



Deep Learning für die Industrie

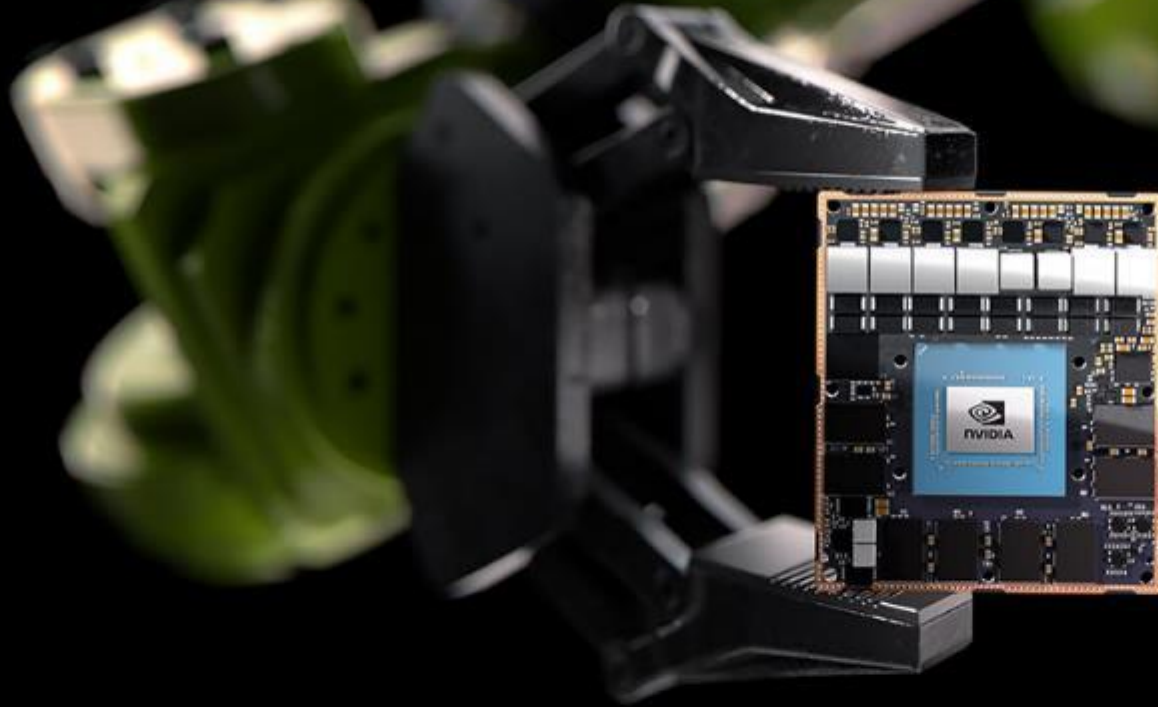
Deepfake und Fledermäuse in der Produktion

:: csem

DEEP LEARNING

- :: 10+ years experience
- :: Support humans
- :: Industry proven

- ✓ Nvidia AGX Orin
- ✓ 275 TeraOPS (10^{12})
- ✓ 15-60W



A DAY IN DATA

The exponential growth of data is undisputed, but the numbers behind this exponential growth – the use of connected devices – are hard to comprehend, particularly when they are presented in large quantities.

500m

tweets are sent every day

Twitter

294bn

billion emails are sent

Radicati Group

3.5bn

people use emails

90% der heutigen weltweiten Daten wurden in den letzten **2 Jahren** generiert

DEMYSTIFYING DATA UNITS

When you hear a familiar "bit" or "megabyte", larger units of measurement are more frequently used to describe the masses of data.

Size

of a byte

463EB

of data will be created every day by 2025

ITC

95m

photos and videos are shared on Instagram

Instagram Business

28PB

to be generated from wearable devices by 2020

Statista

The image features a dense network of nodes and edges, resembling a data visualization or a complex graph. The nodes are small, multi-colored squares (red, blue, green, yellow) scattered across the frame. The edges are thin, light blue lines that converge towards a central, bright yellow and white point, creating a tunnel-like effect. The overall background is dark, making the nodes and edges stand out. The text is overlaid on this background.

...but annotated data »

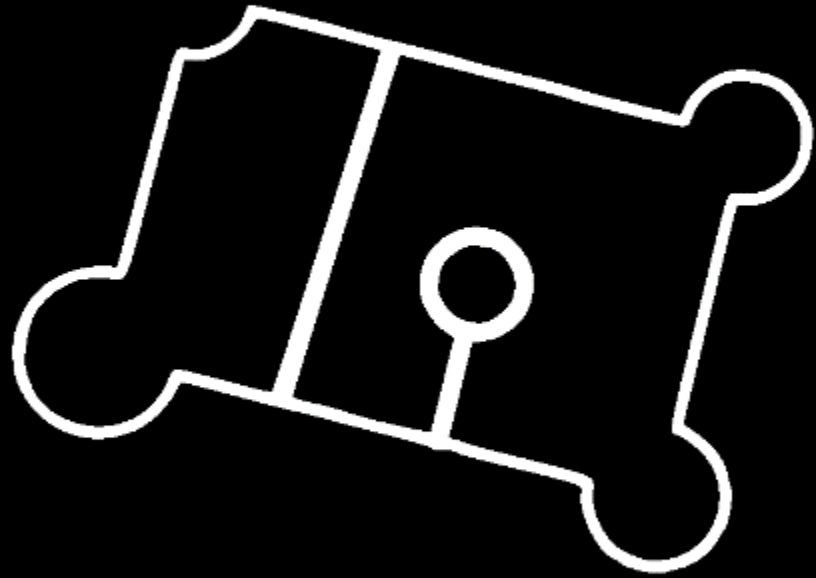
Aluminum Profile Classification on the Go



vs



Photorealistic 3D Profiles





Top 3
99.9%



Ukraine 24 is on Facebook. To connect with Ukraine 24, join Facebook today.

Join

or

Log In

Сьогодні / Станя / Подорожі

Терміново!

