# Phase 3: Development part

## Here are the some basic steps to help for deploying IOT get started:

1.Define objectives:

Clearly outline the goals of your noise pollution monitoring project.What data do you want to collect,and how will it be used?

2.Select IOT devices:

Choose appropriate sensors and IOT devices for noise measurement.Common options include sound level meters or microphones that can capture audio data.

3.Hardware setup:

Set up your IOT devices in the target locations.Ensure they are powered and connected to the internet or a network for data transmission.

4.Data collection:

Configure your devices to continuously collect noise data.Ensure that data is timestamped for accurate analysis.

5.Data transmission:

Choose a method for transmitting data to a central server or cloud platform.This cloud be through Wi-Fi,cellular,or other communication protocols.

6.Data storage and management:

Store and manage the collected data in a secure and accessible manner.Consider using cloud services or a local server.

7.Maintenance:

Regularly maintain and calibrate your IOT devices to ensure accurate data collection.

8.Scaling:

If successful,you can consider expanding your noise pollution monitoring network to cover a larger area.

## SENSOR UNIT:

A noise pollution monitoring sensor unit is a device designed to measure and monitor noise levels in a specific area or envioronment.It typically consists of the following componenets:

1.Microphone:

The sensor unit is equipped with a microphone or sound sensor to capture ambient noise.

2.Signal processing unit:

This unit processes the audio signals from the microphone,analyzing sound levels,frequencies,and patterns .

3.Data logger:

The sensor unit often includes a data logger to record noise data over time.This data can be useful for analysis and reporting.

4.Connectivity:

Many sensor units have connectivity options,such as Wi-Fi,cellular,or Bluetooth,to transmit data to a central database or system.

5.Power source:

These units require a power source,which can be batteries,solar panels,or a wired power connection.

6.Housing and weather protection:

To ensure the sensor’s durability and reliability,it’s often housed in a protective casing with weatherproofing for outdoor use.

7.Software interface:

The data collected by the sensor unit can be accessed and analyzed through software or a web-based interface,allowing users to monitor noise levels in real-time.

## PYTHON SCRIPT :

import pyaudio

import numpy as np

# define constants for audio analysis

CHUNK=1024

FORMAT=pyaudio.palnt16

CHANNELS=1

RATE= 44100 #sample rate (Hz)

THRESHOLD=1000 # adjust this threshold an needed

# Initialize pyaudio

Audio=pyaudio.pyaudio()

# open the audio stream

Stream=audio.open(format=FORMAT,channels=CHANNELS,rate=RATE, input =true, frames-per-buffer=CHUNK)

Print(“Listening….”)

Try:

While true:

Data=stream.read(CHUNK)

Audio-data=np.frombuffer(data,dtype=np.int16)

# Calculate the sound level sound-level=np.max(audio-data)

If sound-level>THRESHOLD:

Print(f”noise levels:{sound-level}”)

Except keyboardinterrupt:pass

#clean up

Print(“stopping….”)

Stream.stop-stream()

Stream.close()

Audio.terminates()