

## **Edge Computing Laboratory**

### **Lab Assignment 5**

#### **Title**

The “Hello World” of Edge Impulse Platform

#### **Introduction**

Edge Impulse is a development platform for machine learning on edge devices, targeted at developers who want to create intelligent device solutions. The "Hello World" equivalent in Edge Impulse would typically involve creating a simple machine learning model that can run on an edge device, like classifying sensor data or recognizing a basic pattern.

#### **Objective**

TinyML: Building and Training a Model

#### **Materials Required**

Raspberry Pi 4 / Nano BLE Sense Board

#### **Theory**

GPIO (General Purpose Input/Output) pins on the Raspberry Pi are used for interfacing with other electronic components. BCM numbering refers to the pin numbers in the Broadcom SOC channel, which is a more consistent way to refer to the GPIO pins across different versions of the

Here’s a high-level overview of steps you’d follow to create a "Hello World" project on Edge Impulse:

#### **Steps to Configure the Edge Impulse:**

1. Create an Account and New Project:
  - Sign up for an Edge Impulse account.
  - Create a new project from the dashboard.
2. Connect a Device:
  - You can use a supported development board or your smartphone as a sensor device.
  - Follow the instructions to connect your device to your Edge Impulse project.
3. Collect Data:

- Use the Edge Impulse mobile app or the Web interface to collect data from the onboard sensors.
- For a "Hello World" project, you could collect accelerometer data, for instance.

#### 4. Create an Impulse:

- Go to the 'Create impulse' page.
- Add a processing block (e.g., time-series data) and a learning block (e.g., classification).
- Save the impulse, which defines the machine learning pipeline.

#### 5. Design a Neural Network:

- Navigate to the 'NN Classifier' under the 'Learning blocks'.
- Design a simple neural network. Edge Impulse provides a default architecture that works well for most basic tasks.

#### 6. Train the Model:

- Click on the 'Start training' button to train your machine learning model with the collected data.

#### 7. Test the Model:

- Once the model is trained, you can test its performance with new data in the 'Model Testing' tab.

#### 8. Deploy the Model:

- Go to the 'Deployment' tab.
- Select the deployment method that suits your edge device (e.g., Arduino library, WebAssembly, container, etc.).
- Follow the instructions to deploy the model to your device.

#### 9. Run Inference:

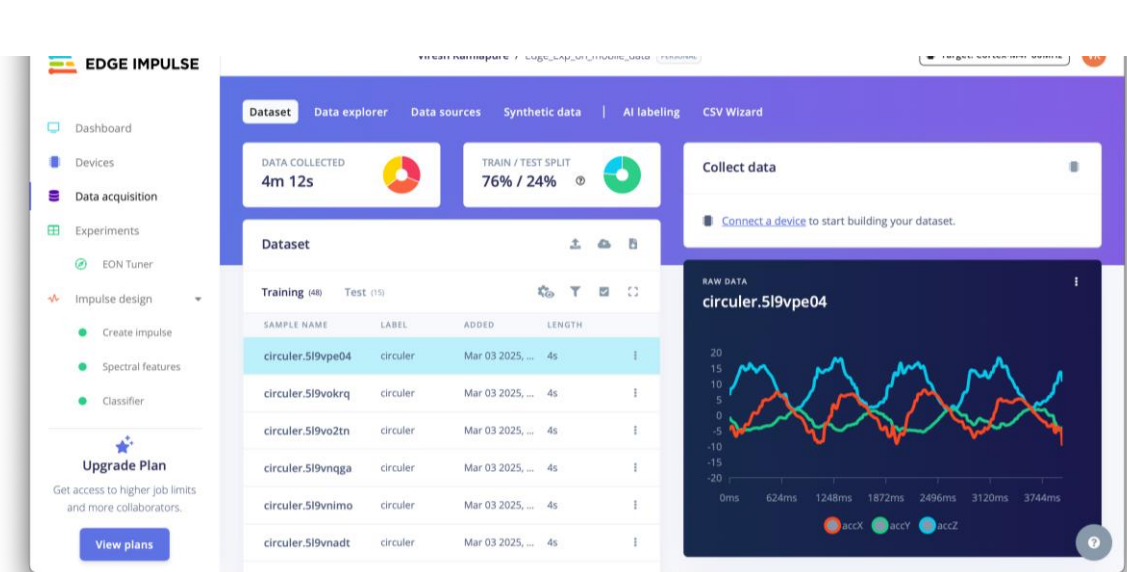
- With the model deployed, run inference on the edge device to see it classifying data in real-time.