► Сторінка новості Методи українською Помітити розмір: Аа / р

19 червня, 12:00

FAKE

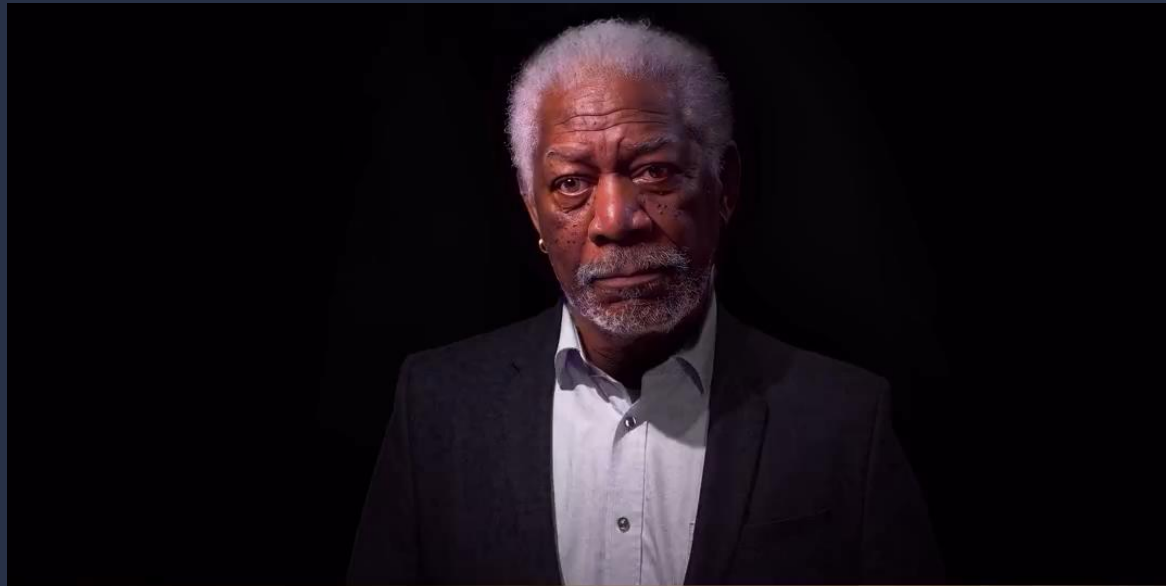


Ukraine 24

🔥 Бегущую строку телеканала "Украина 24" и сайт "Сегодня" взломали вражеские хакеры и транслируют сообщение Зеленского о якобы "капитуляции"

!!! ЭТО ФЕЙК! ФЕЙК!

