NOISE POLLUTION MONITORING

Overview:

Project title: Noise pollution monitoring

Project phase: Phase-2 data analysis, innovation

Objective: The project aims to develop a system that monitors noise pollution in real-time and provides alerts when noise levels exceed predefined thresholds.

Components:

<u>Noise Sensors:</u> Use sound sensors (e.g., microphones) to detect ambient noise levels.

<u>Microcontroller:</u> An IOT-compatible microcontroller (e.g., Arduino, Raspberry Pi) to process sensor data.

<u>Data Transmission:</u> Employ Wi-Fi, Bluetooth, or other communication protocols to send data to a central server or cloud platform.

<u>Cloud Platform:</u> Store and analyze the collected noise data on a cloud server.

<u>Mobile/Web Application:</u> Develop an interface for users to access real-time noise levels and set threshold alerts.

<u>Alert System:</u> Trigger alerts (e.g., notifications or emails) when noise levels surpass predefined limits.
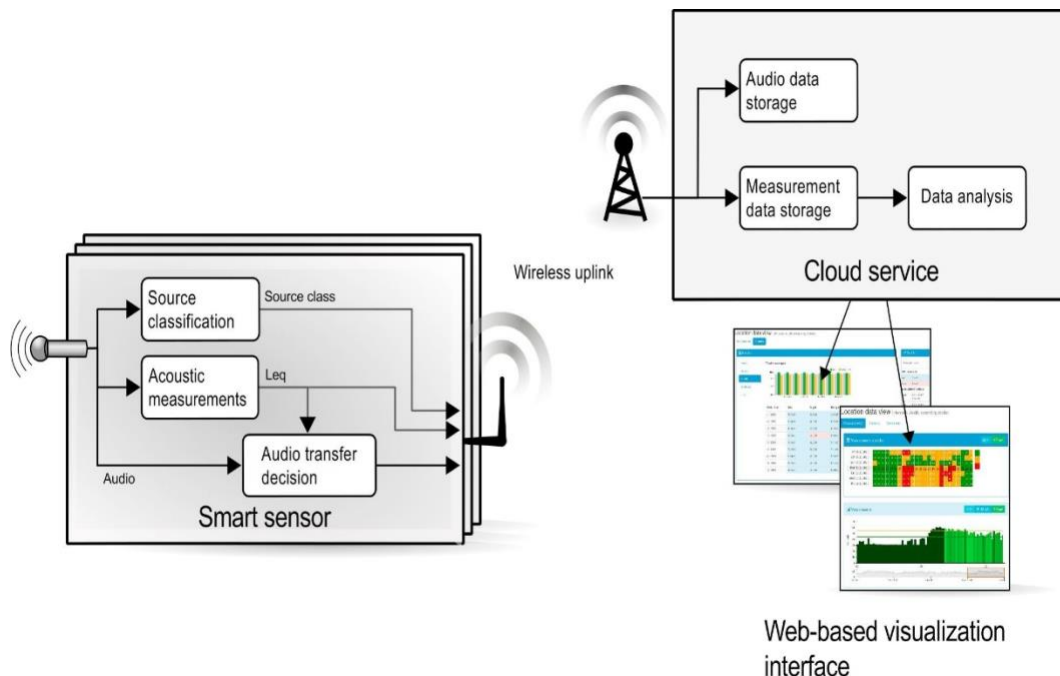
DATA ANALYSIS

Looking at the current data, we estimate that environmental noise contributes to 48,000 new cases of ischaemic heart disease a year as well as 12,000 premature deaths. In addition, we estimate that 22 million people suffer chronic high annoyance and 6.5 million people suffer chronic high sleep disturbance.

