

# Edge Impulse Overview

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# Agenda

1. Overview of Edge Impulse
2. Demo
3. New Features
4. University Program

## Questions?

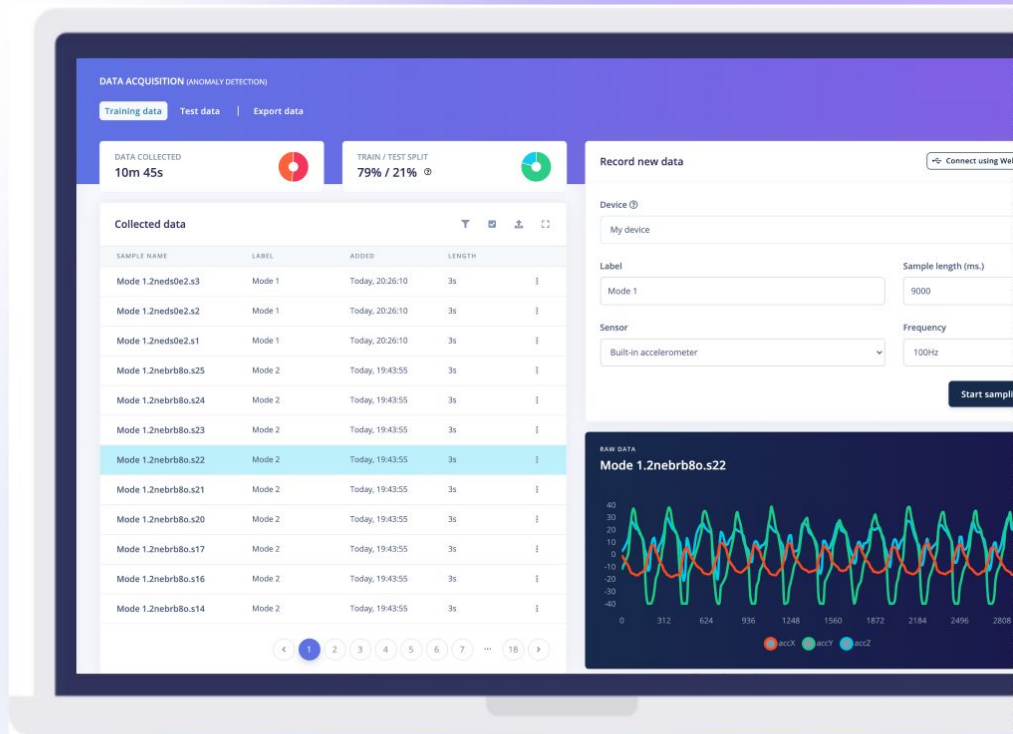


Tag me [@ShawnHymel](#) in the

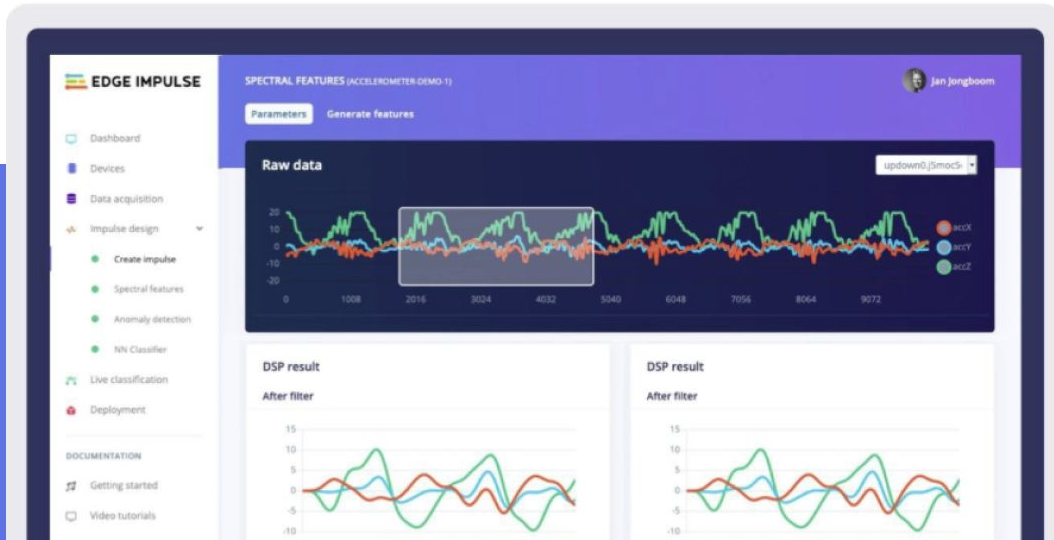
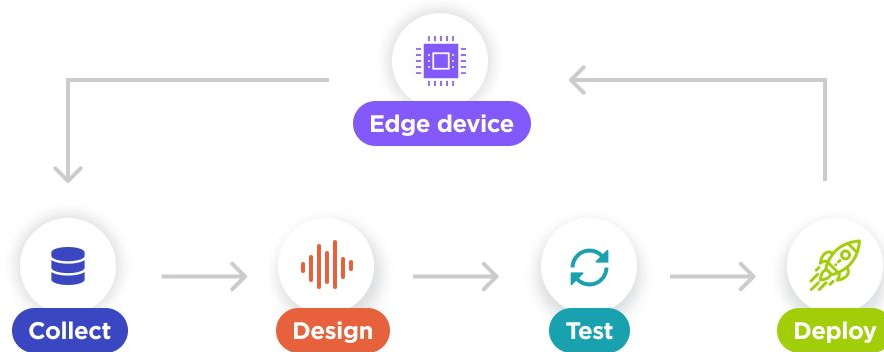
[Tiny Machine Learning](#) server on [Discord](#)

