International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

AIR QUALITY MONITERING & ALERT SYSTEM

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Abstract - This document provides an insight on air quality monitoring and alert system ,Air pollution poses a significant threat to global health, impacting respiratory and cardiovascular systems. This dissertation proposes an air quality monitoring and alert system to safeguard public health. The system leverages a network of sensors to collect real-time data on key pollutants like particulate matter, ozone, and carbon monoxide. This data is transmitted wirelessly to a blynk cloud for processing and analysis using advanced c++ programming algorithms. The system features a user-friendly interface accessible through web and mobile applications. It provides real-time air quality index (AQI) visualizations, and customizable alerts based on user-defined thresholds. Alerts can be disseminated through buzzer allowing individuals to take preventive measures during periods of poor air quality.

1.INTRODUCTION

Air is the invisible mixture of gases that surrounds Earth. Air contains important substances, such as oxygen and nitrogen, that most species need to survive. Standard Dry Air is made up of nitrogen, oxygen, argon, carbon dioxide, neon, helium, krypton, hydrogen, and xenon. It does not include water vapour because the amount of vapour changes based on humidity and temperature, Standard Dry Air is not accurate everywhere at once. Nitrogen and oxygen make up about 99 percent of Earth's air. People and other animals need oxygen to live. Pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere. Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution. Pollutants of major public health concern include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulfur dioxide. Outdoor and indoor air pollution cause respiratory and other diseases.

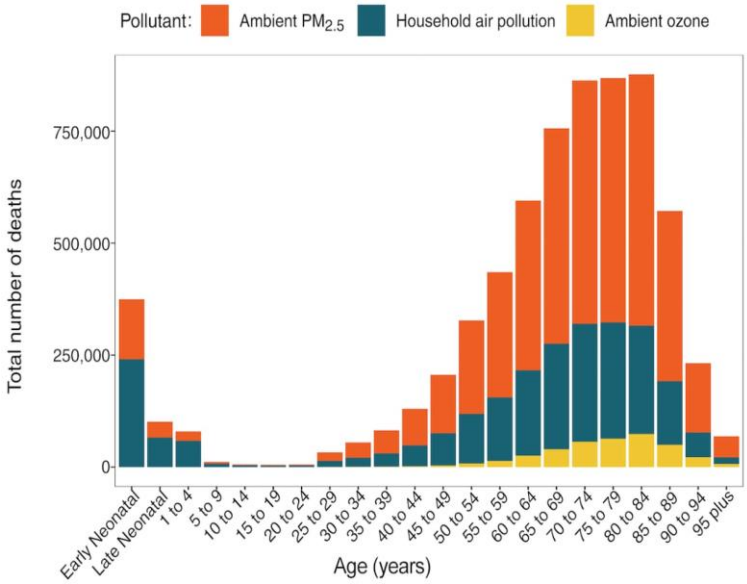

Fig 1: Graph of death rate due to pollution

2. PROBLEM STATEMENT

Real time data collection & alert system: The existing model of air quality monitoring systems faces significant challenges, primarily centered around the lack of real-time data accessibility and immediate alert

mechanisms. Traditional methods often exhibit delays in recognizing and responding to fluctuating air quality conditions, limiting their effectiveness in safeguarding human health and the environment. This project seeks to address this critical problem by introducing a sophisticated Air Quality Monitoring and Alert System that transcends the constraints of conventional monitoring approaches. By leveraging advanced sensor technologies and cloud connectivity, the system aims to provide a dynamic solution to the pressing issue of timely and accurate air quality assessment.

Traditional air quality monitoring systems: These systems typically relay on periodic sampling and offline analysis, resulting in delays in recognizing and responding to dynamic changes in air quality. The lack of continuous, up-to-the-minute monitoring hampers the ability to address sudden fluctuations or hazardous conditions promptly. Moreover, the absence of an efficient alert mechanism compromises the system's ability to provide timely warnings, impacting its overall effectiveness in safeguarding public health and the environment.

3. OBJECTIVES OF THE PROJECT:

The main objective of the proposed system is,

- To provide real-time air quality data to individuals and communities.
- To issue timely alerts when air quality levels exceed established thresholds.

4 Overview of the project

The proposed system employs Internet of Things (IoT) nothing but the interconnected network of physical devices, vehicles, appliances, and other objects embedded with sensors, software, and network connectivity. These devices collect and exchange data, enabling them to communicate and make intelligent decisions. IoT has applications across various sectors, including smart homes, healthcare, agriculture, and industrial automation.

Connect sensors like CO, PM sensors, and methane to the Arduino Uno, creating a sensor array. Then establish a reliable serial connection between Arduino Uno and ESP8266 for seamless data transmission. Later configure the ESP8266 to connect to the Blynk cloud, facilitating remote data access, The sensors senses the content in the air ,when the value rise above the threshold value the alerts is given to the people or individual through a buzzer and also air quality is monitored through blynk cloud app.

Particulate matter sensor: when the particulate matter content is more than 2.5 micron, it provides output in the form of an analog voltage proportional to the measured dust density, with a sensitivity of 0.5V/0.1mg/m3.

Ozone sensor: It detects the ozone gas when its concentration range is around 10PPB-2PPM Ozone.

Carbon monoxide: The sensor measures concentrations of CO in the air when it is from 10 to 10,000 ppm.

Methane sensor: sensor measures the methane content in the air, when methane present in air around 300 to 10000ppm.

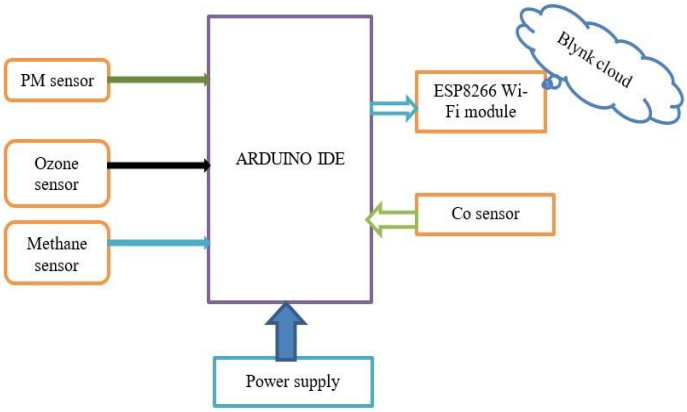

Fig 2.Block diagram

5 CONCLUSION

Air quality monitoring and alert system that utilizes a sensor to provide real-time air quality data . The system will collect data on various air pollutants, including particulate matter (PM), methane gas, ozone (O3), and carbon monoxide (CO). This data will be processed and analyzed to provide real-time air quality information to the public. The system will alerts peoples when air quality levels exceed predetermined thresholds, informing individuals about air quality and allowing them to take necessary action.

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