Deepfake

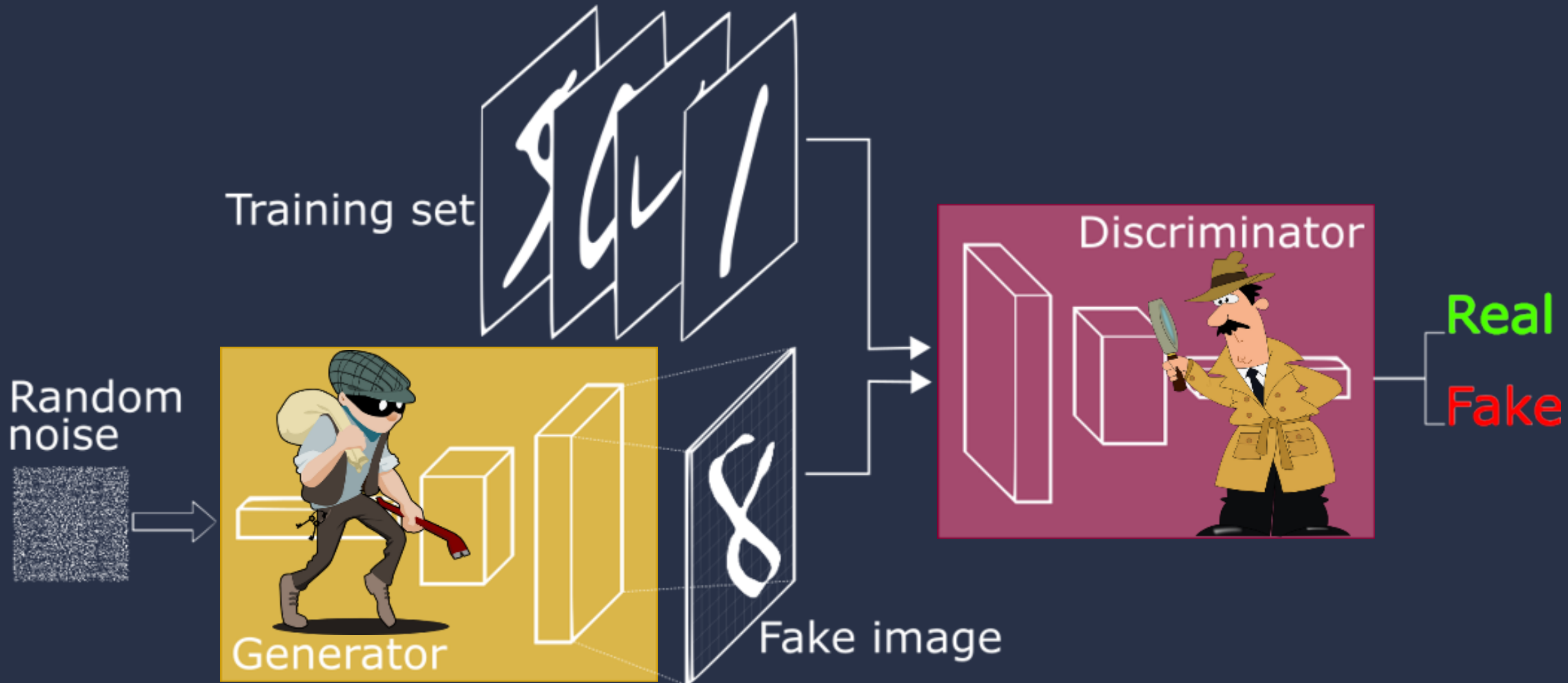


← fake

real →



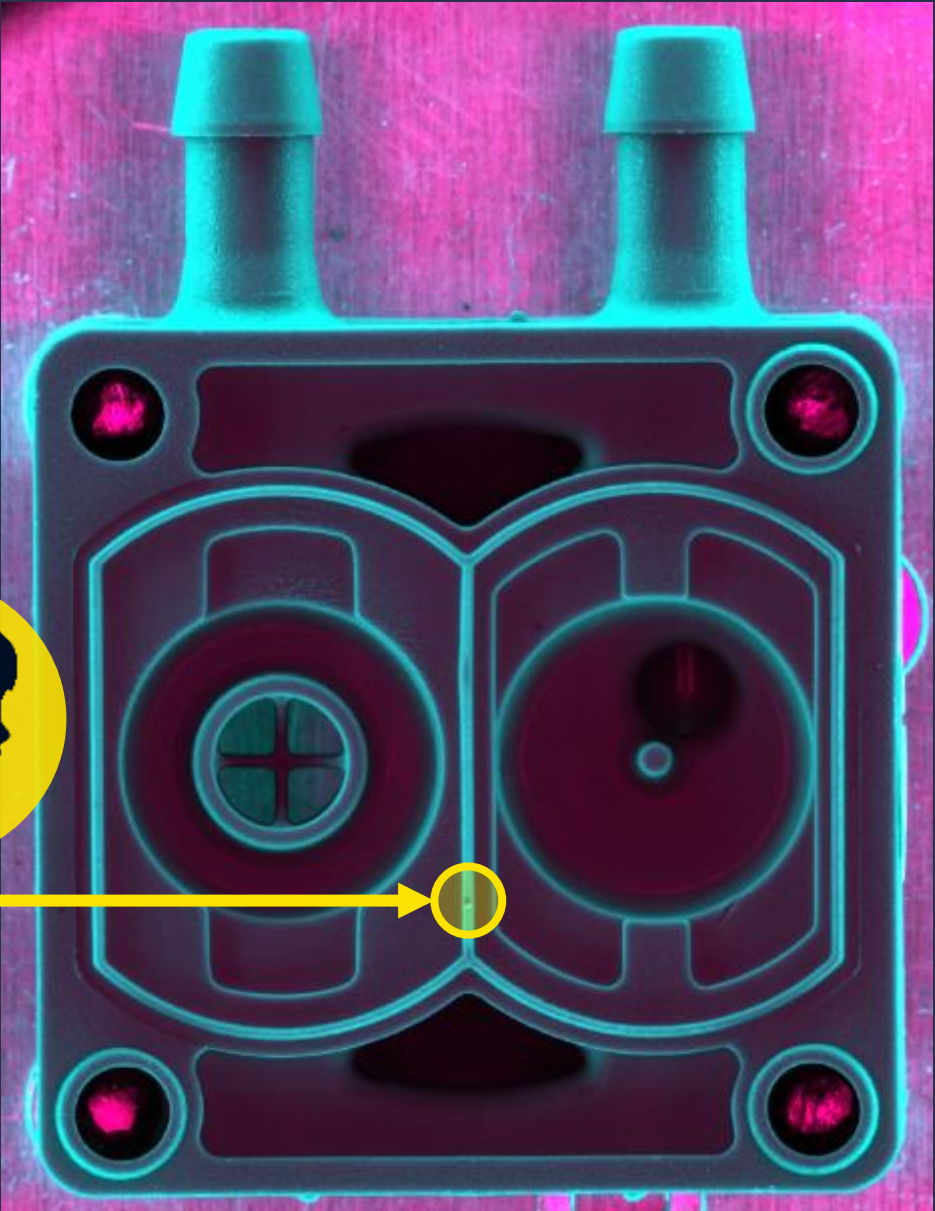
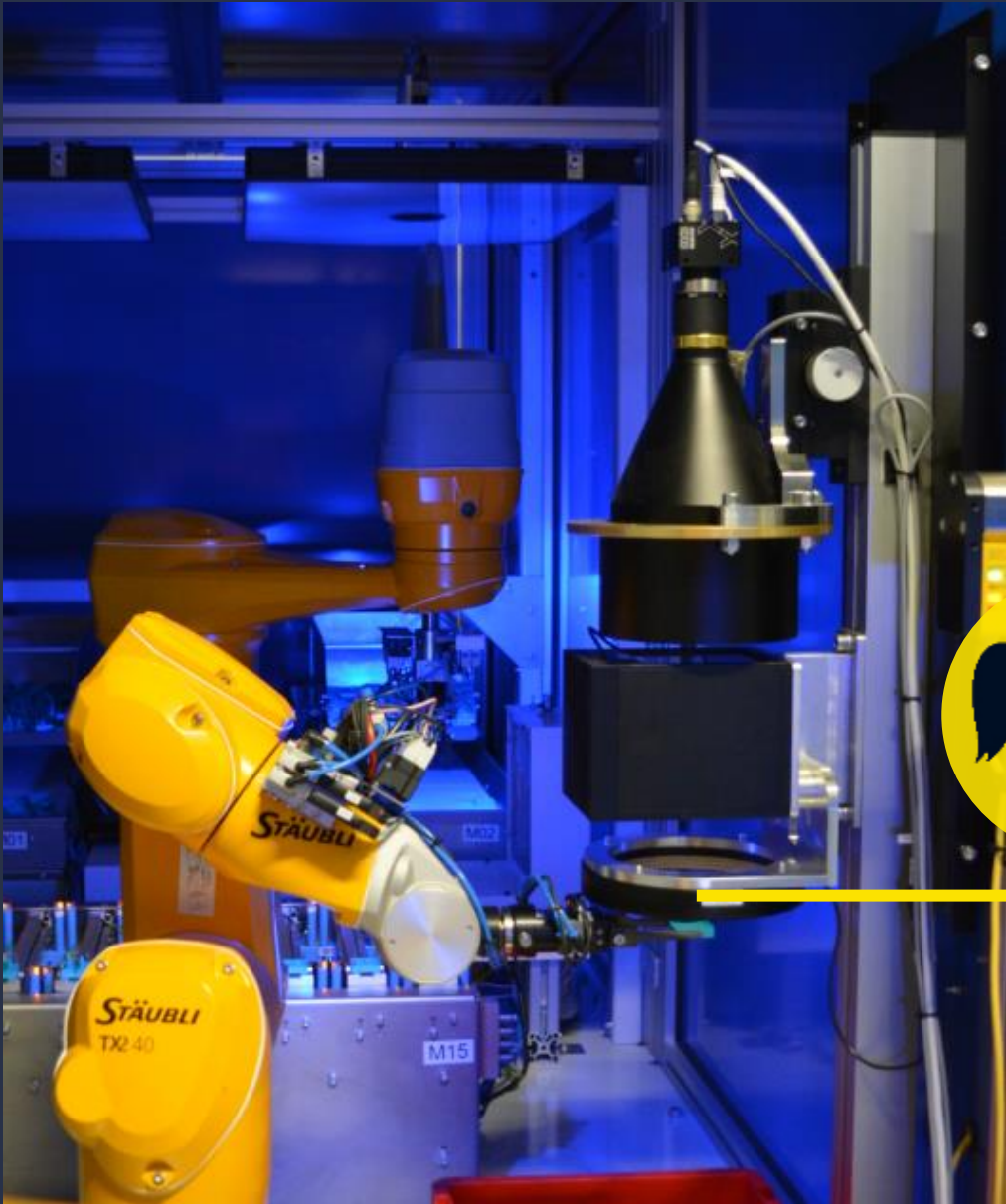
Generative Adversarial Net (GAN)



