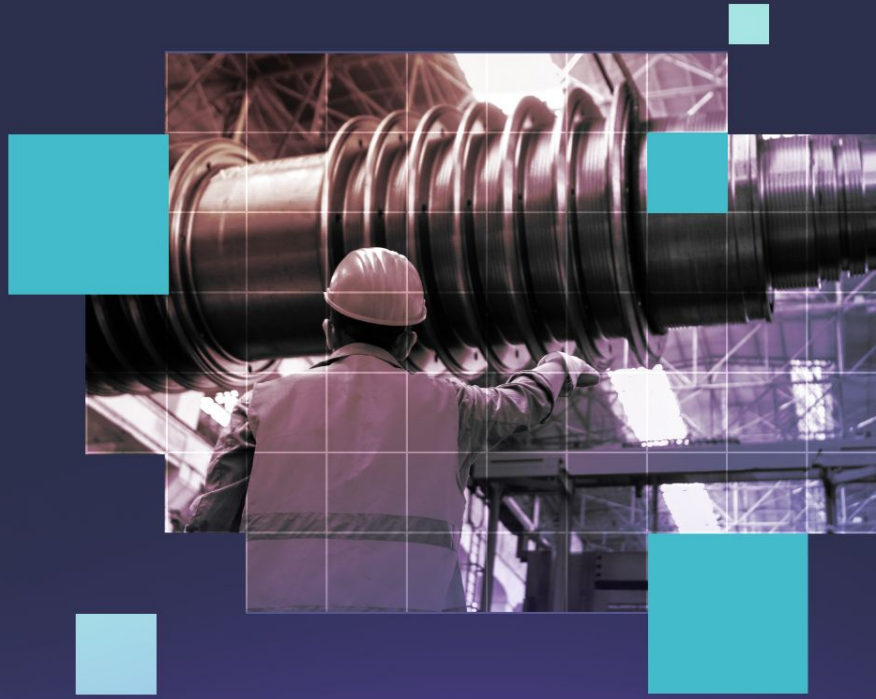
EDGE IMPULSE

We put ML into real products



Louis Moreau, Senior DevRel Engineer
@luisomoreau

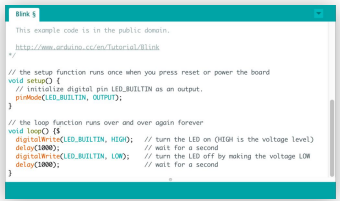
A paradigm shift

Traditional programming

Data

+

Rules



Outcomes

Adapt the rules

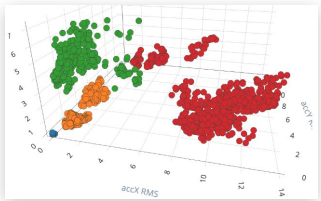
vs

Machine learning

Data

+

Outcomes



Rules

Collect more data

Benefits of edge ML

Innovation

Add new differentiating features, become a market leader by standing out from your competition

Privacy

Data stays on the device, gets processed locally and drives remote alerts, notifications, and actions

Power

Stay operational for longer periods of time

Cost

Save on storage and compute costs by not sending raw data constantly to the cloud

Reliability

Be operational in low connectivity environments

Bandwidth & Latency

Process data real-time on the edge device, without having to wait for a response back from the cloud

