SciTinyML

Scientific use of machine learning on low power devices
Regional Workshop - Africa

Introduction to Edge Impulse

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Senior DevRel Engineer, Edge Impulse

Agenda

1:05-1:20 PM UTC	Introduction to Edge Impulse	Shawn
1:20-1:35 PM UTC	Getting Started with Edge Impulse	Marcelo
1:35-1:50 PM UTC	Supervised learning and motion classification	Shawn
1:50-2:35 PM UTC	Hands-on Motion Classification	Marcelo
2:35-2:50 PM UTC	Unsupervised Learning and Anomaly Detection	Shawn
2:50-3:35 PM UTC	Hands-on Anomaly Detection	Marcelo
3:35-3:55 PM UTC	Conclusion and Q&A	Marcelo and Shawn

Platform

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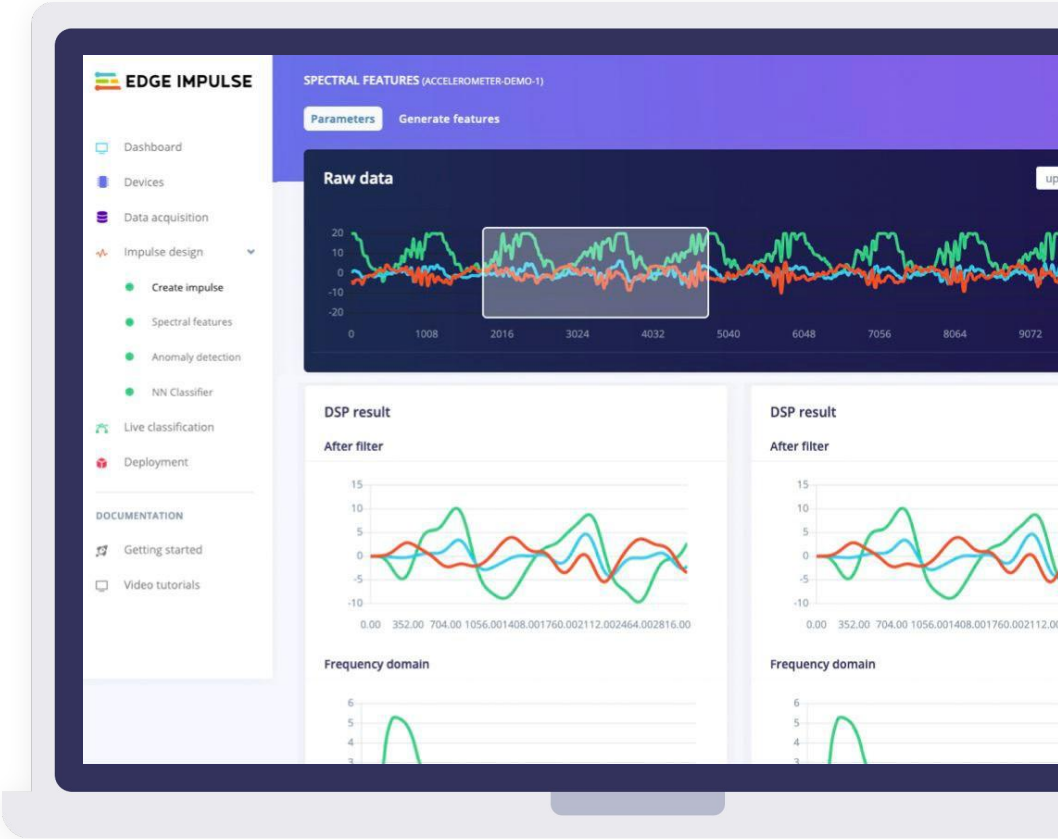
EDGE IMPULSE

The developer-first edge ML platform

- No royalty, no impact on BOM
- Your IP, stays your IP
- Total explainability, no black boxes



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Any sensor, any data, any use case

