VEHICLE POLLUTION MONITORING SYSTEM

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Abstract

Technological advancement has continued to affect the environment in a negative way. Environmental pollution has the ability to cause a drastic change in the environment. Global warming destroys and causes severe effects on all the living organisms mainly due to pollution or effluents emitted from automobile leads to greenhouse effect which in turn causes global warming. Travel green app is an android app which smartly measures the emissions due to different transportation modes while travelling from one place to another. The app will help to understand the amount of emissions that can be saved by using different methods of transport such as driving a car, cycling or taking a bus. Travel green app makes emissions personal by tracking each trip you take, and what method of transport is used (car, bicycle, public transportation, train, or plane).It calculate the amount of emissions generated (or avoided) for each trip. Users can simply start the app before each trip, by login through account. The app will track the speed and distance, and then calculate emission value of that journey. The app will also provide information on air quality index at various locations during your travel .Air quality index will include information regarding status like whether we are entering from low to high polluted area (vice-versa) and health related impact and precautions. It will also account emission in weeks and months for assessment of rewards

Keywords: effluents, toxic, pulmonary , emission , greenhouse

1. Introduction

Any activity involving burning things/fuels and mixing substances that cause chemical reactions may release toxic gases in the process and some activities like construction, mining, transportation, etc. produce large amounts of dust which has the potential to cause air pollution. There are about a half billion cars on the road today. Virtually all of them are powered by gasoline and diesel engines that burn petroleum to release energy. Petroleum is made up of hydrocarbons (large molecules built from hydrogen and carbon) and, in theory, burning them fully with enough oxygen produces nothing worse than carbon dioxide and water. In practice, fuels are not pure hydrocarbons and engines do not burn them cleanly. As a result, exhausts from engines contain all kinds of pollution, notably particulates (soot of various sizes), carbon monoxide (CO), a poisonous gas), nitrogen oxides (NOx), volatile organic compounds (VOCs), and Lead (Pb) and indirectly produced ozone. Mixing up these noxious gases together and energizing it with sunlight produces som 23 data on air quality have prompted WHO to call for greater awareness of health risks caused by air pollution, implementation of effective air pollution mitigation policies and close monitoring of the situation in cities worldwide.

In April 2014, WHO issued new information after estimating that outdoor air pollution was responsible for the deaths of about 3.7 million people under the age of 60 in 2012 (TNI 2014).

Air Quality Index United States Environmental Protection Agency designated a standardized air pollution level indicator known as the Air Quality Index (AQI), which mainly consists of six common air pollutants called as criteria air pollutants that can injure health, harm the

environment and cause property damage are carbon monoxide (CO), Lead (Pb), nitrogen dioxide (NO2), Ozone (O3), particulate matter (PM), and sulfur dioxide (SO2) (USEPA-APM). In India, the Central Pollution Control Board (CPCB) has specified CO, NO2, SO2 and PM as criteria pollutants for monitoring through its National Air Quality Monitoring Programme (NAMP).

Vehicles' Contribution of Air Pollution in Urban Centers Vehicles constitute a major source of pollutants in metropolitan cities. Air pollutants such as CO, NOx, SPM and HC are emitted from motor vehicles into the atmosphere in significant quantities in addition to CO2 emission, causing serious environmental and health problems. Hence we use several sensors in order to detect the harmful gases and shot the users, how much amount of toxicity is produce by him to the atmosphere and also the health problems.

2. Related Work

Micro-climate monitoring usually requires deploying a large number of measurement tools. By adopting vehicular wireless sensor networks (VSNs), we can use fewer tools to achieve fine-grained monitoring. This work proposes a VSN architecture to realize micro-climate monitoring based on GSM short messages and availability of GPS receivers on vehicles. We demonstrate our prototype of a ZigBee-based car network to monitor the concentration of carbon dioxide (CO2) gas in areas of interest. The reported data are sent to a server, which is integrated with Google Maps as our user interface. Since mobility of these vehicles is not controllable and sending short messages incurs charges, we also design an on-demand approach to adjust vehicles' reporting rates to balance between the micro-climate accuracy and the communication cost.

3. Implementation

Our app will help to understand the amount of emissions that can be saved by using different methods of transport such as driving a car, cycling or taking a bus. It aims to make the requisite data much easier to access by serving as a personal transport tracker. It is intended to encourage, motivate, and reward people to make greener travel choices. Travel green app makes emissions personal by tracking each trip you take, and what method of transport is used (car, bicycle, public transportation, train, or plane).It calculate the amount of emissions generated (or avoided) for each trip. users can simply start the app before each trip, by login through account. The app will track the speed and distance, and then calculate emission value of that journey. The app will also provide information on air quality index at various locations during your travel. Air quality index will include information regarding status like whether we are entering from low to high polluted area (vice-versa) and health related impact and precautions. It will also account emission in weeks and months for assessment of rewards.

3.1 Material used

3.1.1 Arduino Microcontroller

ATmega-328 is basically an Advanced Virtual RISC (AVR) micro-controller.