Platform

Powering the largest edge ecosystem with MLOps

40,000+
Developers

90,000+
Projects

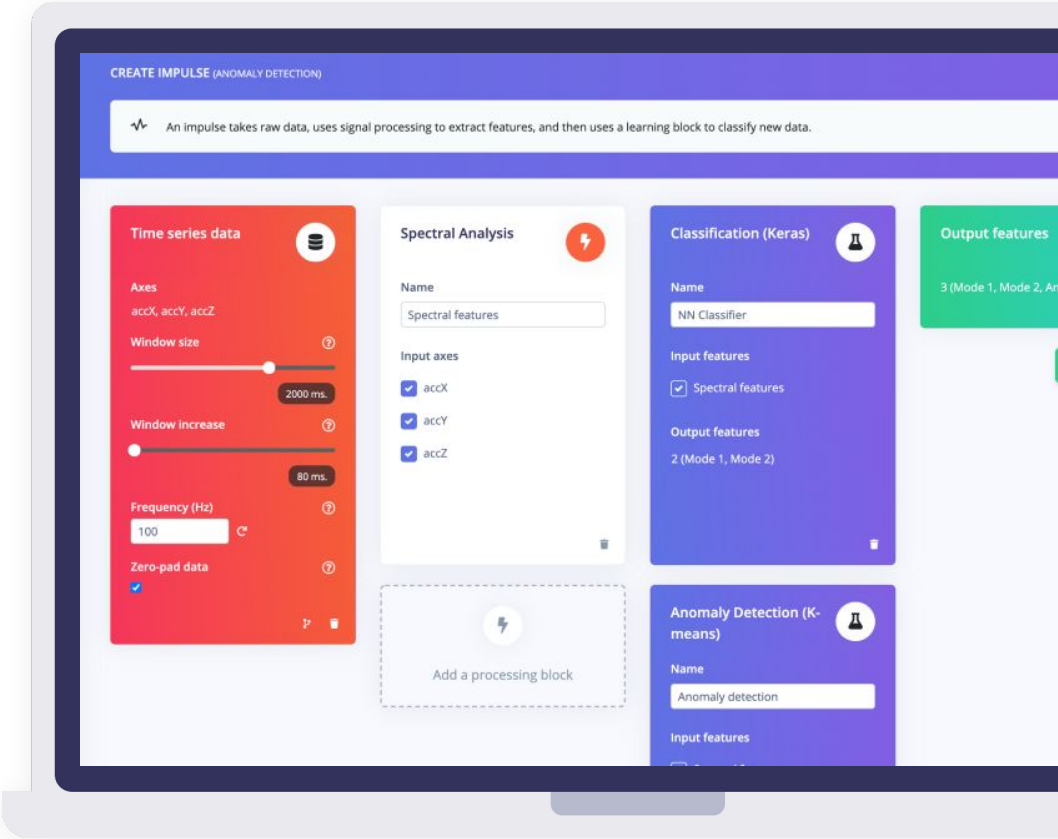
1,000+
Enterprises

TRUSTED BY LEADING ENTERPRISES

EDGE IMPULSE

The developer-first edge ML platform

- Royalty-free business model, therefore no impact on BOM cost
- Your IP, stays your IP
- Total explainability, no black boxes

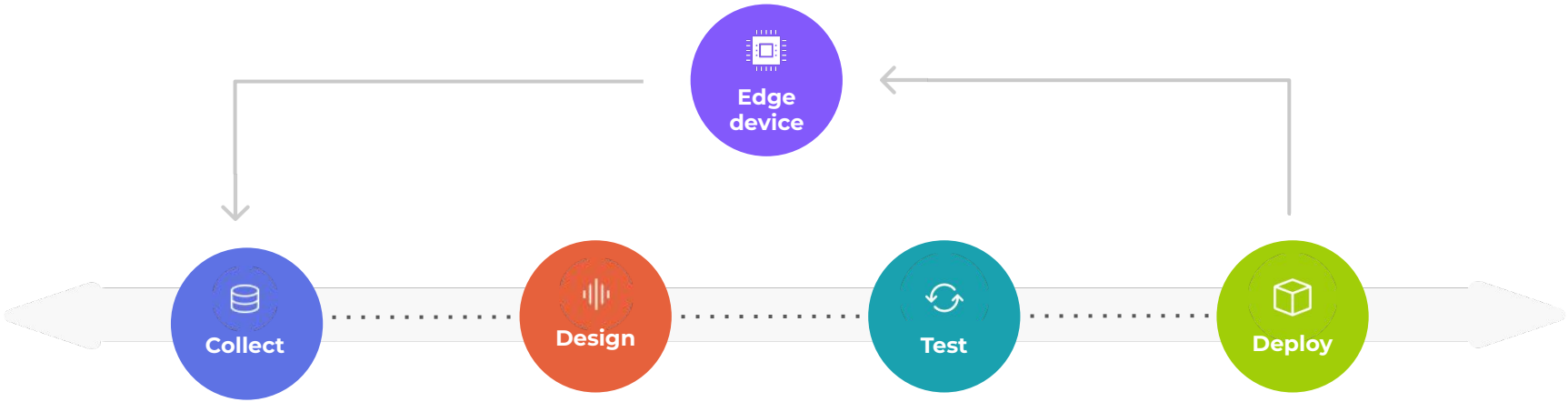


Any sensor, any data, any use case

	Ultra low power	Low-end MCU	High-end MCU	NPU	MPU	GPU
	Anomaly detection	Sensor fusion classification	Audio classification	Image classification	Complex image or voice	Video classification
Memory	10kB	18kB	50kB	256kB	1MB+	1GB+
Sensor	✓	✓	✓	✓	✓	✓
Audio	✓	✓	✓	✓	✓	✓
Image			✓	✓	✓	✓
Video					✓	✓

