Project Title : AQM (Air Quality Monitoring) – IOT

Phase 3 : Development Part 1

AI & ADS:

Ai can gather data from sensors and satellites and assist scientists in blending climate models. These ai-based sensors detect the levels of pollutants in the air, such as particulate matter, volatile organic compounds (vocs), and gases. By providing real-time information on environmental conditions and predicting natural disasters, ai can help prevent environmental damage and protect human lives. By optimizing energy consumption and reducing waste, ai can help reduce greenhouse gas emissions and conserve natural resources.

iot devices, such as air quality sensors, can monitor pollutant levels in various environments, including cities, industries, and homes. This data can be analysed to identify pollution sources, implement targeted mitigation strategies, and track the effectiveness of pollution control measures.

DAC:

In this paper, an IoT-based indoor air quality monitoring platform, consisting of an air quality-sensing device called “Smart-Air” and a web server, is demonstrated. This platform relies on an IoT and a cloud computing technology to monitor indoor air quality in anywhere and anytime. Smart-Air has been developed based on the IoT technology to efficiently monitor the air quality and transmit the data to a web server via LTE in real time. The device is composed of a microcontroller, pollutant detection sensors, and LTE modem. In the research, the device was designed to measure a concentration of aerosol, VOC, CO, CO 2 , and temperature-humidity to monitor the air quality. Then, the device was successfully tested for reliability by following the prescribed procedure from the Ministry of Environment, Korea. Also, cloud computing has been integrated into a web server for analysing the data from the device to classify and visualize indoor air quality according to the standards from the Ministry. An application was developed to help in monitoring the air quality. Thus, approved personnel can monitor the air quality at any time and from anywhere, via either the web server or the application. The web server stores all data in the cloud to provide resources for further analysis of indoor air quality. In addition, the platform has been successfully implemented in Hanyang University of Korea to demonstrate its feasibility.

IOT:

An IoT-based air and sound pollution monitoring system is implemented using a network of sensors, connectivity technologies, and data analytics platforms. Air quality sensors are deployed in strategic locations to measure pollutant levels such as particulate matter, gases, and volatile organic compounds (VOCs). IoT (Internet of Things) has become an integral part of our lives and it has already made an impact in various sectors, including the environment. Air pollution is a severe problem that has been affecting our planet for years. Therefore, there is a need for a reliable and efficient air pollution monitoring system to protect ourselves from its hazardous effects. An IoT-based air pollution monitoring system is an ideal solution that can provide real-time data and insights about the air quality in a particular area.

An IoT based air pollution monitoring system consists of several hardware and software components that work together to collect and process data. The hardware components include sensors, microcontrollers, and communication modules. The software components consist of a cloud platform, a mobile application, and a web-based dashboard.

CAD:

Air quality is getting worse worldwide, especially in cities with high population density and many industrial parks. Raising community awareness and applying science and technology are effective ways to mitigate the negative impacts of industrialization and pollution on the natural environment as well as public health. This work presents the design and deployment of an IoT-based air quality monitoring system, named the Environmental Monitoring System (EnMoS). LoRa (Long-Range) wireless communication technology and innovation sensors being used aim to facilitate the development of data communication network over a large area, improving sensing reliability, extending battery life as well as reducing total system costs. The air quality factors such as particulate matter (PM2.5 and PM10), carbon dioxide (CO 2 ), air temperature and humidity, after being read from the sensors were uploaded to a real-time database server for Air Quality Index (AQI) calculation. In addition, for indicating conveniently obtained AQI values a web page is also developed to provide an interactive map along with corresponding charts. A case study on an actual LoRa network consisting of three sensing nodes and a gateway were conducted for validating the feasibility of the system.