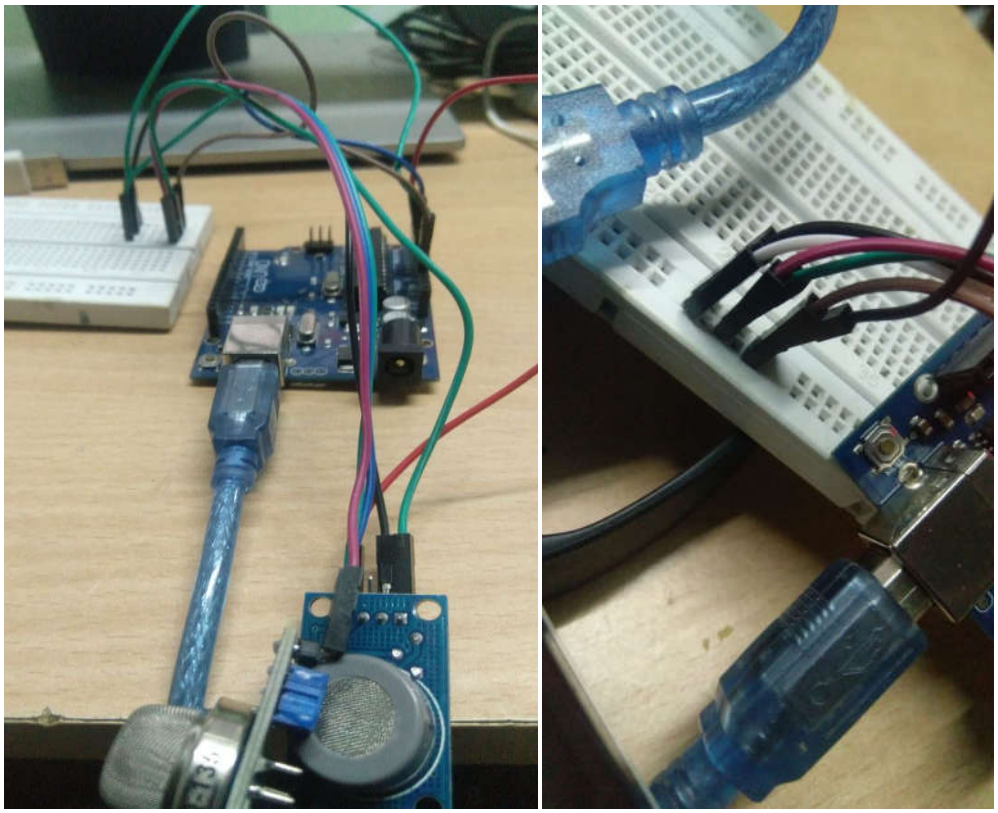
3.1.2 Sensors

MQ135 gas sensor for ammonia, MQ-7 gas sensor for carbon monoxide and MQ2 to detect H2, LPG, CH4, CO.

3.1.3 Bluetooth

HC-05 Bluetooth Module

3.1.4 Circuit Connection



3.2. Experimental Work

Using the sensors we have detected the following values from several bikes.

Table 1: Details of pollution from bikes

Bike	MQ135	MQ7	MQ2
TN81X7007	128	729	657
TN45AX4557	127	520	705
TN81AZ5173	120	661	672
TN45AB2121	134	589	650
TN45AX7549	140	574	724
TN45AN8775	133	550	662

4. Result and Discussion

When the arduino is connected to the android via Bluetooth, the values will be sent only when the bike is started. The values will be recorded from the android and sent to the cloud such that after 1second interval the values are sent to the mobile. There present an threshold value such that at each stage the bike will be monitored whether it us polluting more or not. These values will be taken into account in the cloud storage so that, if a bike pollutes more than the threshold value it will be marked as polluting vehicle in the respective persons aadhar number. This indeed helps the police officers to take action against the vehicle number.