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

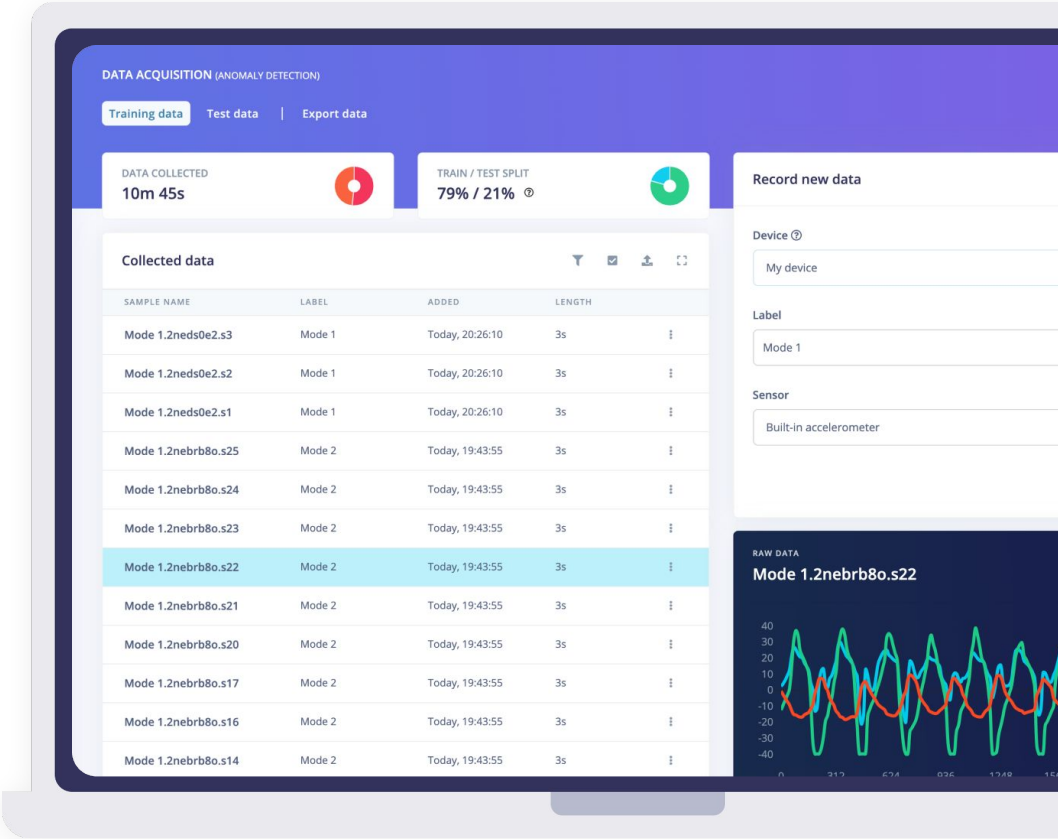
Accurately test model performance

Easily deploy on any edge target

Collect

Build valuable datasets at scale

- Tools to collect data directly from devices



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