	Ultra low power	Low-end MCU	High-end MCU	NPU	MPU	GPU
Use cases	•Wake word smart helmet •O&G drill bit applied force prediction	•Glass breaking detection •Pallet situation awareness •Pump anomaly detection	•MCSA (motor) •Fire detection •Washing machine load estimation •Object detection	•Smart kitchen visual aid •Fitness tracker •KWS enterprise headsets	•Worker safety assembly line manufacturing •QA food conveyor •Smart camera	•Crowd management •Multi-object detection •Traffic management
Memory	Anomaly detection 10kB	Sensor fusion classification 18kB	Audio classification 50kB	Image classification 256kB	Object detection complex voice processing 1MB+	Video classification 1GB+
Sensor	✓	✓	✓	✓	✓	✓
Audio	✓	✓	✓	✓	✓	✓
Image			✓	✓	✓	✓
Video					✓	✓

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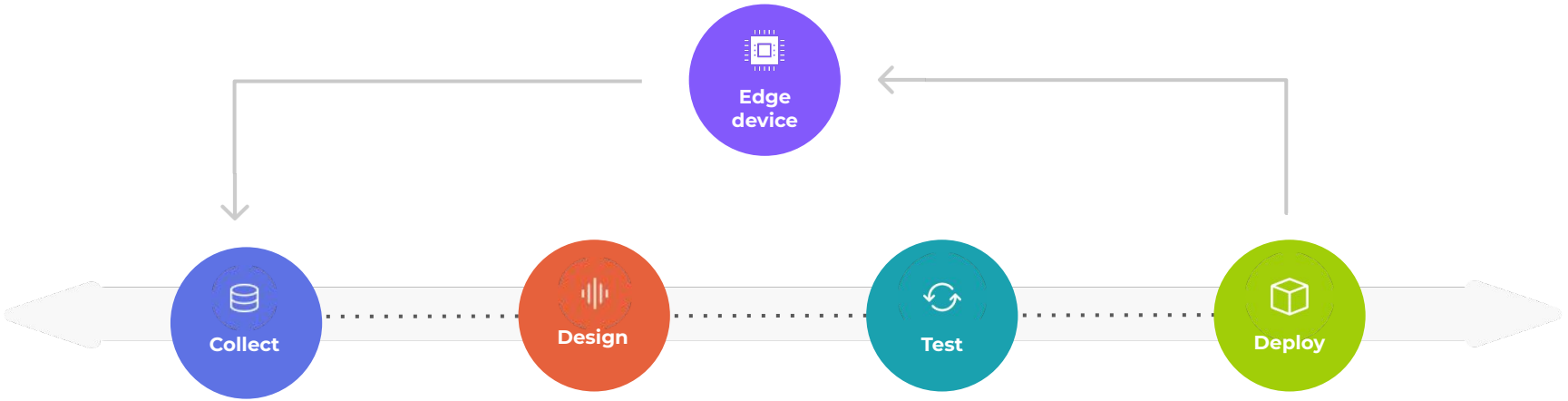
Develop edge ML applications with Edge Impulse

The infrastructure and integrations your data science and ML teams need.



