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

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:

<table>
<thead>
<tr>
<th>TIMESTAMP</th>
<th>TEMPERATURE</th>
<th>HUMIDITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022-11-24 21:59:00</td>
<td>28.04</td>
<td>9.81</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SAMPLE #</th>
<th>TEMP. READING 1</th>
<th>TEMP. READING 2</th>
<th>TEMP. READING 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>28.04</td>
<td>28.24</td>
<td>28.31</td>
</tr>
<tr>
<td>2</td>
<td>22.81</td>
<td>23.02</td>
<td>22.96</td>
</tr>
</tbody>
</table>

Do you have a timestamp or time elapsed column?
- Yes, it's [Sample rate]
- No

What's the frequency of this data?

1 Hertz
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
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
New Feature: Python SDK

TensorFlow
TensorFlow Lite
other model formats

EDGE IMPULSE

Python SDK

profile()

target: cortex-m4f-80mhz
RAM: 39.1 kB
flash: 37.6 kB
latency: 145 ms

deploy()
University Program

Learn more: edgeimpulse.com/university