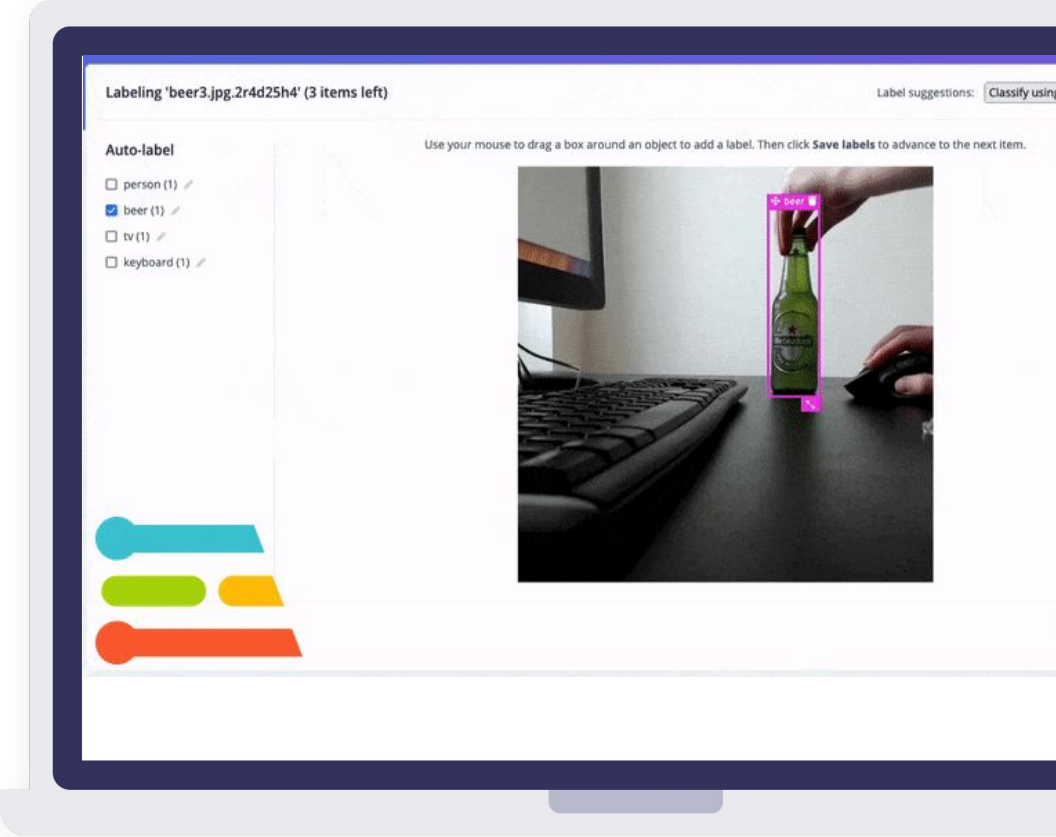
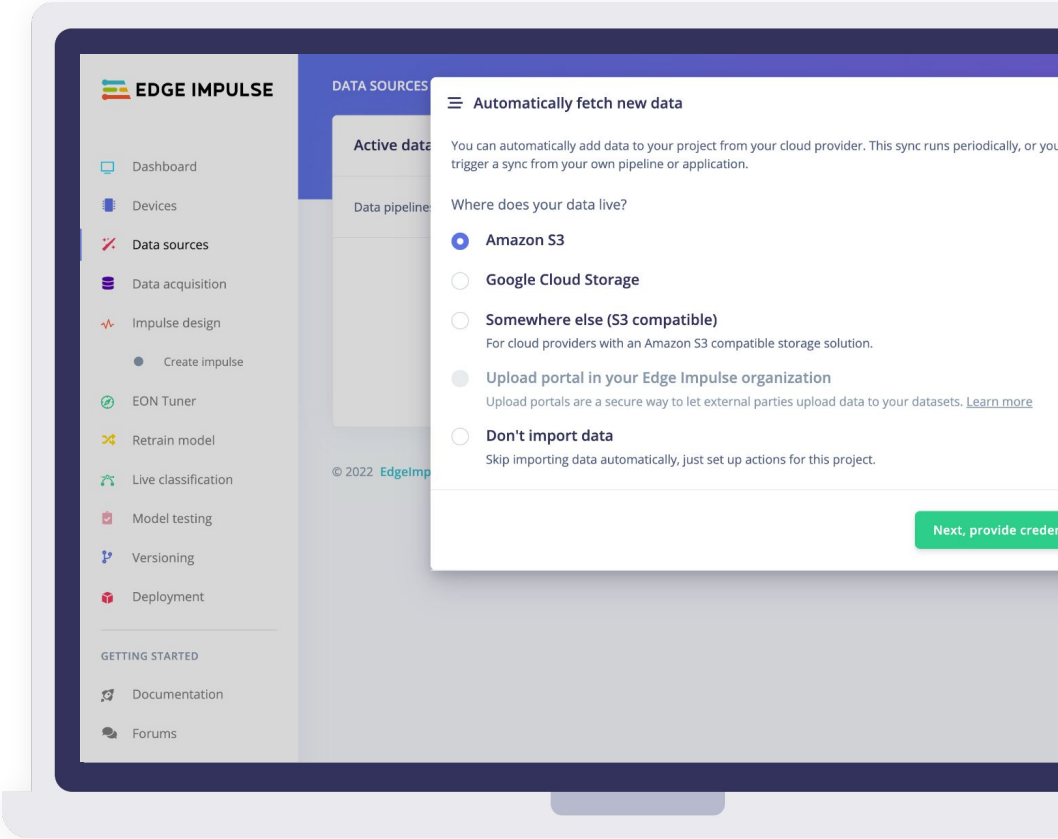


Collect

Build valuable datasets at scale

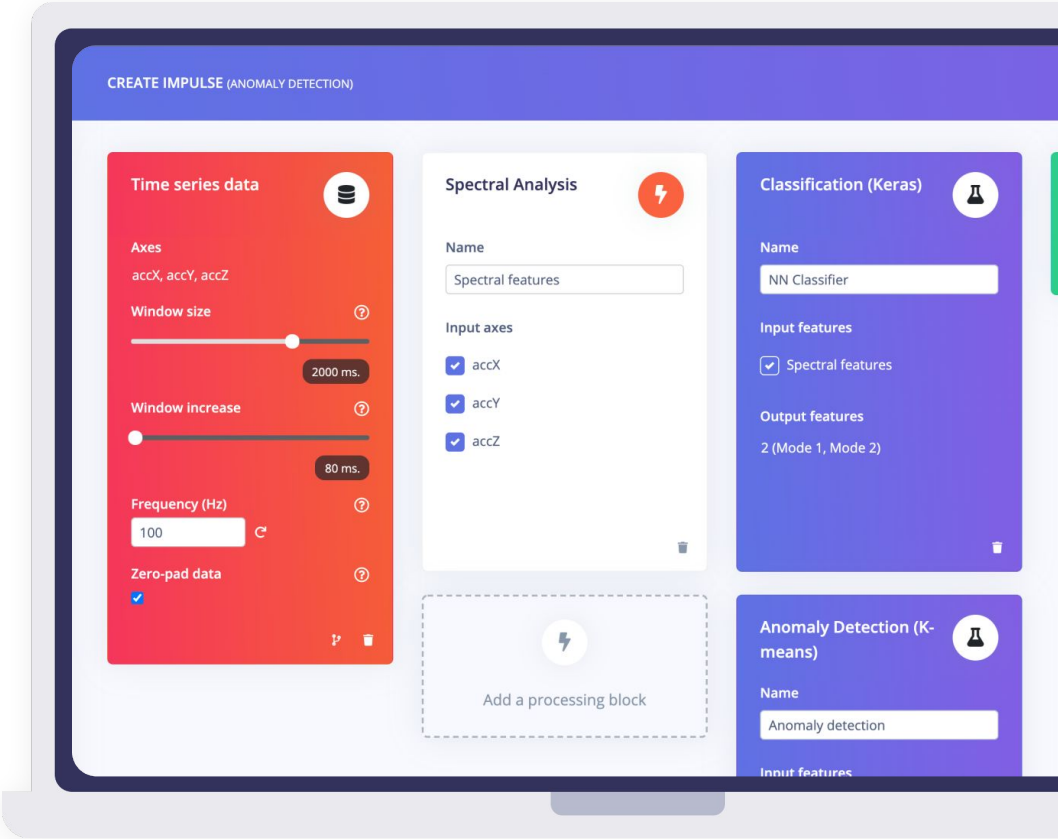
- The infrastructure data science teams need
- Assisted-labeling tools
- Integrations with most widely used cloud data buckets