Rapidly build custom datasets

Develop models & algorithms

Track experiments

Accurately test model performance

Easily deploy on any edge target

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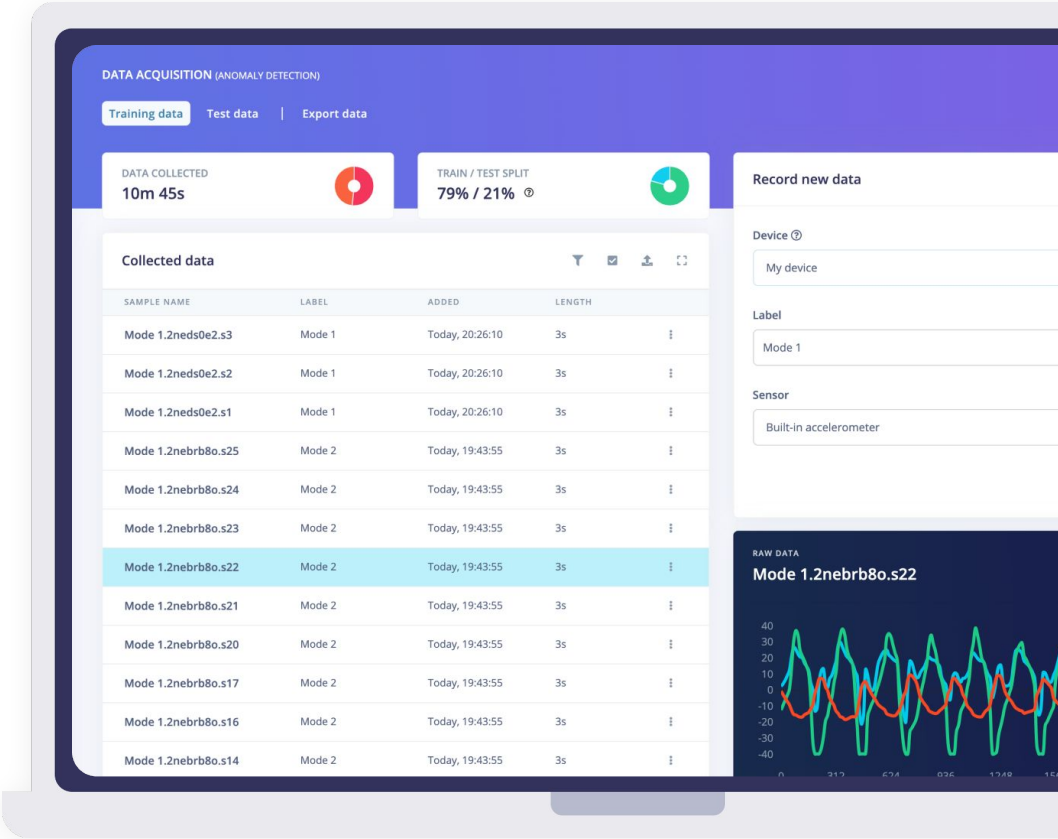
Collect

Build valuable datasets at scale

- The infrastructure data science teams need
- Auto-labeling tools
- Integrations with most widely used data science tools
- Strong data traceability and quality control
- Secure data exchange portal



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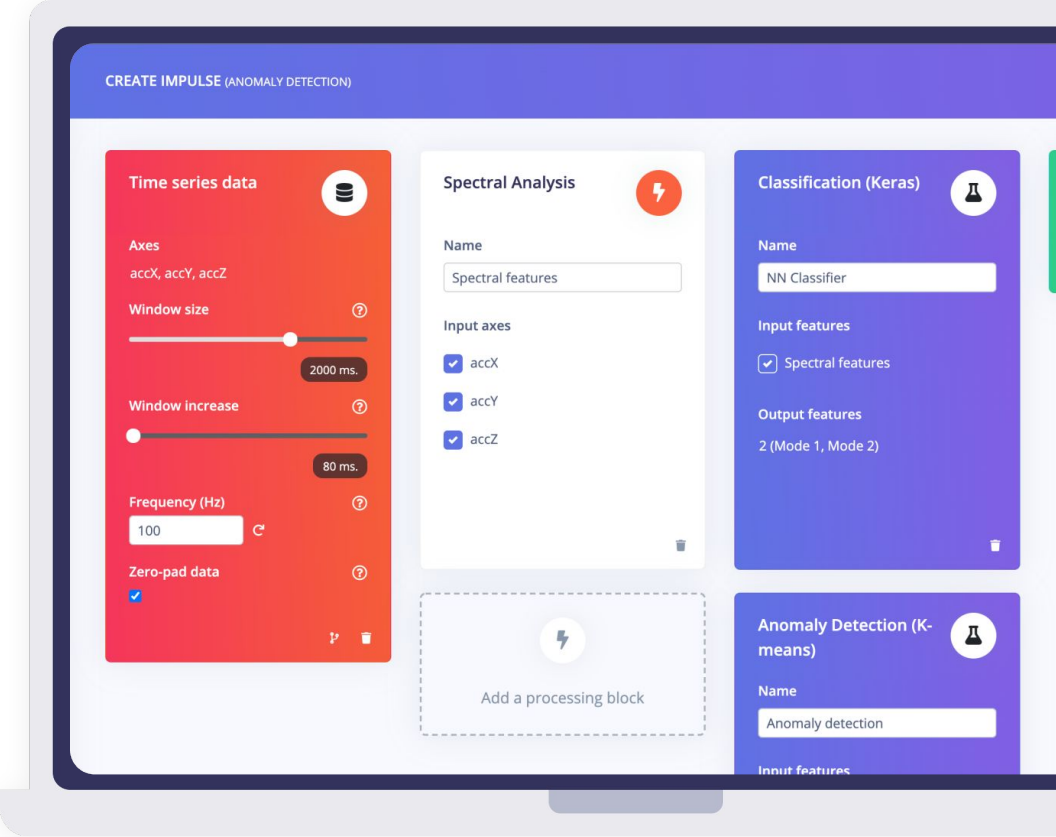
Design

