IOT ENABLED ENVIRONMENTAL AIR POLLUTION MONITORING AND REROUTING SYSTEM

ABSTRACT:

Air pollution is a major threat faced by all cities in the world. However, in metropolitan cities, especially in developing nations, the infrastructure for monitoring air quality is insufficient. The increasingly degrading quality of air in several regions of the biosphere can be a reliable impact of human difficulties of increasing globalization and urbanization. Air pollution levels in many cities exceed legal and World Health Organization (WHO) limits for particulate matter and gaseous pollutants which can be found in concentrations that are hazardous to health. Regular acquaintance to high pollution intensities results in increase of humans affected from respiratory disorders such as asthma, chronic obstructive lung disease and increased mortality. In most of the cities, there is no chance for peoples to apprehend the levels of pollution they are undergoing in their day-to-day lives which is necessary to reduce their risks from poor air quality conditions. The quality of air can be measured by using a parameter named Air quality index. The Key pollutants to calculate Air quality index are particulate matter (PM2.5 and PM10), Ozone (O3), Nitrogen Dioxide (NO2), Sulphur Dioxide (SO2) and Carbon Monoxide (CO). The government cannot afford to install air pollution monitoring stations because of the high cost associated with it. Moreover, present-day monitoring solutions are inadequate in monitoring several locations spread across the city. To effectively solve the problem, a solution is needed that provides an accurate estimate of pollution in real time, as well as be economically viable for governments and local bodies to install it. This work deliberates the implementation of cloud based IoT system for air quality monitoring in which the sensors are used to calculate CO, PM2.5 and PM10, O3, SO2 and NOx pollution level with environmental condition like temperature and humidity. The obtained information can be updated in cloud platform using Lora nodes and Lora Gateway. The web-based application developed has a Google map API where the pollution status can be frequently updated. With the collected time series samples, the prediction analysis was done for PM with neural network Multi-Layer perceptron and support vector machine regression (SVMR) learning algorithm. This can helps a person to travel to any other places by automatically rerouting conditions in a pollution free environment.

BLOCK DIAGRAM:

Get Status, Distance, Location

Good — Status = Good

Moderate — Moderate optimal distance with C=2

Loc (1) is the best route

Poor — Poor Optimal Distance with C=1

Very Poor — Very Poor Optimal Distance with C=0.5

END