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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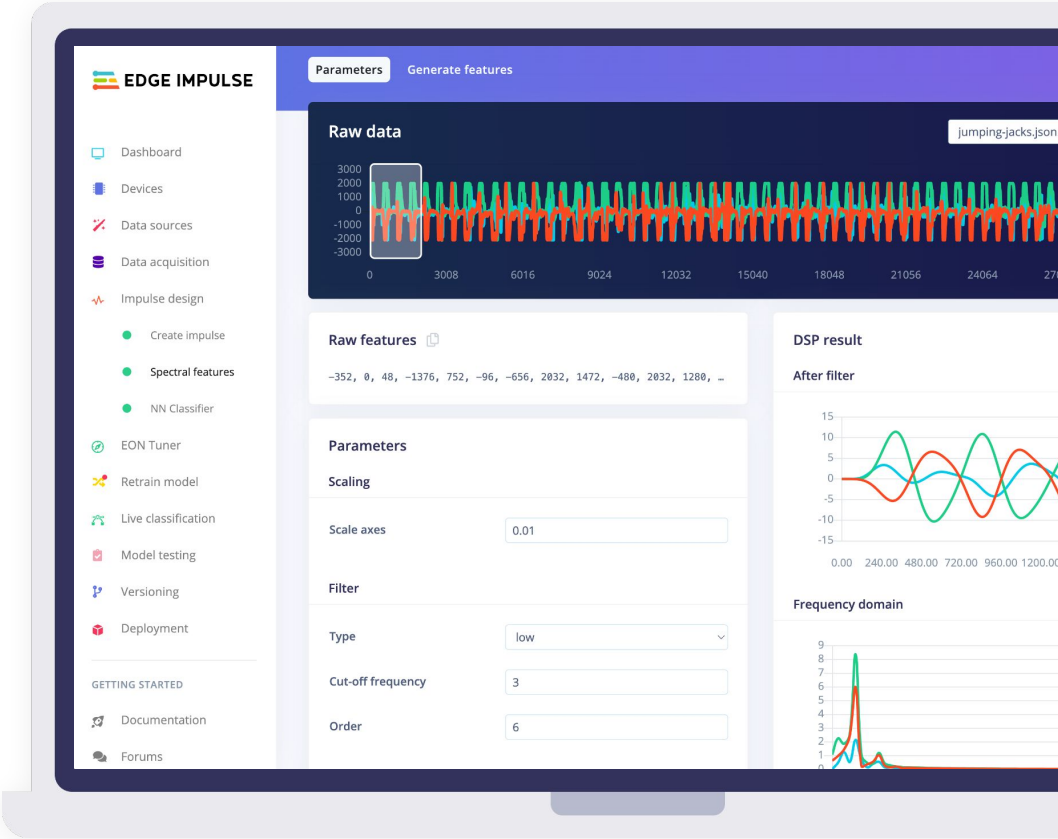