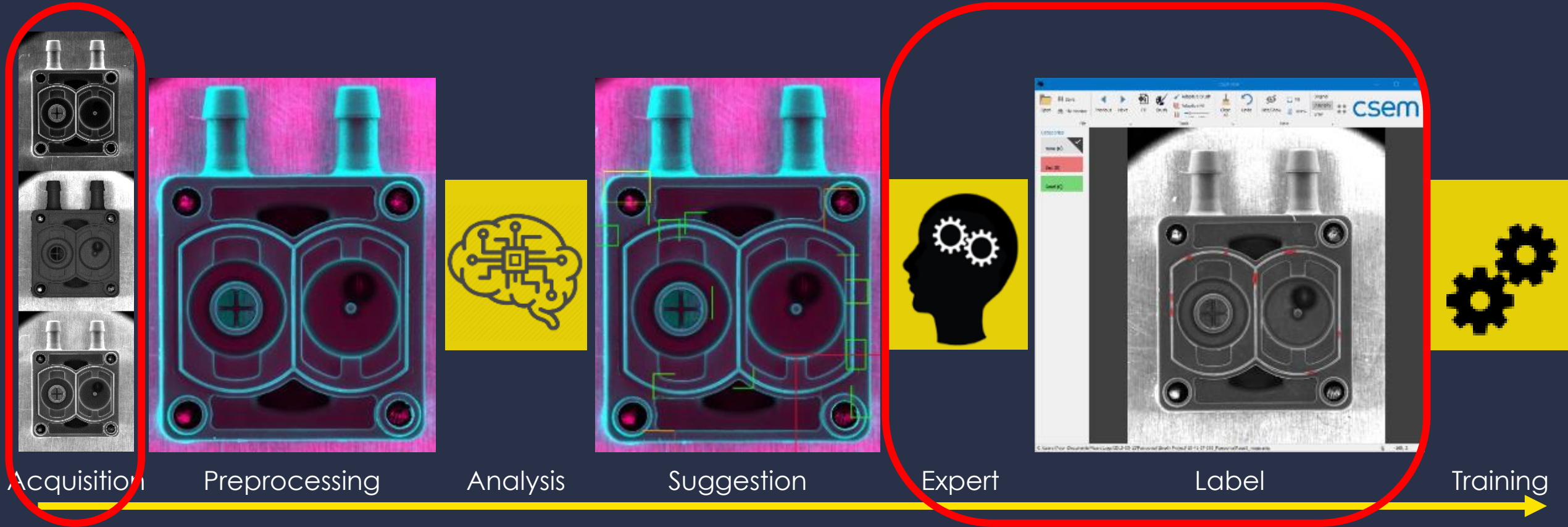


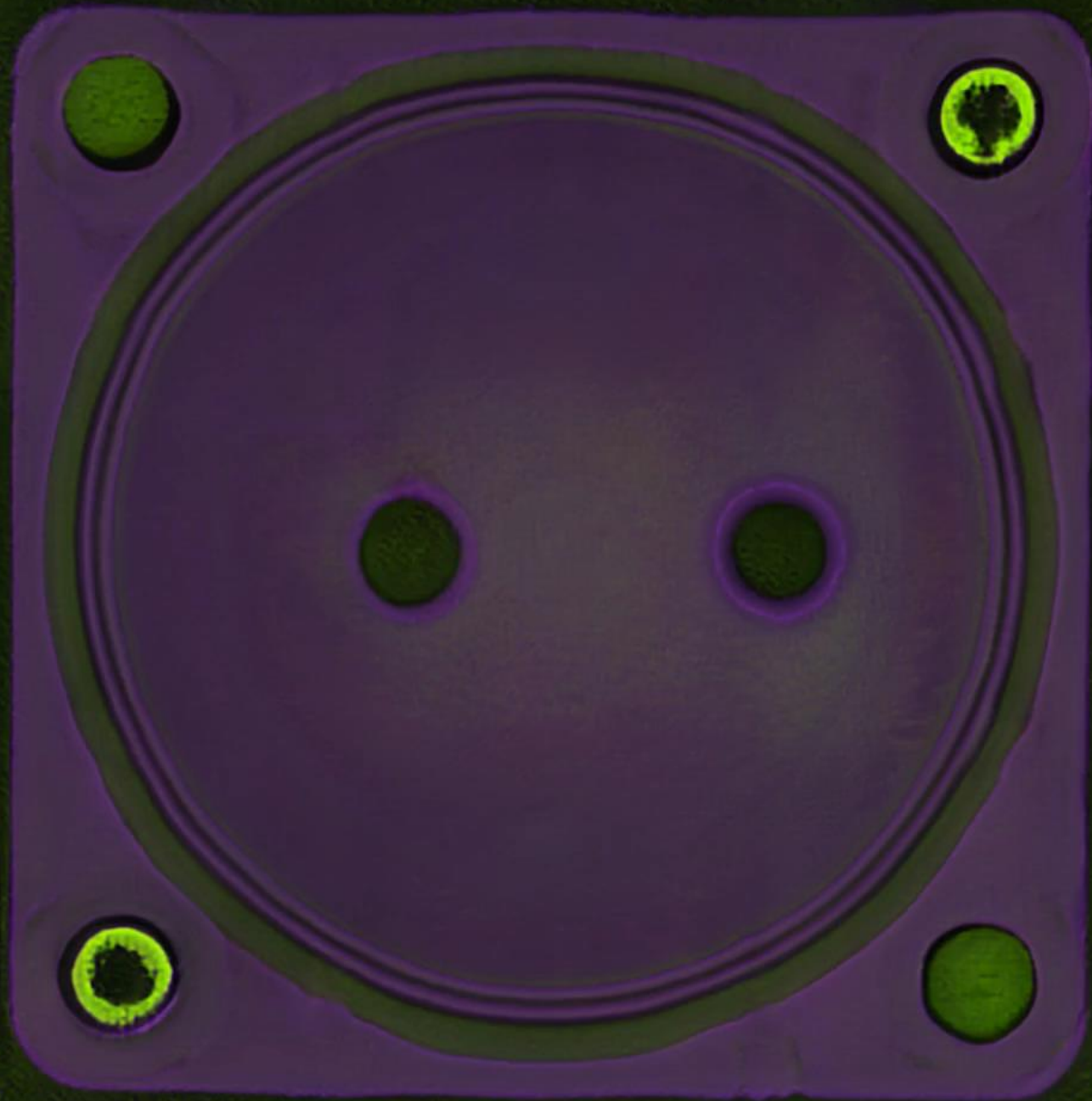
Injection molding parts





Easy Training Pipeline





Deepfake for industry



Original Image



Desired Defect Locations

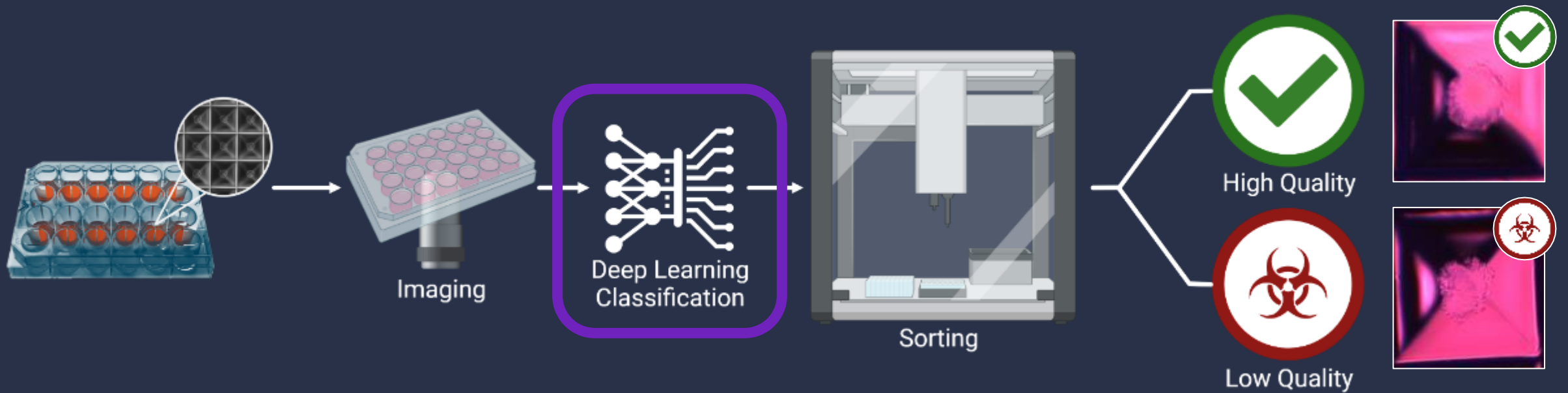