Data analysis graph for noise pollution in public area upto 2007
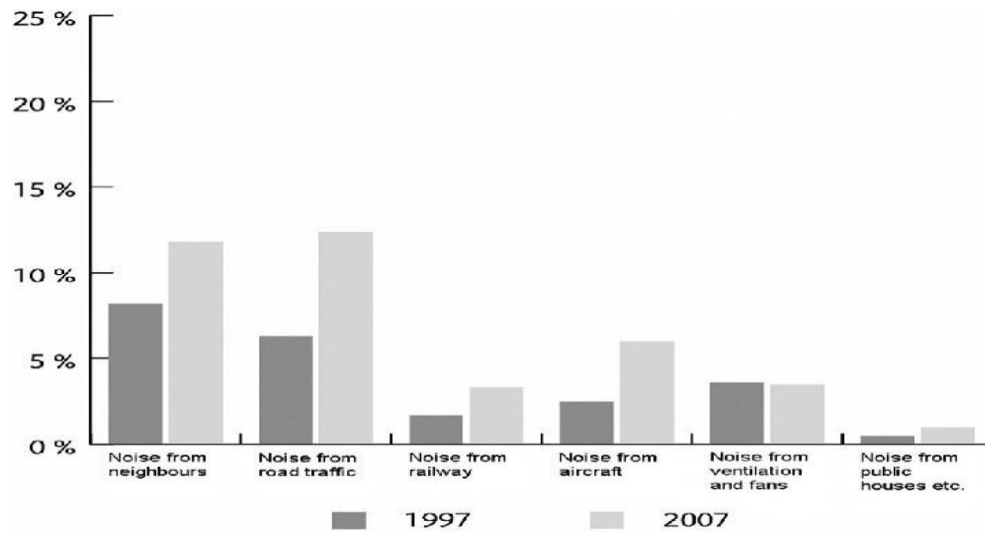
Noise pollution level in metro cities
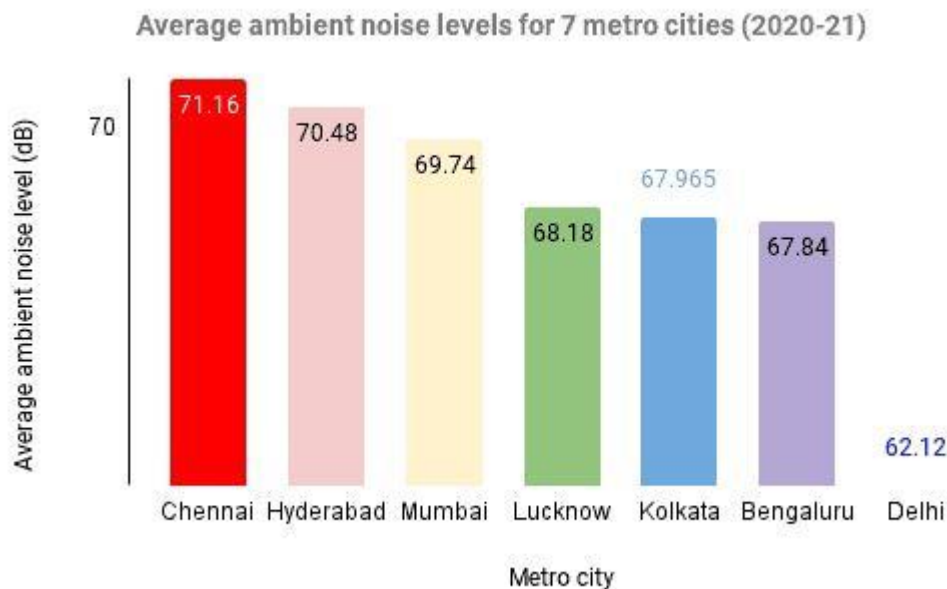
High Noise Level areas:

➢ "High noise level" means any noise level measured on the A-weighted scale is 85 dB or above.
➢ Construction sites. Building and car park construction and road and pavement resurfacing works are very noisy.
➢ Exposure to high levels of noise can cause permanent hearing loss. Neither surgery nor a hearing aid can help correct this type of hearing loss.

<u>Potential sources:</u> Noise pollution can come from outdoor sources, such as road traffic, jet planes, garbage trucks, construction equipment, manufacturing process- example: lawn mowers, leaf blowers, and indoor sources, including: boom boxes, heating and air conditioning units, and metal chairs scraping on floors.

Innovation:

IOT decibel meter: to measure sound in a particular place and record the value in a graph using IOT.

Sound Level Meter (SLM):

A sound level meter (SLM) can measure sound at different frequencies

DOCUMENTATION

IOT decibel meter

➢ A device like this will be useful in places like hospitals and schools to track and monitor the sound levels and take action accordingly
➢ The noise sensors continuously monitor sound levels.

Sound Level Meter

➢ Measures sound at different frequencies
➢ Record sound clips to determine the sound of noise pollution

Functionality

➢ Data is transmitted to the cloud for storage and analysis.
➢ Users can access noise data via a mobile or web application.
➢ The system sends alerts if noise exceeds acceptable limits, helping residents or authorities take action.

Use Cases:

➢ Residents can monitor noise in their neighbourhoods.
➢ Local authorities can use the data for urban planning and noise control measures.
➢ Research institutions can collect long-term noise data for studies on urban noise pollution.

Benefits:

➢ Raises awareness about noise pollution.
➢ Provides valuable data for research and decision-making.
➢ Enables timely response to excessive noise.

Challenges:

- ➢ Accurate noise measurement and calibration of sensors.
- ➢ Data security and privacy concerns.
- ➢ Scalability for large-scale deployment.

Future Enhancements:

- ➢ Integration with machine learning algorithms for advanced noise pattern recognition.
- ➢ Geographic mapping of noise levels for better visualization.
- ➢ Mobile app features like historical noise data and trends.
- ➢ This project can make a significant contribution to addressing noise pollution issues in urban areas and provide a practical application of IOT technology for environmental monitoring.

IOT Noise Pollution Alerts:

Create a system that sends notifications to residents or authorities when noise levels exceed predefined thresholds. Users can customize the thresholds based on their preferences

Conclusion:

Consider incorporating data analytics to identify noise pollution patterns, high- noise areas, and potential sources,etc.. noise pollution can be easily measured and reduced.