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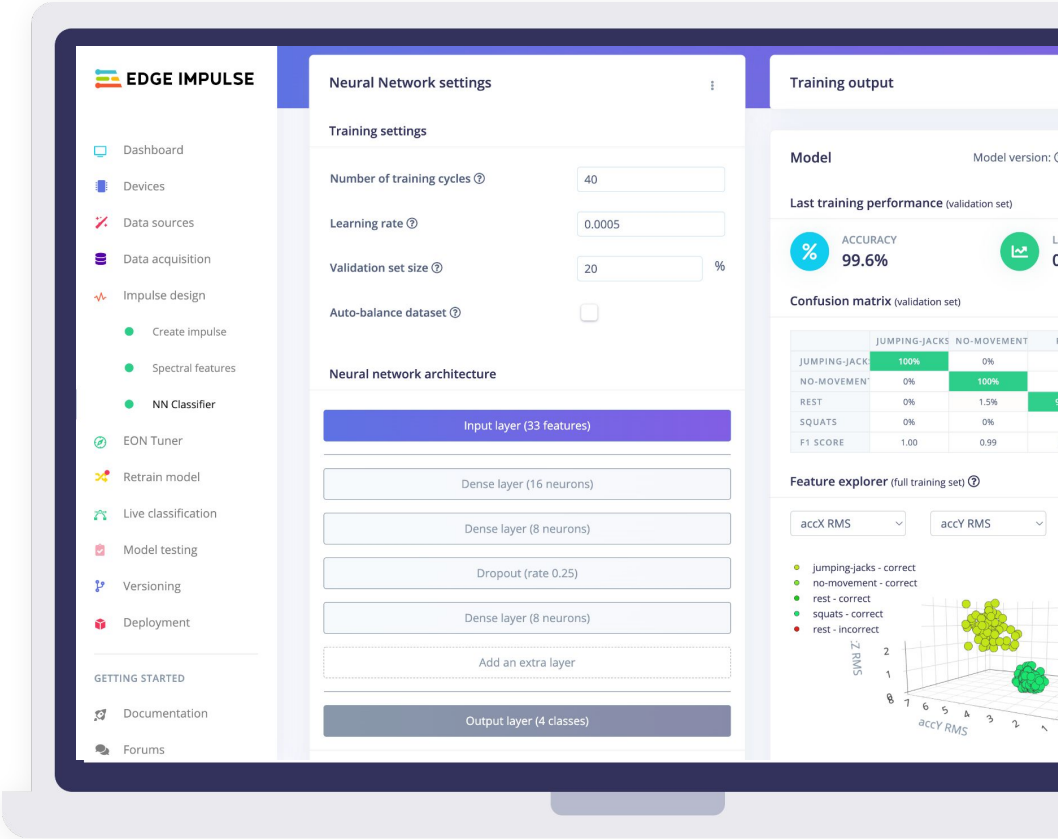
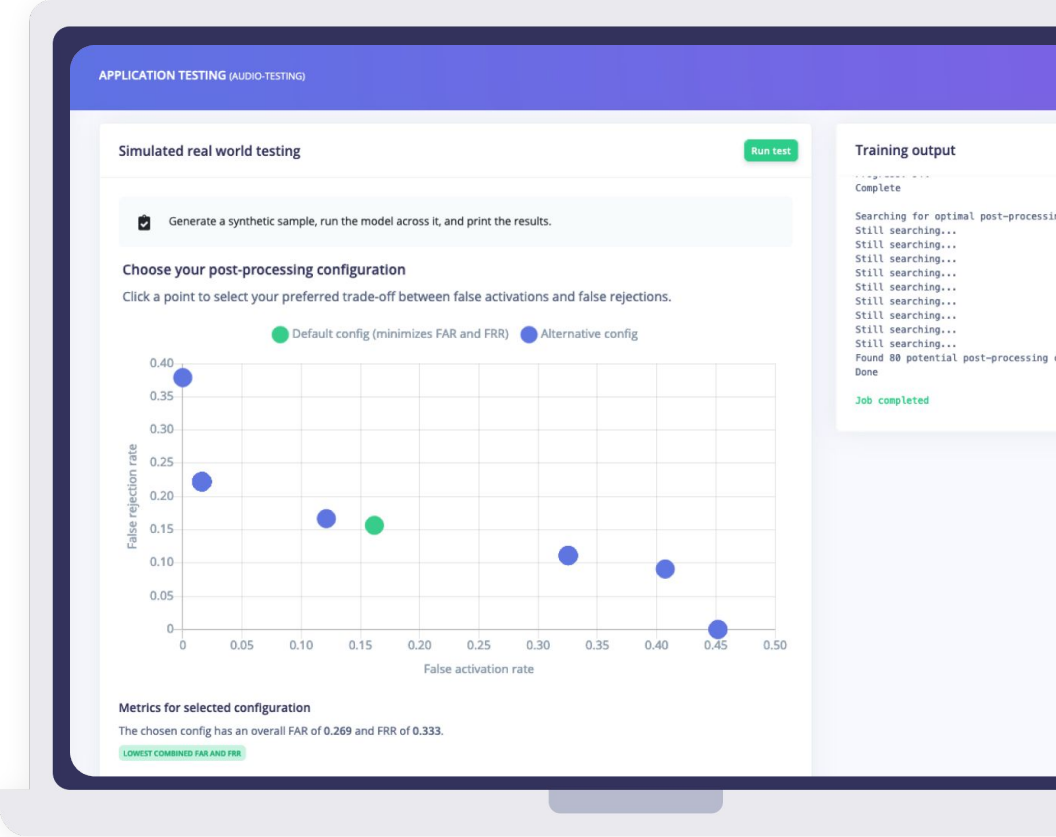