#### 10. Monitor:

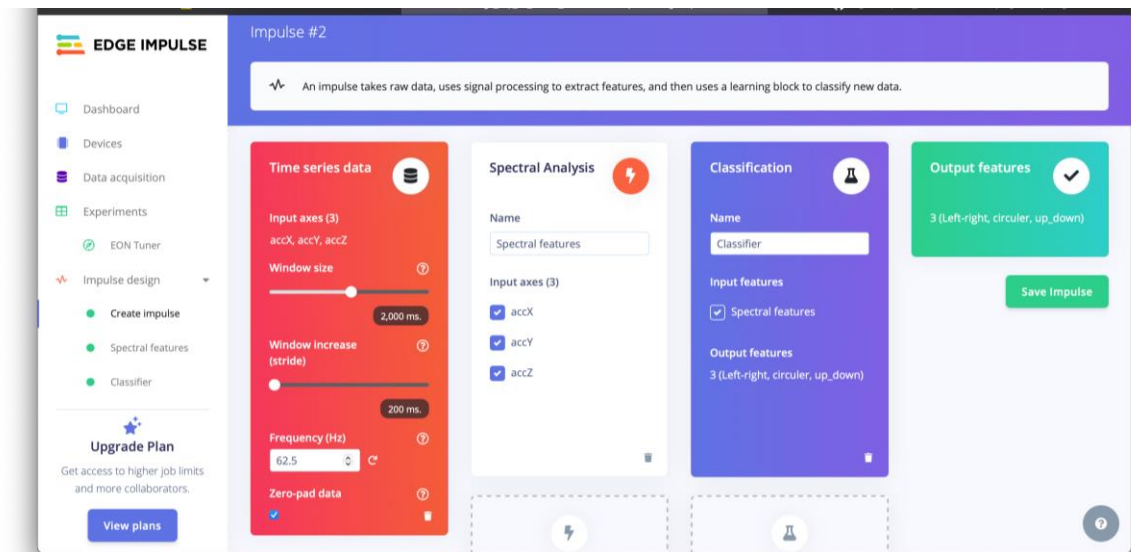
- You can monitor the performance of your device through the Edge Impulse studio.

Screenshots:

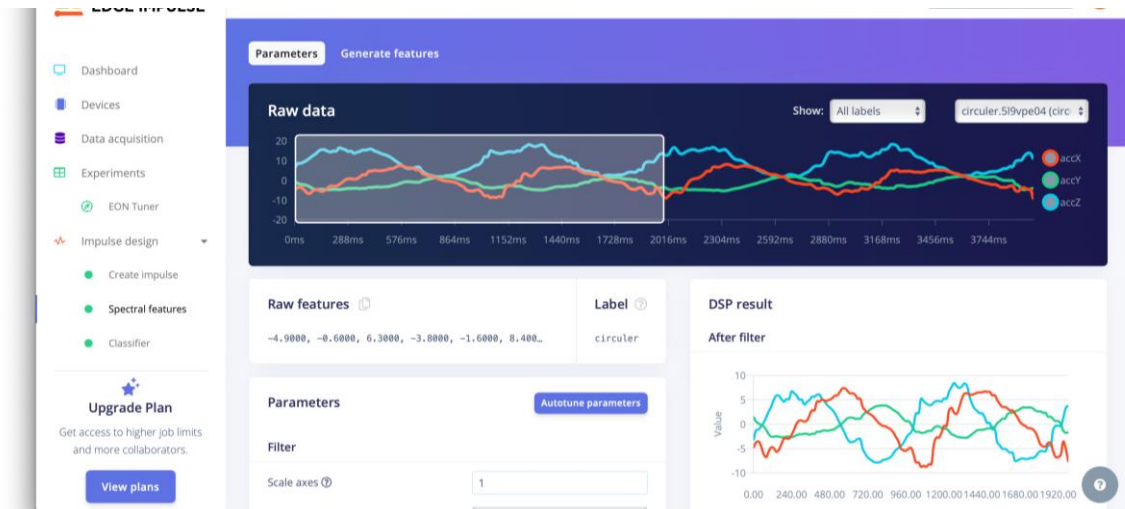
1. Dataset Image



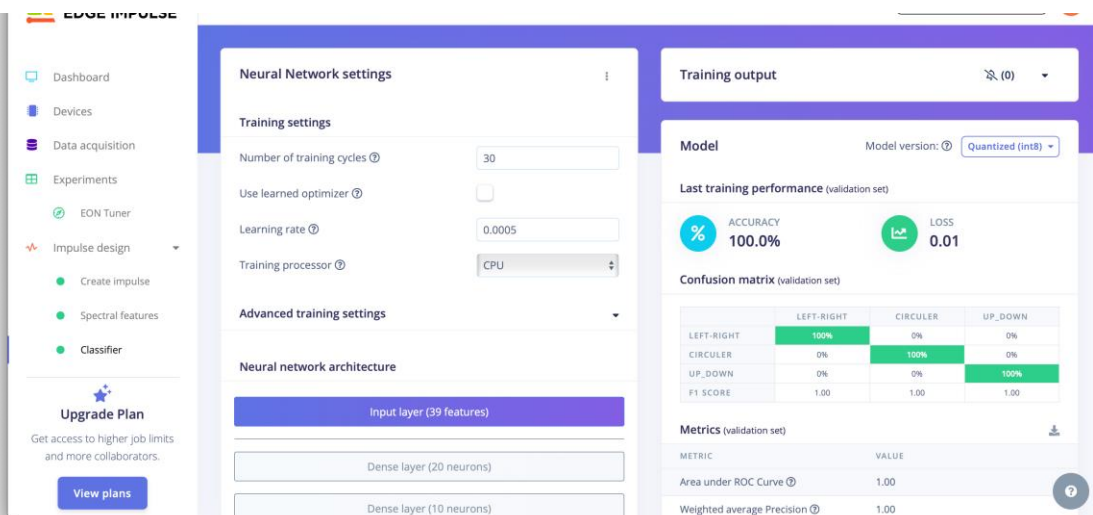
2. Feature extraction - Image



### 3. Accuracy / Loss - Confusion Matrix – image



### 4. Validation Result – Image



**Conclusion:-** Created and deployed ML model with sound based data on edge device