Generated Images with defects

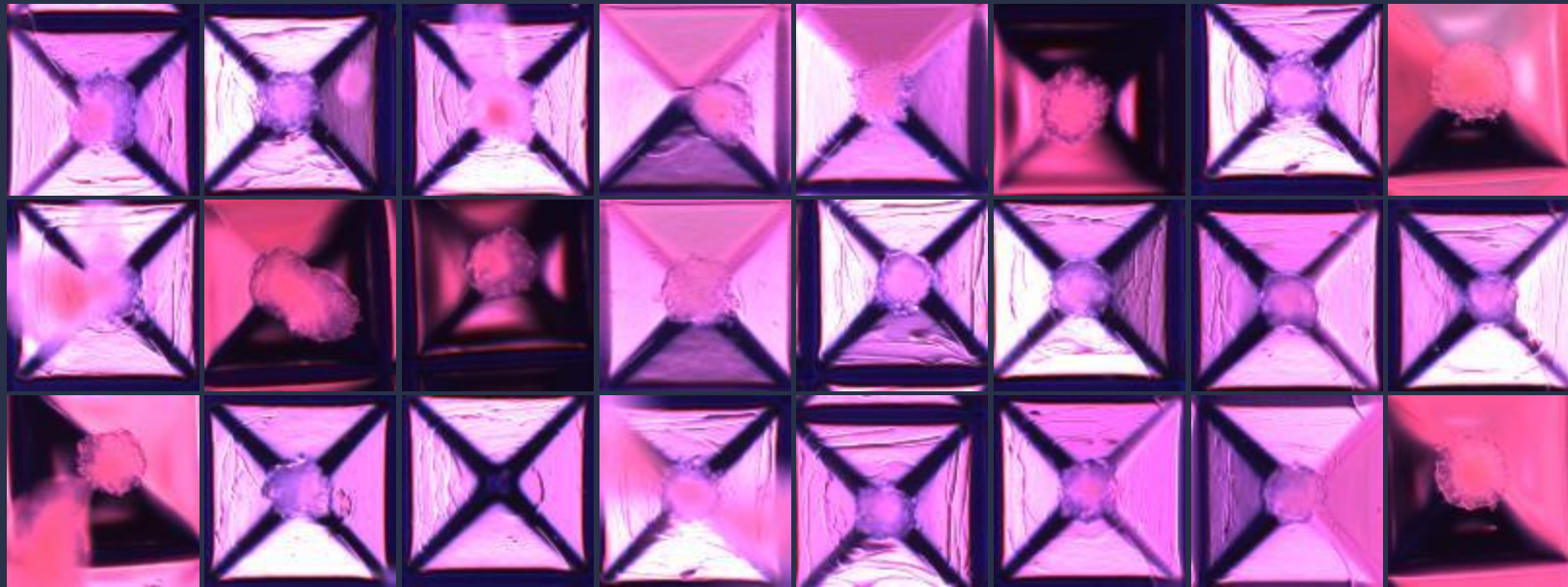


Spheroids

Spheroids Sorting



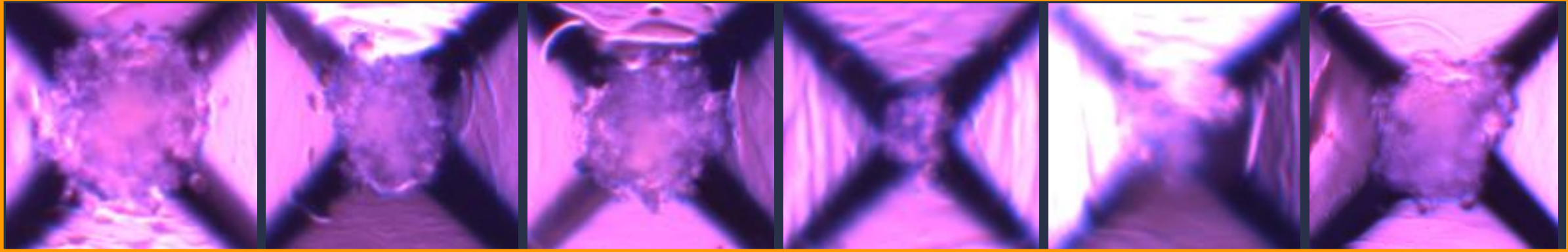
Healthy



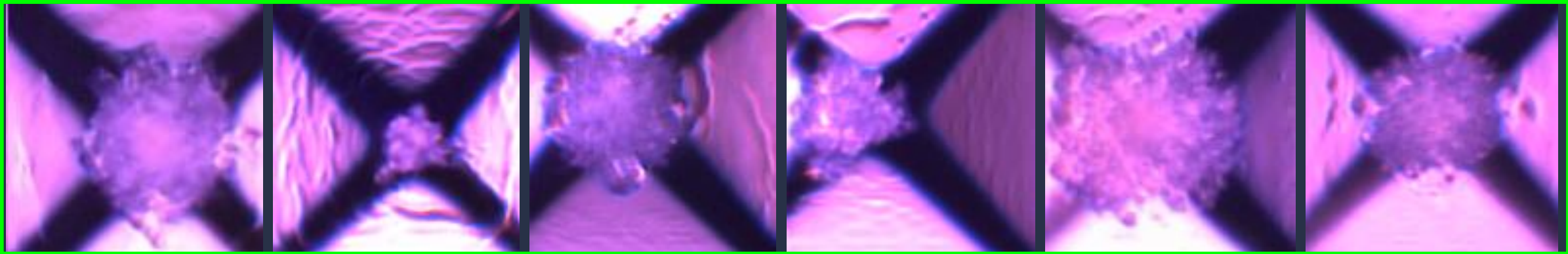
Unhealthy



Real spheroids



GAN



Welche Reihe wurde künstlich erzeugt?

