

Phase 1: Problem Definition and Design Thinking

PROJECT TITLE: NOISE POLLUTION MONITORING

Project Definition:

The project involves deploying IoT sensors to measure noise pollution in public areas and providing real-time noise level data accessible to the public through a platform or mobile app. The primary objective is to raise awareness about noise pollution and enable informed decision-making. This project includes defining objectives, designing the IoT sensor system, developing the noise pollution information platform, and integrating them using IoT technology and Python.

Design Thinking:

1. Project Objectives The aim of this project is to deliver a development of an IoT based noise monitoring system comprises of a sound sensor

- ❖ **Real Time Noise Pollution Monitoring:** Noise pollution, also known as environmental noise or sound pollution, is the propagation of noise with harmful impact on the activity of human or animal life.

Objectives: To regulate and control noise producing and generating sources. Maintaining the ambient air quality standards in respect of noise.

- ❖ **Public awareness:**

- Turn off Appliances at Home and offices.
- Shut the Door when using noisy Machines.
- Use Earplugs.
- Lower the volume.
- Stay away from Noisy area.
- Follow the Limits of Noise level.
- Control Noise level near sensitive areas

- ❖ **How does noise affect quality of life?**

Noise pollution adversely affects the lives of millions of people. Studies have shown that there are direct links between noise and health. Problems related to noise include stress related illnesses, high blood pressure, speech interference, hearing loss, sleep disruption, and lost productivity.

2. IoT Sensor Design

Sensor deployment is performed to achieve objectives like increasing coverage, strengthening connectivity, improving robustness, or increasing the lifetime of a given WSN.

❖ IOT noise sensors in various public areas to measure noise levels.

Many industrial environments are noisy, and people who are in these environments need to be protected from the noise. This can be done through personal protective equipment and measures such as containing the sound. It is also important that noise levels are always checked in such environments. However, spot monitoring does not make sense. Only continuous monitoring of noise levels ensures that the measures are demonstrably working.

3. Noise pollution information platform

- Few years ago, due to the drastic infrastructural changes and population growth in the city of Skopje, the noise pollution in the city is evidently increased.
- Prompted to create an environmentally sustainable solution in order to monitor the noise problem, the software company Netcetera created an Internet of Things (IoT) monitoring platform called Pulse.eco, inspired by the concept of “Smart city”.
- This platform, gathers environmental data in 18 measurement points through a sensor network spread across the city, such as air pollution, humidity, temperature and noise level and presents it on the skopje.pulse.eco website.

4. Integration approach:

The method of noise level monitoring involves using specialized equipment, such as sound level meters or noise dosimeters, to measure and quantify the intensity of sound in a given environment.

❖ How iot sensors will send data to noise pollution platform?

Sound sensor or mic sensor provides digital output and it detects sound from atmosphere. A WiFi module is also connected to Arduino and it is used to transfer data from the sensors to cloud server.