Advanced algorithm and ML expertise

- Advanced algorithm and DSP expertise
- No black boxes
- Explainable AutoML
- Knowledge sharing and collaboration between teams



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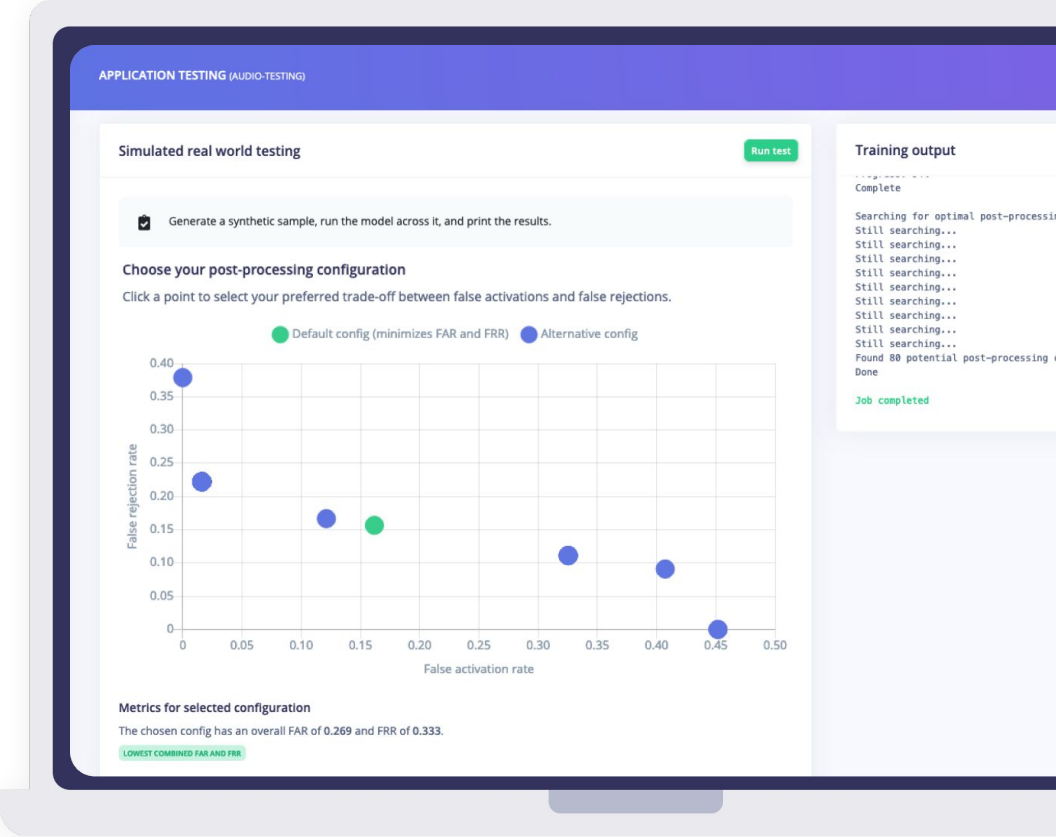
Test

Go to market faster, with confidence

- Hardware-aware development
- Full visibility across the whole ML pipeline
- Test your development against 24hrs of real world data
- Tune the post-processing algorithm to perform optimally