Real spheroids

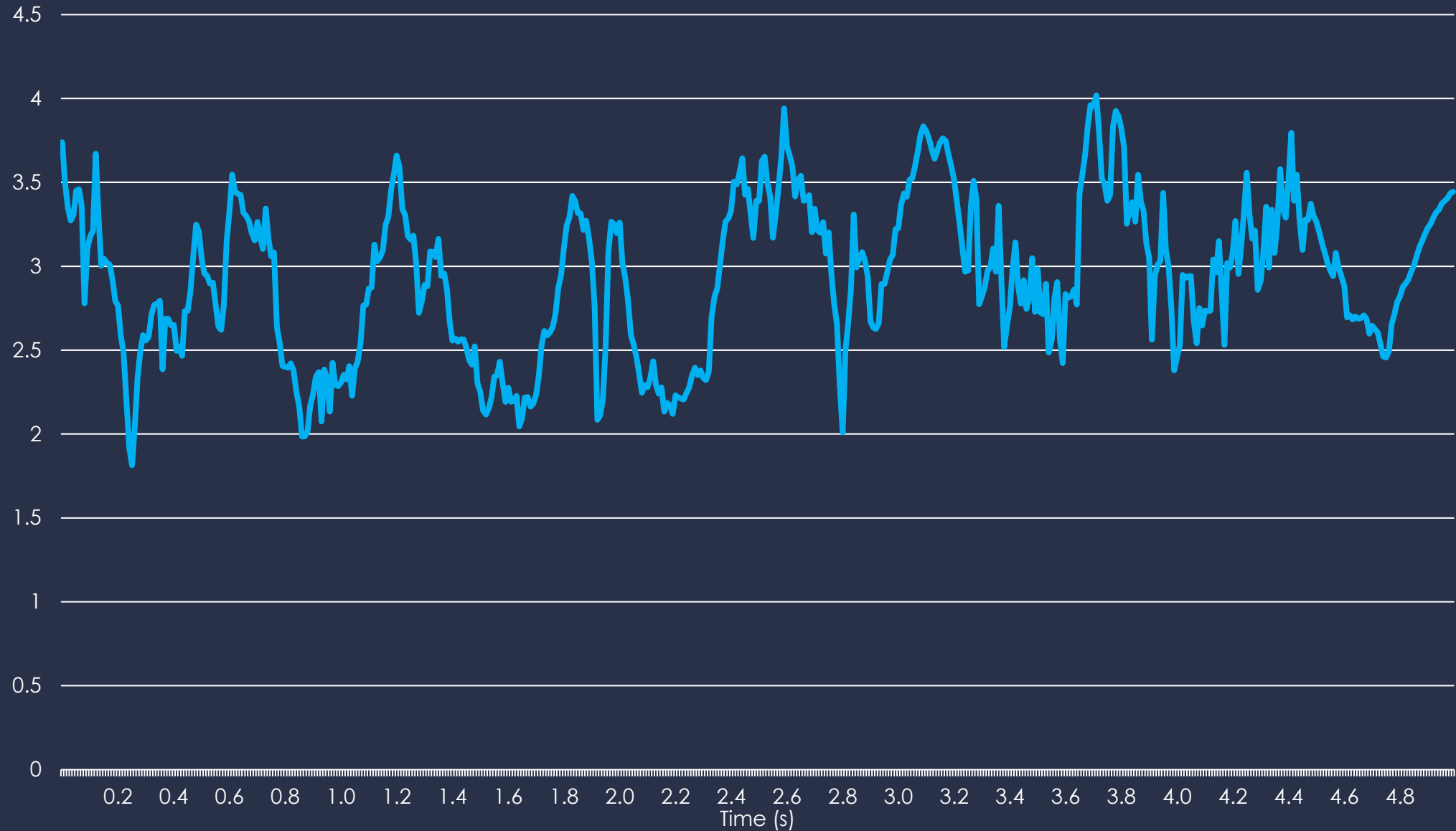


GAN



48%

Time Series Data



Predictive Maintenance

for industrial assets



- Unseen instances
- Interpretability
- Operational parameters

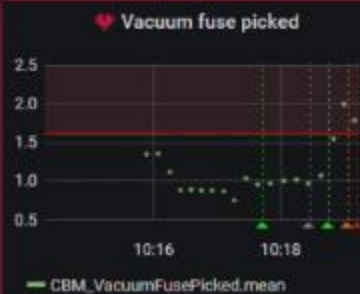
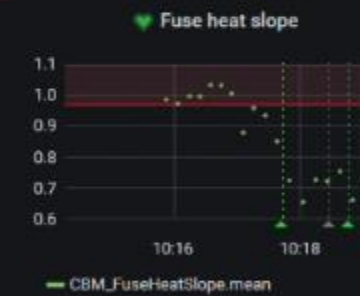
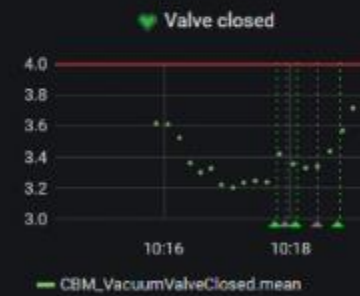
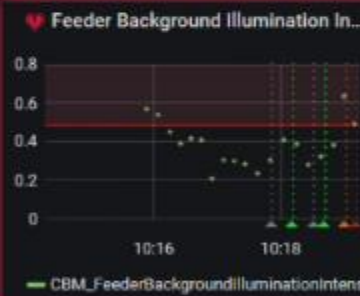
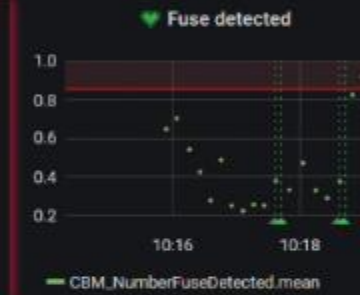
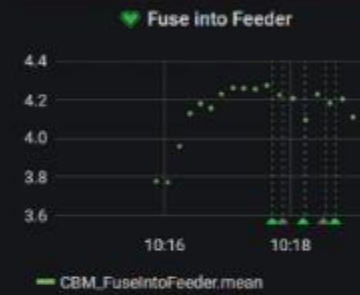
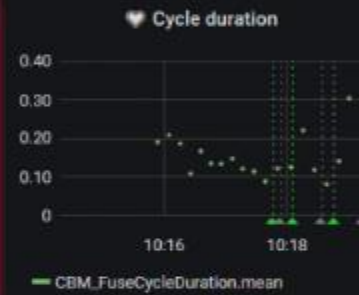
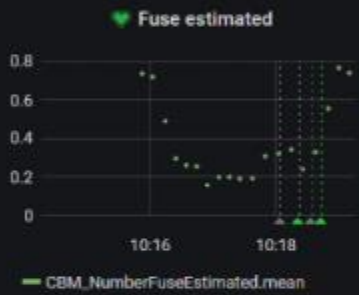
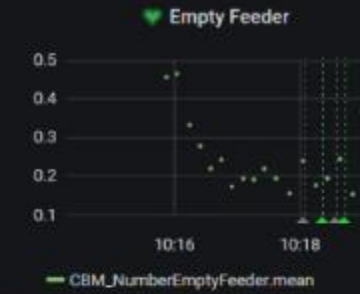
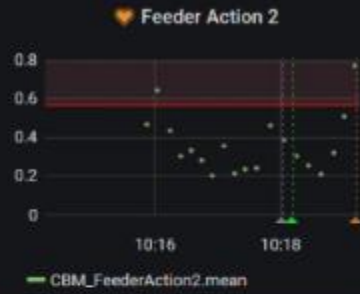