# The developer-first edge ML platform

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



# Go to market faster with confidence



# Example: Roshambo

Machine learning model that classifies hand gestures

Public project: <https://studio.edgeimpulse.com/public/184608/latest>

Full workshop: <https://github.com/edgeimpulse/workshop-arduino-tinyml-roshambo>



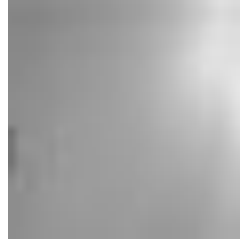
rock



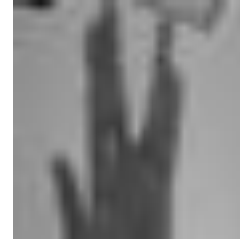
paper



scissors



\_background



\_unknown

# New Feature: CSV Wizard

EDGE IMPULSE

Dashboard

Devices

Data sources

Data acquisition

Impulse design

Create impulse

EON Tuner

Retrain model

Live classification

Model testing

Versioning

Deployment

GETTING STARTED

Documentation

Forums

CSV Wizard - Step 3: About your data

Let's learn a bit about the structure of your data.

Is this time-series data?

- Yes, this is time-series data (either raw sensor data, or processed features)  
 No

How is your time-series data formatted?

- Each row contains a reading, example:

TIMESTAMP	TEMPERATURE	HUMIDITY
2022-11-24 21:59:00	28.04	9.81
2022-11-24 21:59:10	28.24	9.79
2022-11-24 21:59:20	28.31	9.61

- Each column contains a reading, and each row contains a full sample, example:

SAMPLE #	TEMP. READING 1	TEMP. READING 2	TEMP. READING 3
1	28.04	28.24	28.31
2	22.81	23.02	22.96

Do you have a timestamp or time elapsed column?

- Yes, it's   
 No

What's the frequency of this data?

Hz

e\_j\_2023-02-27\_13-31-51.CSV

TIME (MS.)	SAMPLE RATE	TIME	HR (BPM)	SPEED (KM/H)	PACE (MIN/KM)	CADENCE	ALTITUDE (M)
0	1	00:00:00	51	0.0	00:00		
1000		00:00:01	51	0.0	00:00		
2000		00:00:02	50	0.0	00:00		
3000		00:00:03	50	0.0	00:00		
4000		00:00:04	50	0.0	00:00		
5000		00:00:05	50	0.0	00:00		
6000		00:00:06	50	0.0	00:00		
7000		00:00:07	51	0.0	00:00		
8000		00:00:08	51	0.0	00:00		
9000		00:00:09	51	0.0	00:00		
10000		00:00:10	51	0.0	00:00		
11000		00:00:11	51	0.0	00:00		
12000		00:00:12	52	0.0	00:00		
13000		00:00:13	53	0.0	00:00		
14000		00:00:14	55	0.0	00:00		
15000		00:00:15	62	0.0	00:00		
16000		00:00:16	65	0.0	00:00		
17000		00:00:17	70	0.0	00:00		
18000		00:00:18	75	0.0	00:00		

Launchpad

EDGE IMPULSE

# New Feature: Wavelets

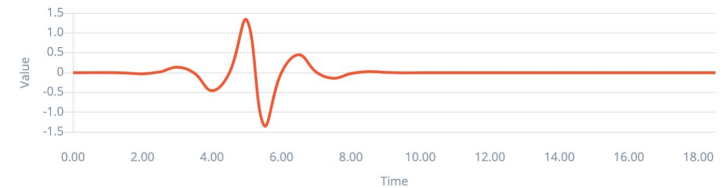
- Discrete Fourier transform (DFT)
  - Decompose signal into sine/cosine components
- Discrete wavelet transform (DWT)
  - Decompose signal into “wavelet” components
  - Multiresolution signal analysis
  - Popular in EEG/ECG analysis

DSP result

After filter



Wavelet function



Wavelet Approximation




Processed features 

3.1952, 0.1165, 0.1165, -0.9579, -0.3279, 0.3033, 0.3522, 0.2674, -0.0082, 0.4534, 0.2076, 0.4534, -1.0691...

