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**Subject=Edge computing Lab**

**Experiment No=06**

**Title-**

Title Keyword Spotting Project like “OK, Google,” “Alexa,” on Edge Devices using Microphone Objective: Build a project to detect the keywords using a built-in sensor on Nano BLE Sense / Mobile Phone Tasks:

* Generate the dataset for keyword
* Configure BLE Sense / Mobile for Edge Impulse
* Building and Training a Model Run the project Keyword Spotting like “OK, Google,” “Alexa 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.

Materials Required

* 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:

* Create an Account and New Project:
* Sign up for an Edge Impulse account.
* Create a new project from the dashboard. 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

. • 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.
* 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. Design a Neural Network:
* Navigate to the 'NN Classifier' under the 'Learning blocks'. Lab Manual 20
* Design a simple neural network. Edge Impulse provides a default architecture that works well for most basic tasks.
* Train the Model:
* Click on the 'Start training' button to train your machine learning model with the collected data.
* Test the Model:
* Once the model is trained, you can test its performance with new data in the 'Model Testing' tab.
* 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.
* Run Inference:
* With the model deployed, run inference on the edge device to see it classifying data in realtime.
* Monitor:
* You can monitor the performance of your device through the Edge Impulse studio.

**Python code=**

#include <EdgeImpulse.h>

#include <Arduino\_LSM9DS1.h> // Required if using additional sensors

// Include your trained model header file

#include "edge-impulse-sdk/classifier/ei\_classifier.h"

void setup() {

Serial.begin(115200);

// Initialize the microphone and BLE Sense if (!begin()) {

Serial.println("Failed to initialize microphone."); while (1);

}

// Load the model and prepare for inference ei\_initialize();

}

void loop() {

// Collect audio data and classify it if (collect\_data()) {

ei\_run\_classifier();

}

// Wait and repeat delay(1000);

}

bool collect\_data() {

// Code to collect data from the microphone

return true; // Implement actual audio collection logic

}







