

Set the 'expected outcome' for each sample to the desired outcome to automatically score the impulse.

SAMPLE NAME	EXPECTED OUTCOME	LENGTH	ACCURACY	RESULT
_unknown...	unknown	1s	100%	1 unknown
_unknown...	unknown	1s	100%	1 unknown
_unknown...	unknown	1s	100%	1 unknown
_unknown...	unknown	1s	100%	1 unknown
_unknown...	unknown	1s	0%	1 uncertain
_unknown...	unknown	1s	100%	1 unknown
_unknown...	unknown	1s	100%	1 unknown

Results

Model version: Unoptimized (float32)

ACCURACY 94.05%

Metrics for Transfer learning (Keyword Spotting)

METRIC	VALUE
Area under ROC Curve	1.00
Weighted average Precision	0.98
Weighted average Recall	0.98
Weighted average F1 score	0.98

Confusion matrix

	ADITYA	NOISE	UNKNOWN	UNCERTAIN
ADITYA	50%	0%	25%	25%
NOISE	0%	97.5%	0%	2.5%
UNKNOWN	0%	0%	95%	5%
F1 SCORE	0.67	0.99	0.96	

Feature explorer

Raw features

Label: unknown

Parameters

Mel-filterbank energy features

- Frame length: 0.02
- Frame stride: 0.01
- Filter number: 40
- FFT length: 256

DSP result

Mel Energies (DSP Output)

FFT Bin Weighting

Aditya Singh / Aditya_S...

...

ADITYA	NOISE	UNKNOWN
299	0.02	0.90
298	0.06	0.57
		0.38

Steps I Took to Complete the Assignment

Part 1: Train and Deploy My Model

1. Created an Edge Impulse Account

- I started by going to Edge Impulse and signing up for an account.
- After that, I created a new project to work on.

2. Followed the Tutorial

- I completed the Edge Impulse tutorial on building a keyword-spotting model titled *Responding to Your Voice*.

3. Deployed the Model to My Smartphone

- Once the model was trained, I followed the tutorial on how to deploy the model to my smartphone using the instructions in *Using Your Mobile Phone*.

4. Brought My Laptop for Deployment

- Deployment was quick (it took less than an hour), but I made sure to have my laptop with me to complete the process without interruptions.

Part 2: Deployed the Model to Arduino Nano 33 BLE Sense

1. Gathered the Required Hardware

- I used the Arduino Nano 33 BLE Sense board, which is part of the TinyML Arduino Learning Kit. The kit includes:
 - 1 Arduino Nano 33 BLE Sense board
 - 1 OV7675 Camera
 - 1 Arduino Tiny Machine Learning Shield
 - 1 USB A to Micro USB Cable
- For this assignment, I only used the Arduino Nano 33 BLE Sense board.

2. Installed the Arduino IDE

- I downloaded and installed the Arduino IDE software from the official Arduino website.

3. Set Up the Arduino IDE

- In the Arduino IDE, I went to **Tools > Boards > Boards Manager**, searched for **nano 33**, and installed the **Arduino Mbed OS Nano Boards** package.
- After installation, I selected the Nano 33 BLE Sense board from **Tools > Board**.

4. Prepared and Deployed My Model

- After training my model in Edge Impulse:
 - I navigated to the **Deployment** page in Edge Impulse.
 - I selected **Arduino Library** and chose **INT8 Quantization**.
 - I clicked **Build** and downloaded the deployment ZIP file.
- In the Arduino IDE:

- I included the ZIP file as a library by going to **Sketch > Include Library > Add .zip Library**.
- To ensure the library was loaded, I exited and re-opened the Arduino IDE.
- I opened the example code from:
File > Examples > YOUR_PROJECT_NAME_inferencing > nano_ble_33_sense > nano_ble_33_sense_microphone_continuous.
- I verified and uploaded the code to the board.

5. Checked Outputs

- Finally, I opened the serial monitor from **Tools > Serial Monitor** to observe the outputs of the model.