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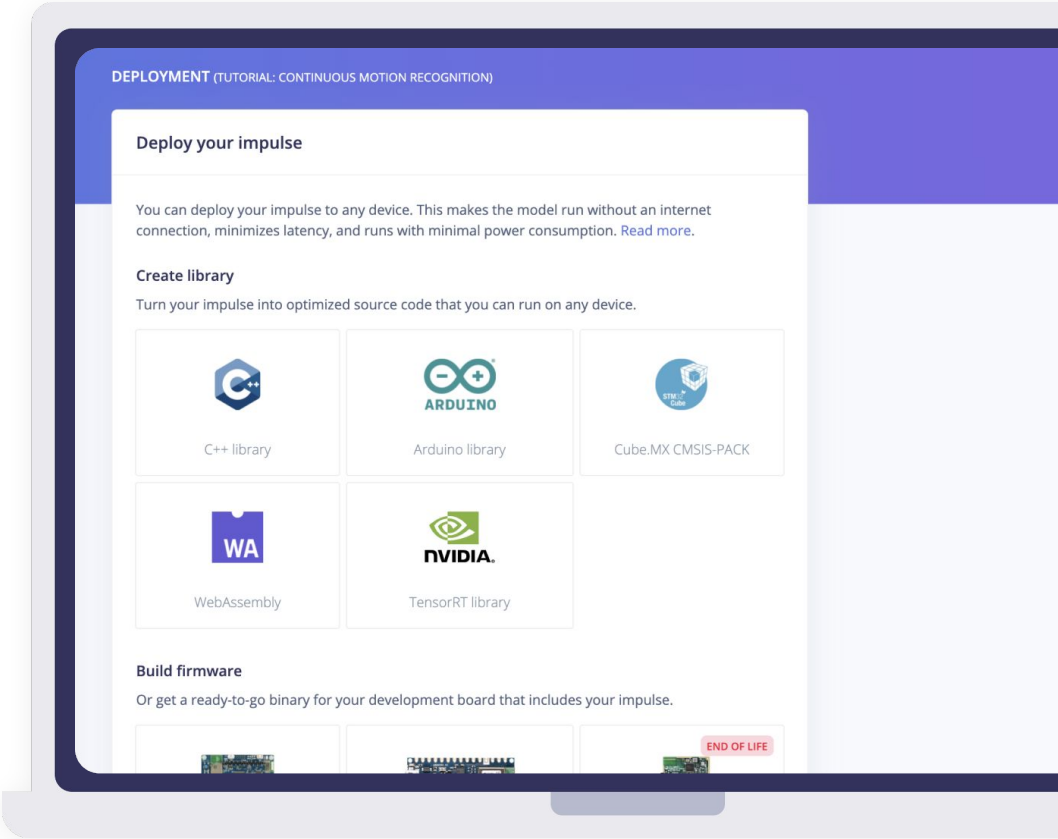
Deploy

Deploy to any edge device with ease

- The largest silicon ecosystem
- Award-winning compiler
- Get access to full source code
- Full firmware integration for a number of devices
- Digital twin for performance profiling and analysis
- Enable brownfield and future greenfield



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Edge device

Comprehensive silicon support

Benefit from our silicon ecosystem

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Customers

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CASE STUDY

Advantech increases manufacturing productivity

Visual inspection system to flag delays on the production line in real-time

Vision

- A reported 15% overall increase in production line efficiency
- Faster detection of idle time raises assembly-line productivity
- Managers free up time to focus on production planning and operations

ADVANTECH

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CASE STUDY

Oura goes deeper on deep sleep

Through the use of Edge Impulse's advanced data infrastructure, Oura rapidly improved their algorithm

Heart **Motion** **Temperature**

- Unprecedented sleep-scoring accuracy. A 17% point increase in scoring accuracy
- Improved correlation accuracy of 79%
- Data-driven development process enabled Oura's data science team to scale

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CASE STUDY

Nordic and Izoelektro predict power line failure

Smart power grid monitoring that improves the operation, stability, and reliability of electricity distribution.”

Current **Motion**

- Automated monitoring of poles and lines
- NB-IoT with 20 year battery life made possible by ML
- Avoid disastrous wildfires and reduce maintenance costs

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USE CASE

Where’s my pallet

Reduce power use on battery operated devices in pallets indoors and outdoors.

Implementation

- A reported 15% overall increase in production line efficiency
- Faster detection of idle time raises assembly-line productivity
- Managers free up time to focus on production planning and operations

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