KINGS ENGINEERING COLLEGE

PROJECT TITLE: NOISE POLLUTION MONITORING

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IoT devices used for noise-activated alerts are designed to detect sound or noise events and trigger alerts or actions based on predefined criteria.

IoT devices sensors used for noise-activated alerts are:

1. Sound Sensor (Microphone):

Microphones can be used to capture audio data and detect noise levels. When the noise exceeds a certain threshold, the device triggers an alert.

2. Acoustic Sensors:

Specialized acoustic sensors are designed for noise monitoring and analysis. They can capture sound patterns, including specific frequencies or patterns associated with alarms, sirens, or other critical sounds.

3. Decibel (dB) Sensors:

These sensors measure sound intensity in decibels. When the sound level surpasses a predefined dB level, it triggers an alert.

4. Smart Cameras with Audio Detection:

Some IoT cameras are equipped with built-in microphones and audio analysis capabilities. They can trigger alerts based on both visual and audio cues.

5. Environmental Monitoring Stations:

These stations may include sound sensors along with other environmental sensors (e.g., temperature, humidity) to monitor noise pollution in a specific area.

6. Smart Home Security Systems:

Many home security systems have integrated sound or audio detection features. They can send alerts to homeowners or security services when unusual noises are detected.

7. Industrial Noise Monitoring Devices:

In industrial settings, IoT devices can monitor noise levels to ensure compliance with safety regulations. They can trigger alerts if noise levels become hazardous.

8. Traffic and Transportation Noise Monitors:

These devices are used to monitor and analyze traffic noise. They can be helpful in managing noise pollution in urban areas.

9. Healthcare Monitoring Devices:

In healthcare settings, IoT devices with audio sensors can monitor patient rooms to detect unusual noises or distress calls.

PYTHON SCRIPT FOR SOUND SENSOR (MICROPHONE)

```
import sound device as sd

# Parameters for audio recording

SAMPLE_RATE = 44100  # Sample rate in Hz

CHANNELS = 1  # Mono audio

THRESHOLD = 0.02  # Adjust this threshold as needed
```

```
ALERT_MESSAGE = "Noise detected!"
def audio_callback(indata, frames, time, status):
    if status:
        print(f"Error in audio input: {status}")
        return
    rms = max(indata)  # Calculate the RMS value

    if rms > THRESHOLD:
        print(ALERT_MESSAGE)
        # Add code here to trigger alerts, e.g., sending
       notifications
```

PYTHON SCRIPT FOR ACOUSTIC SENSORS:

```
import RPi.GPIO as GPIO
import time
# Set the GPIO mode to BCM
GPIO.setmode(GPIO.BCM)

# Define the GPIO pin connected to the acoustic sensor
sensor_pin = 18

# Set the pin as an input
GPIO.setup(sensor_pin, GPIO.IN)

# Noise threshold (adjust as needed)
THRESHOLD = 1
```

PYTHON SCRIPT FOR DECIBELS (dB) SENSORS:

```
import RPi.GPIO as GPIO
import time
# Set the GPIO mode to BCM
GPIO.setmode(GPIO.BCM)

# Define the GPIO pin connected to the dB sensor
sensor_pin = 18

# Set the pin as an input
GPIO.setup(sensor_pin, GPIO.IN)

# Noise threshold in dB (adjust as needed)
THRESHOLD_DB = 70  # Adjust this threshold based on your sensor's specifications
```