CSEM Research Machine

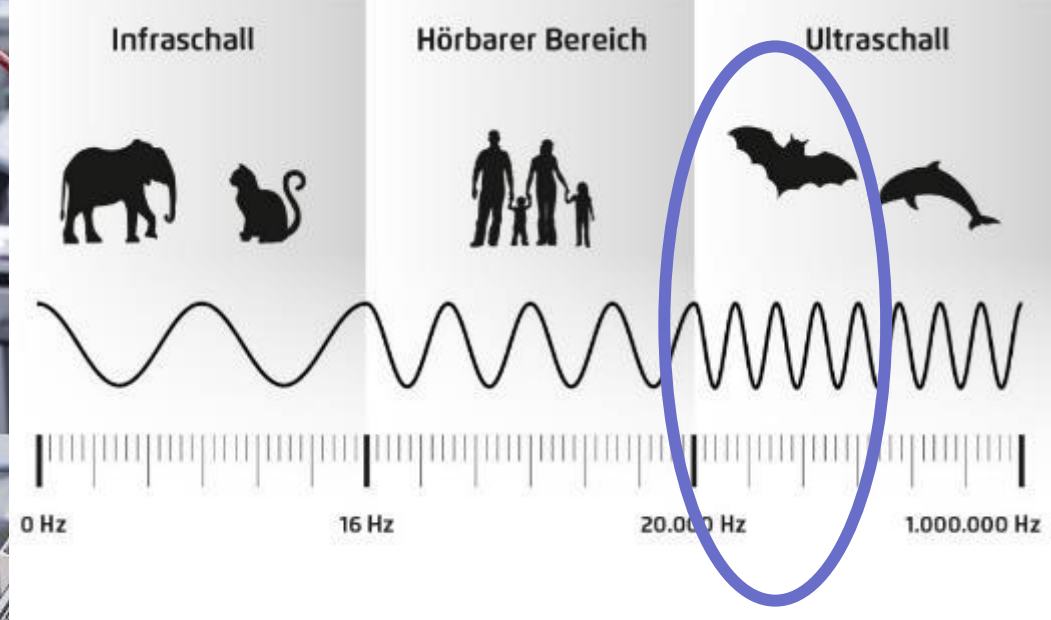
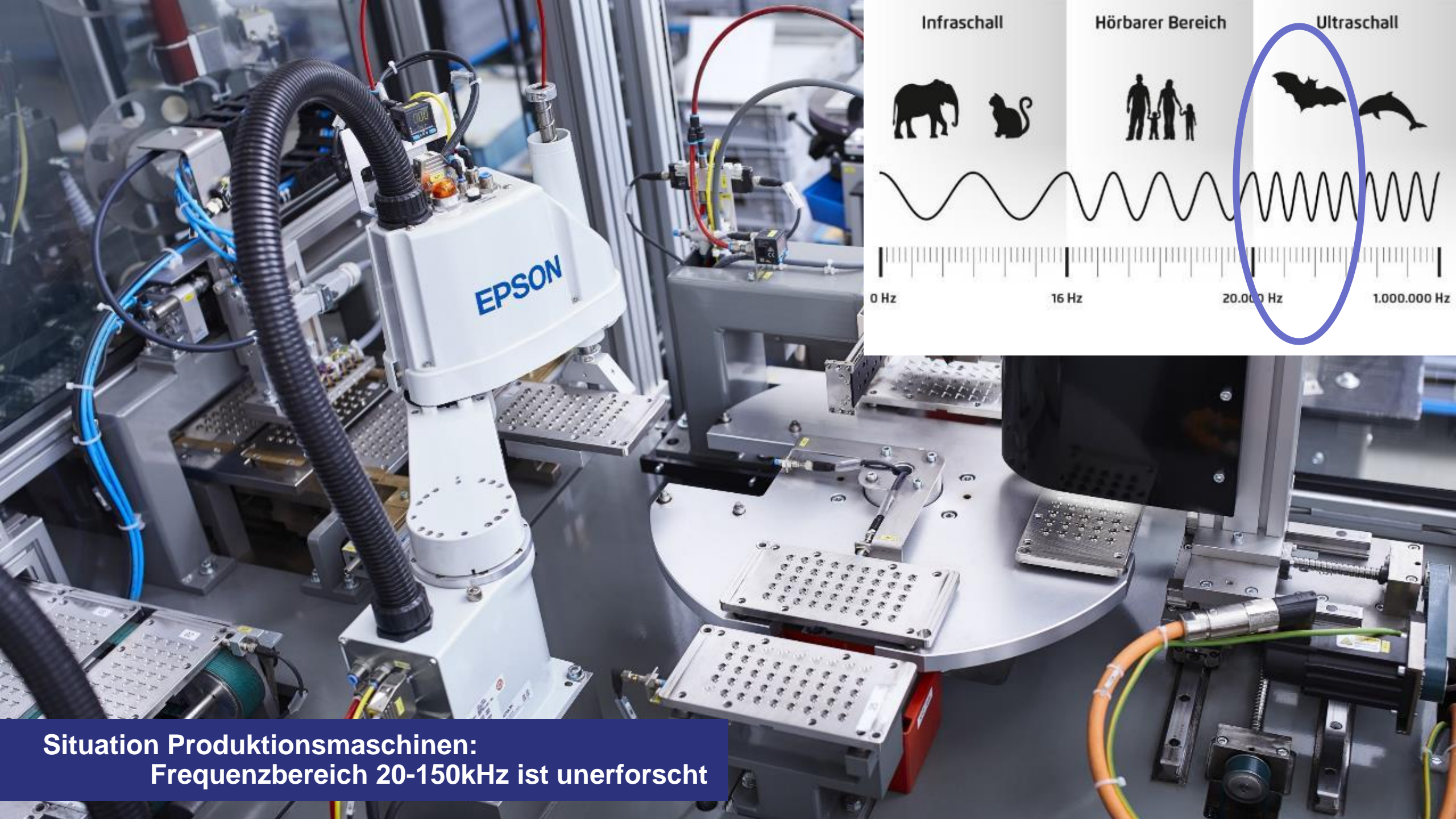


- Feeder
- Robot
- Conveyor
- Sorter
- Camera
- Illumination
- IR
- Pump
- Vacuum
- Sensors

