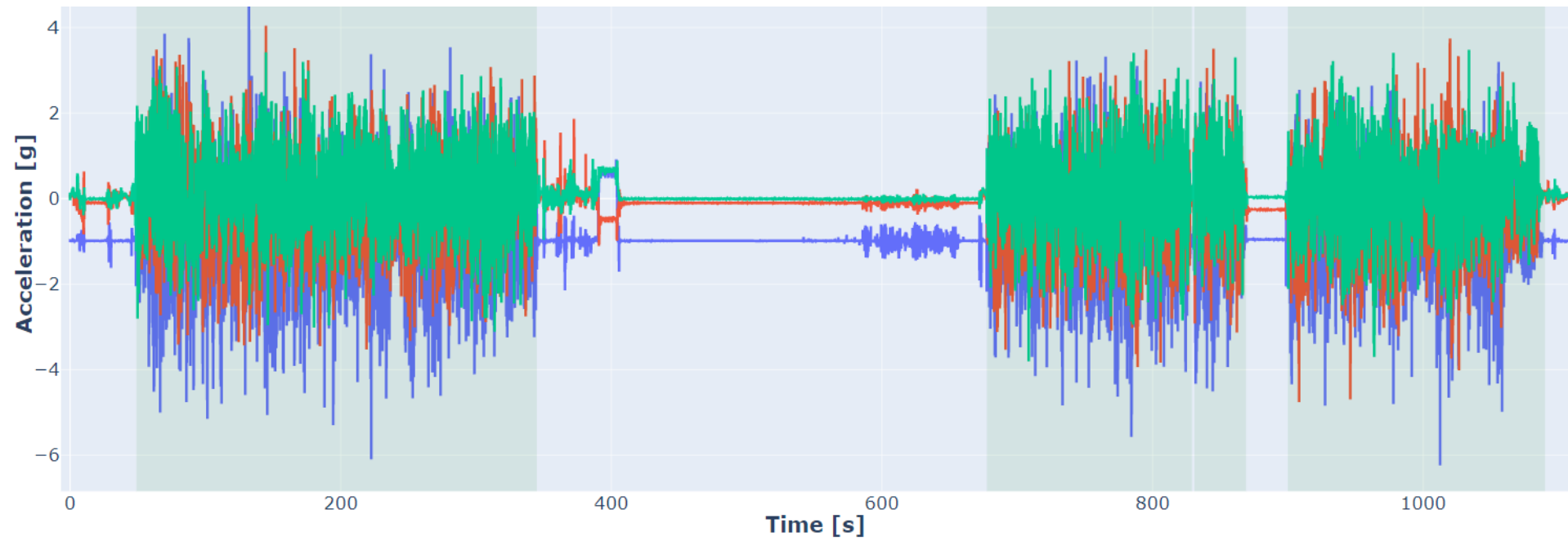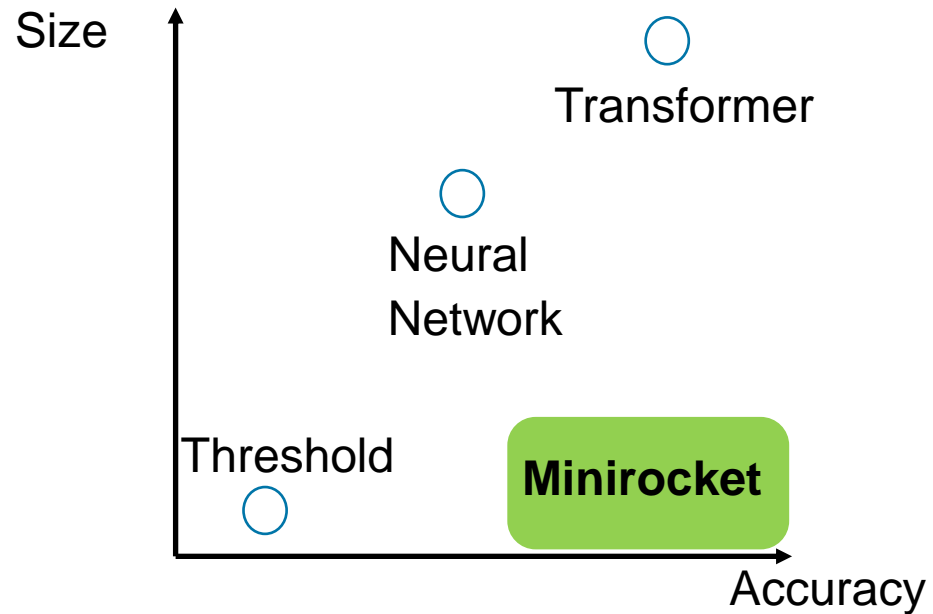
RIGOROUS DATA COLLECTION BY HILTI