Test

Go to market faster, with confidence

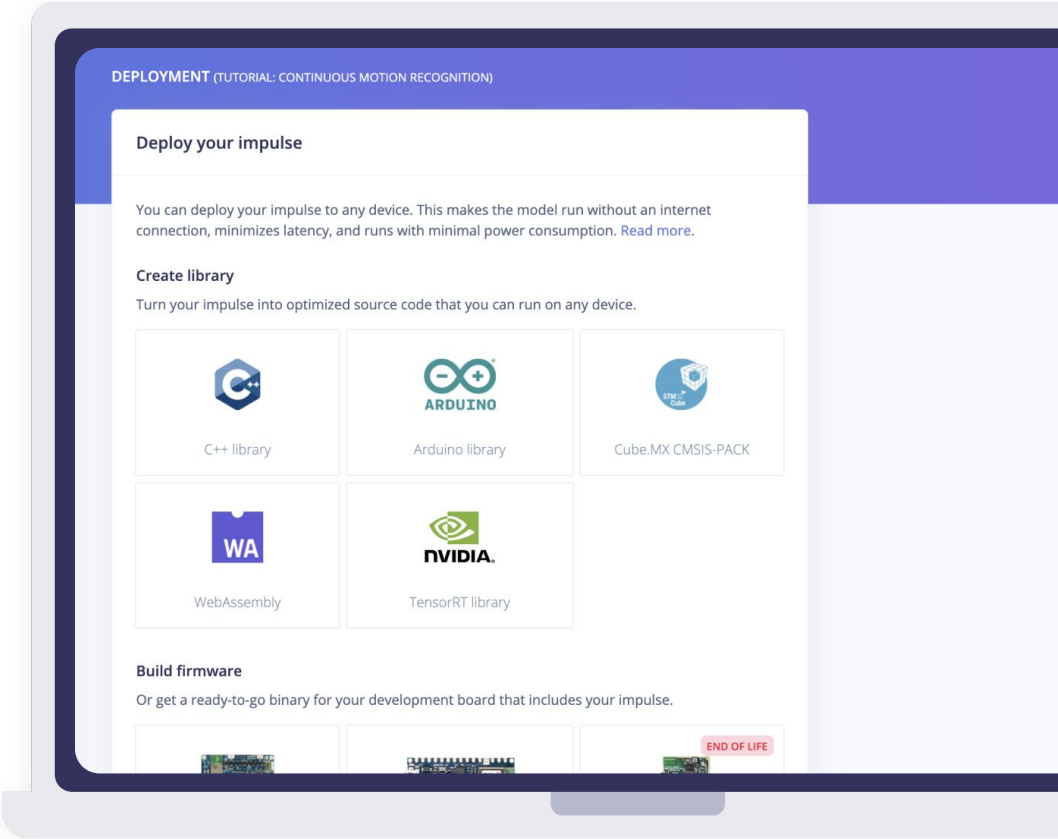
- Hardware-aware development
- Full visibility across the whole ML pipeline
- Test your development against 24hrs of real world data
- Tune the post-processing algorithm to perform optimally