4.1 Screenshot

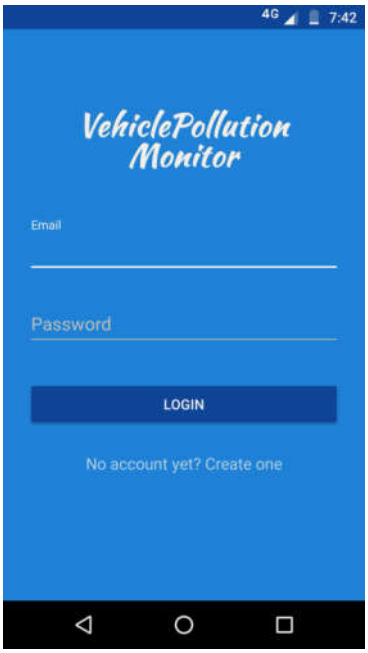


Figure 1. Login

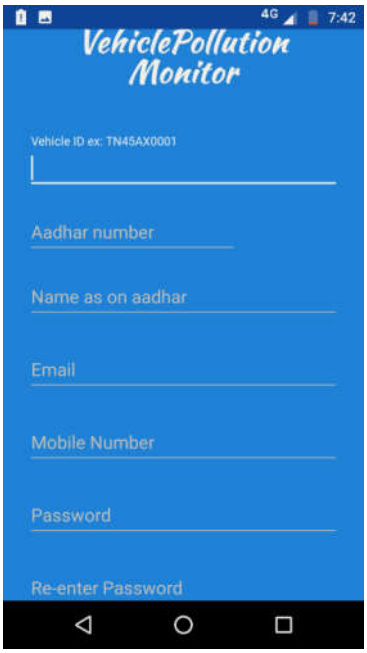


Figure 2. Registration

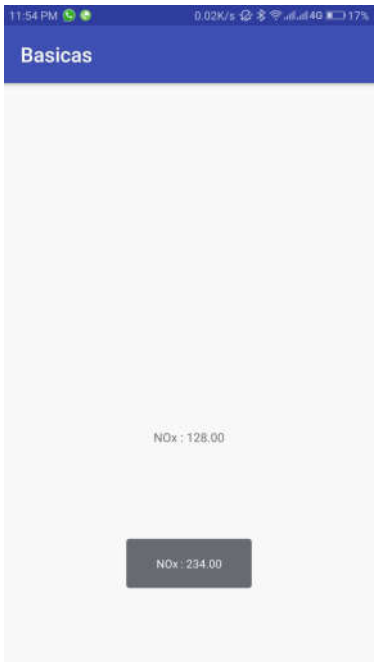


Figure 3. Harmful Gas(NOX)

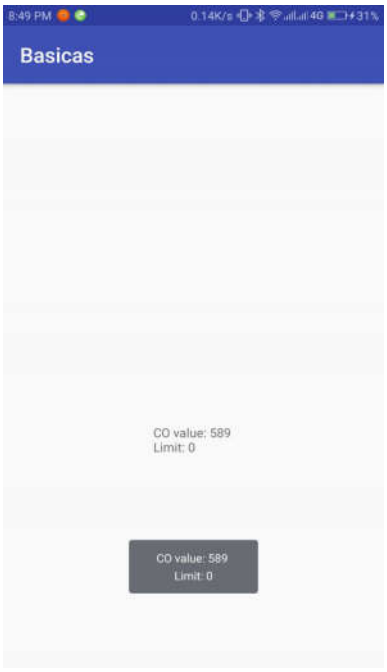


Figure 4. Carbon Monoxide

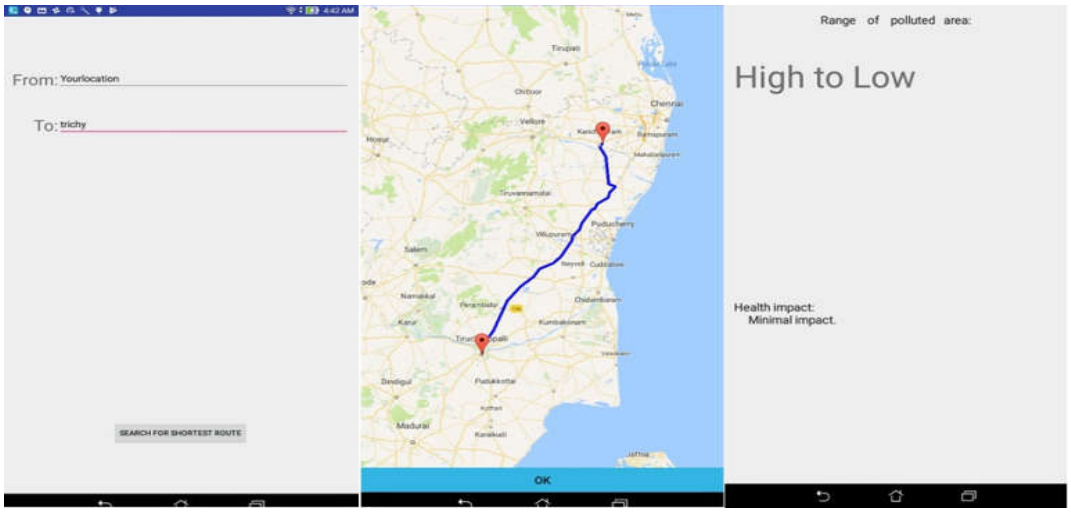


Figure 5 Range of Pollution

5. Conclusions

This paper presented the design and development of IoT based vehicular pollution monitoring system for green revolution. The hardware architecture and software implementation are discussed in length. The performance of the system is also verified using IoT technology. The designed smart intelligent environmental system monitors the pollutants produced by the vehicles and also warn the vehicle owners to control the pollution. The system also sends the pollutant level data to the server for future analysis. The air pollution agencies can able to analyze the data and also detect the vehicle registration numbers that causes more pollution in the atmosphere. The developed system is a low cost, simple to operate and is easily inserted in any locations. The developed system provides better accuracy with low cost than the existing system.

6. References

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