Condition Based Monitoring for Industry 4.0





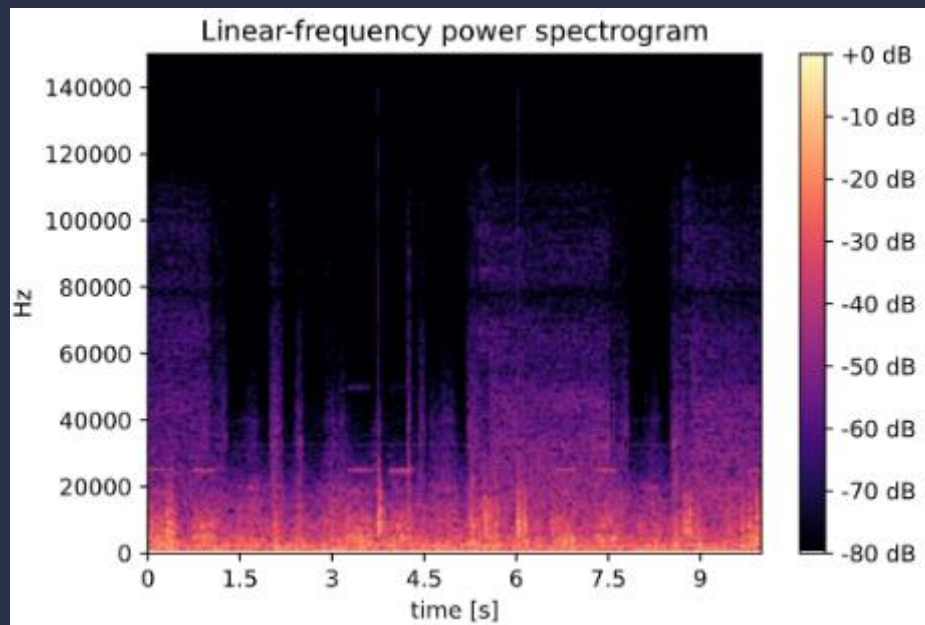


**Situation Produktionsmaschinen:
Frequenzbereich 20-150kHz ist unerforscht**

Special sensor – Batlogger

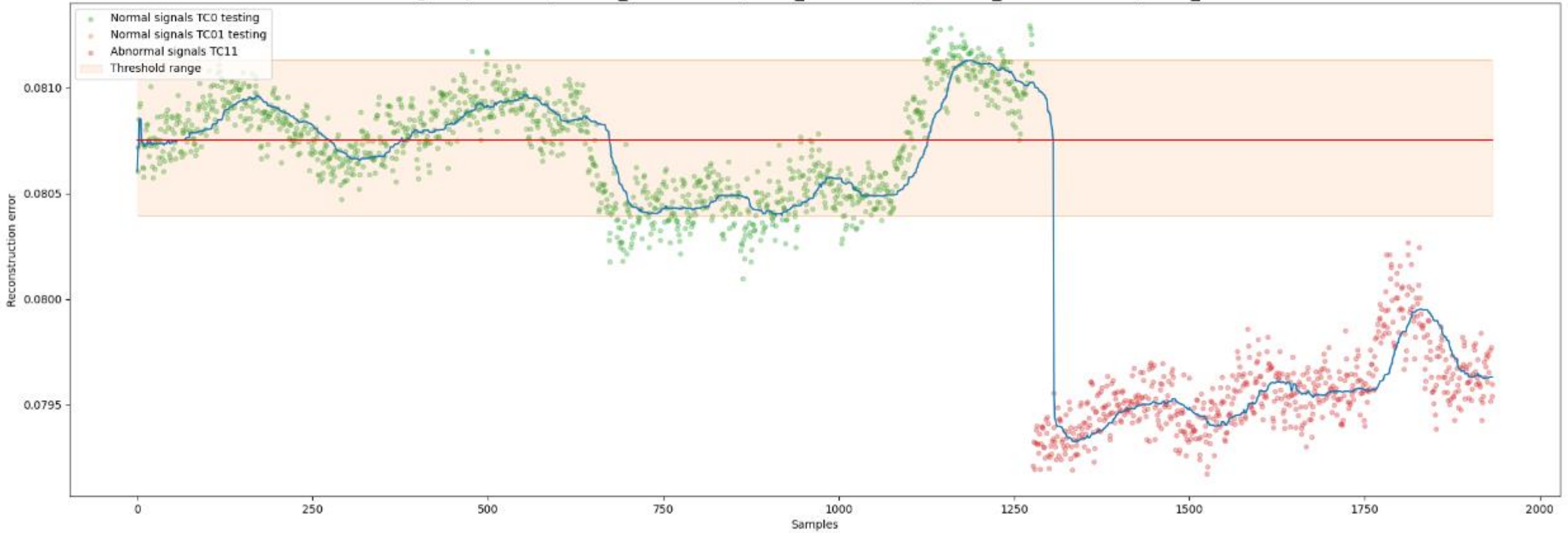


- Microfon: 0-150kHz
- Sampling frequency: 1MHz
- 10s log files
> 500GB of data



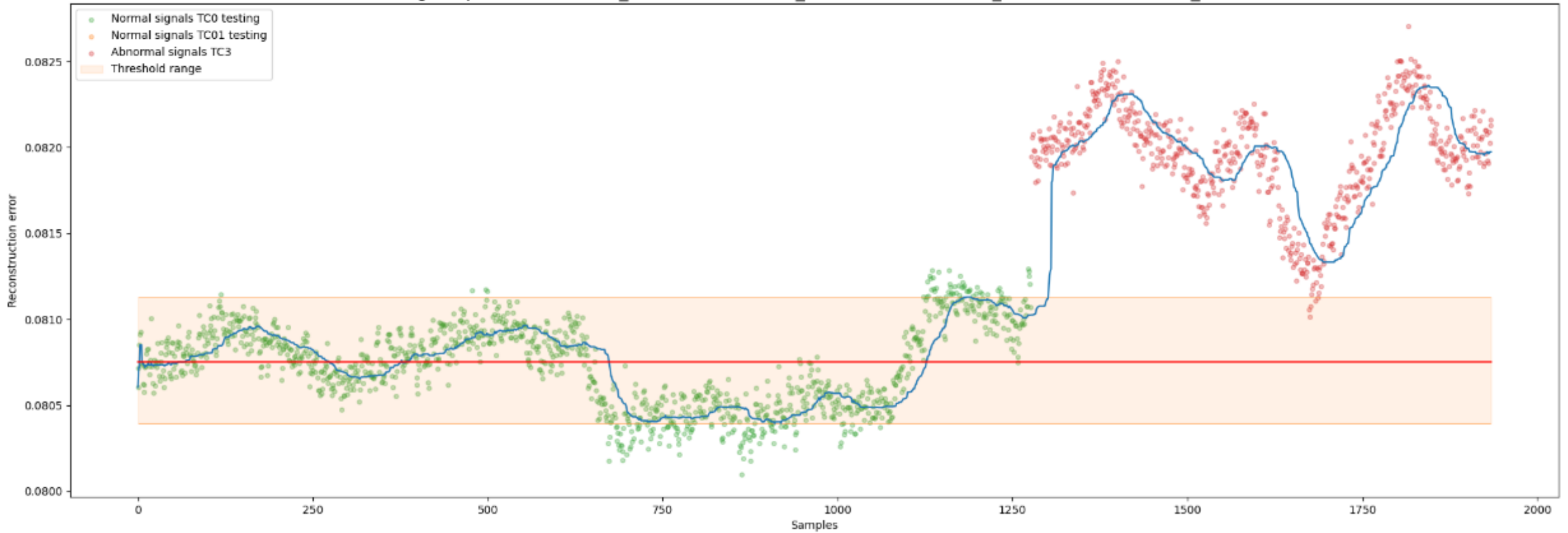
Conveyor Belt Failure

Threshold range exploration, correct_normal: 1.00, false_normal: 0.00, correct_abnormal: 0.95, false_abnormal: 0.05



Camera Failure

Threshold range exploration, correct_normal: 1.00, false_normal: 0.00, correct_abnormal: 0.96, false_abnormal: 0.04



5 Point Plan



1. Sensors
2. Data
3. Expert Knowledge
4. Algorithm pipeline
5. Business case





Photo by Pilatus Aircraft Ltd

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