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



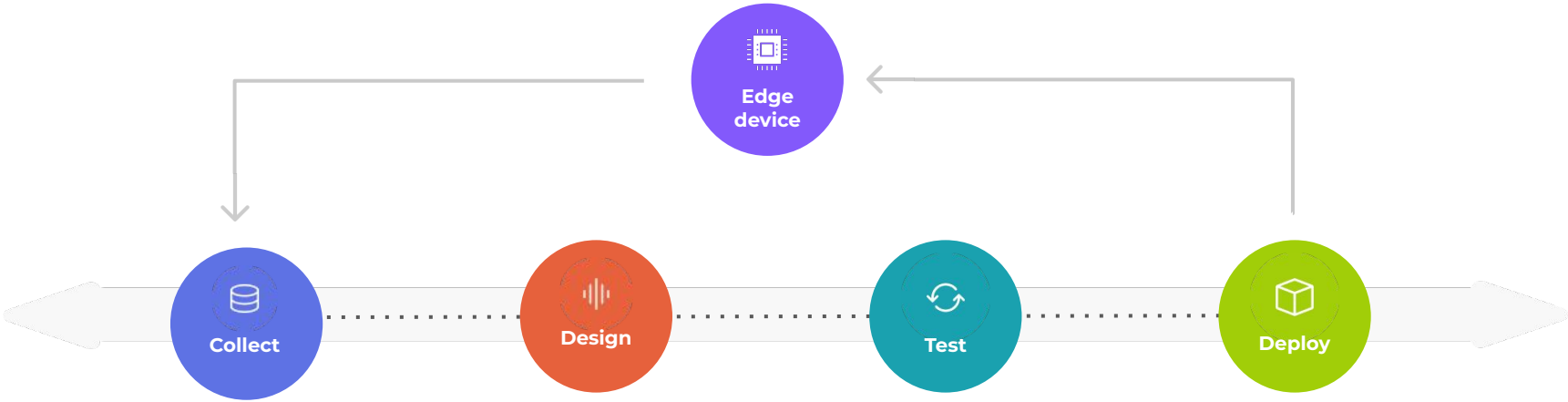
Edge device

Comprehensive hardware support

Benefit from the leading edge ML silicon ecosystem

Integrations

arm NVIDIA intel RISC-V



Rapidly build custom datasets

Develop models & algorithms

Track experiments

Accurately test model performance

Easily deploy on any edge target

Google Cloud
Azure
aws

TensorFlow
Keras
PyTorch
MATLAB
SciPy

mlflow
W&B
RAY

TensorFlow Lite
ARDUINO

docker
TensorRT
WEBASSEMBLY
ONNX

Features

FEATURE HIGHLIGHT

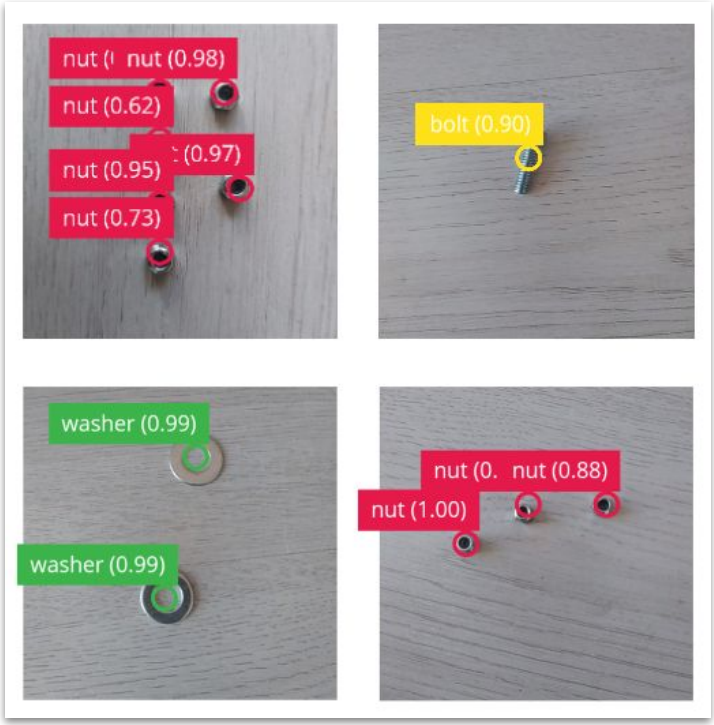
Optimal ML solutions with EON Tuner

- Make the most of limited and heterogeneous compute
- Find the perfect balance between feature extraction and model architecture
- Recommendations based on real performance metrics
- Built for constrained use cases to high end HW and complex use cases (e.g.: high-end CV)
- Suggestions on optimal hardware target for use case

FEATURE HIGHLIGHT

FOMO: Faster objects, more objects

- **20x average performance improvement**
- Object detection on MCUs
- Ultra fast on embedded Linux
- Better at detecting smaller and more numerous objects
- Capable of segmentation and counting objects

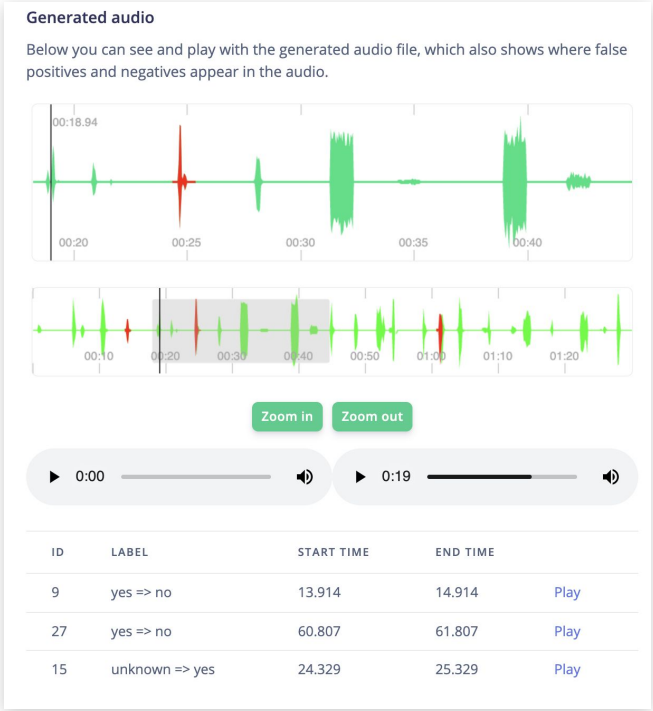


	Cortex-M4	Cortex-M7	Cortex-A	Nvidia
FOMO	2 fps	15-30 fps	60+ fps	150+ fps
SSD	NA	NA	3 fps	20 fps

FEATURE HIGHLIGHT

Calibrate your application at scale

- Test on realistic samples: 24 hours of real world audio
- Understand the impact of post-processing while accounting for device constraints and latency
- Choose your ideal balance between false activations and false rejections
- Leverage genetic algorithms to design optimal post-processing configuration



Customers

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

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

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

USE CASE

Where’s my pallet?

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

Implementation

- Gather vibration / accelerometer data from existing tracking devices in pallets (wood and plastic)
- Label, train model to identify if in a forklift, truck, idle, indoor / outdoor.
- Test in pallets in select service centers