DASHBOARD FOR DATA ANALYSIS

ALGORITHM SELECTION:

Size

Transformer

Neural Network

Threshold

Minirocket

Accuracy

MINIROCKET

A Very Fast (Almost) Deterministic Transform for Time Series Classification

Angus Dempster
angus.dempster1@monash.edu
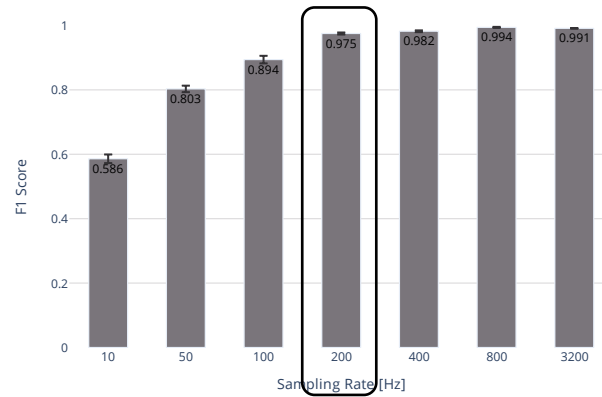Monash University
Melbourne, Australia

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Geoffrey I. Webb
geoff.webb@monash.edu
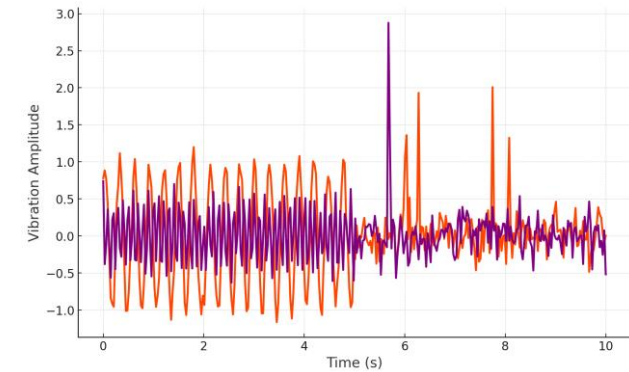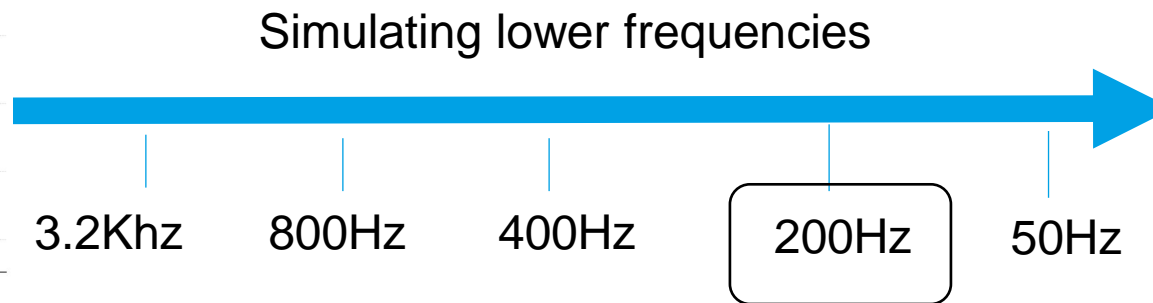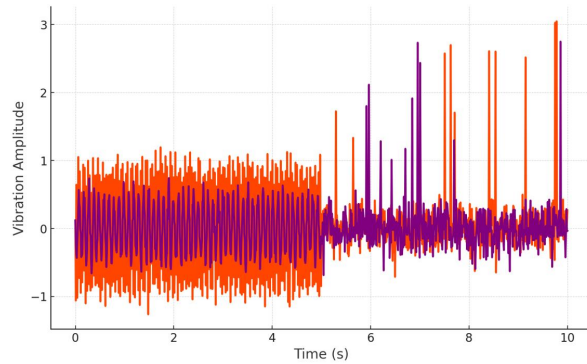Monash University
Melbourne, Australia

F1 Score	Precision	Recall
0.994	0.995	0.994

F1 Score	Precision	Recall
0.980	0.966	0.996

Simulating lower frequencies

3.2Khz   800Hz   400Hz   200Hz   50Hz

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