# New Feature: DSP Autotuning

- Picking parameters for wavelets (and FFT) can be difficult
- New autotune feature
- Tries different wavelet functions and parameters
- Looks at feature separation among post-DSP samples

Raw features 

0.0055, 0.1886, -0.1571, 0.3971, -0.1756, -0.4850, 0.0212, 0.1136, -0.1776, 0.463...

Parameters Autotune parameters

Filter

Scale axes

Input decimation ratio

Type

Analysis

Type

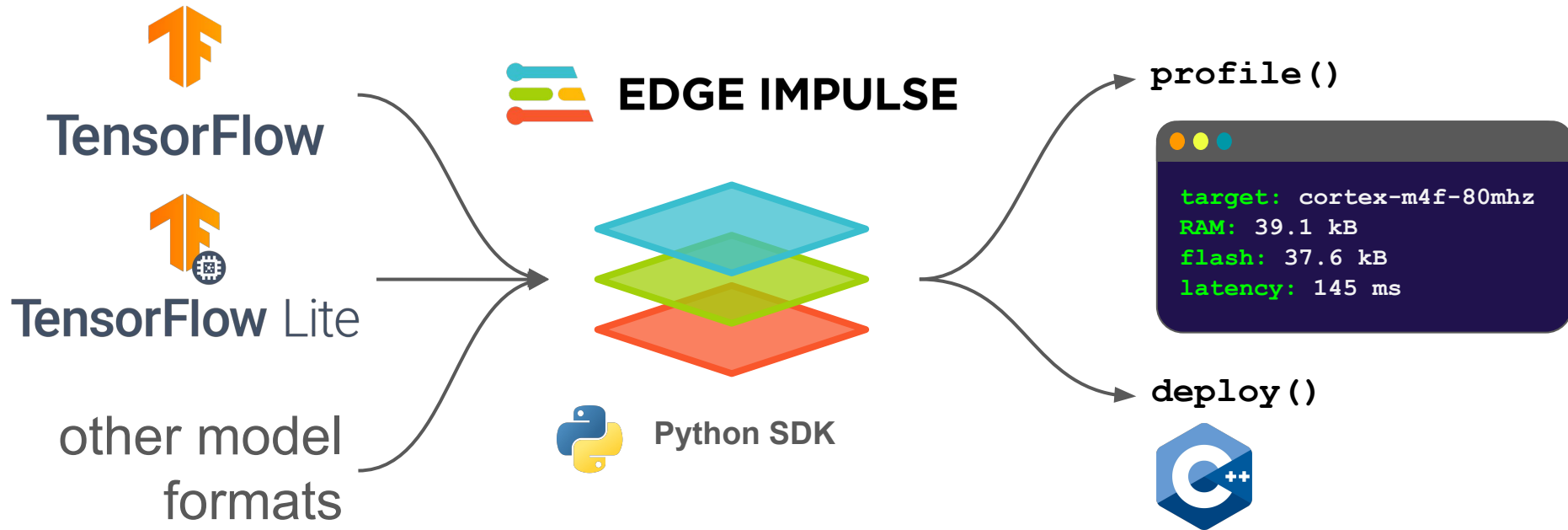
Wavelet Decomposition Level

Wavelet

Save parameters



# New Feature: Python SDK



# University Program

Learn more: [edgeimpulse.com/university](https://edgeimpulse.com/university)

## Teach edge machine learning using Edge Impulse

The Edge Impulse university program empowers educators from around the world to train the next generation of edge machine learning professionals.

We no longer have kits for 2022, but we plan to be back with more kits in 2023. Fill out the interest form to be added to our mailing list and be the first to know when you can apply for kits.

[Join the mailing list](#)



### Free hardware kits

10 Arduino Kits



### Learning resources

Access to lesson plans and sample projects



### Online training

Access to training videos



### Community support

Join a Discord channel of edge ML experts



[hello@edgeimpulse.com](mailto:hello@edgeimpulse.com)

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