

Air Pollution Monitoring And Control System For Urban Areas

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ABSTRACT: Fresh air is necessary for all human being. For that various technologies have been used and some of these technologies are really useful in order to provide a real time air quality data but these technologies fail to locate source of pollution. The main source of air pollution is vehicles. This paper is on portable system that can be placed on individual vehicle so that we can monitor that particular vehicle and control the pollution.

KEYWORDS: Air quality, pollution, real time monitoring.

I. INTRODUCTION

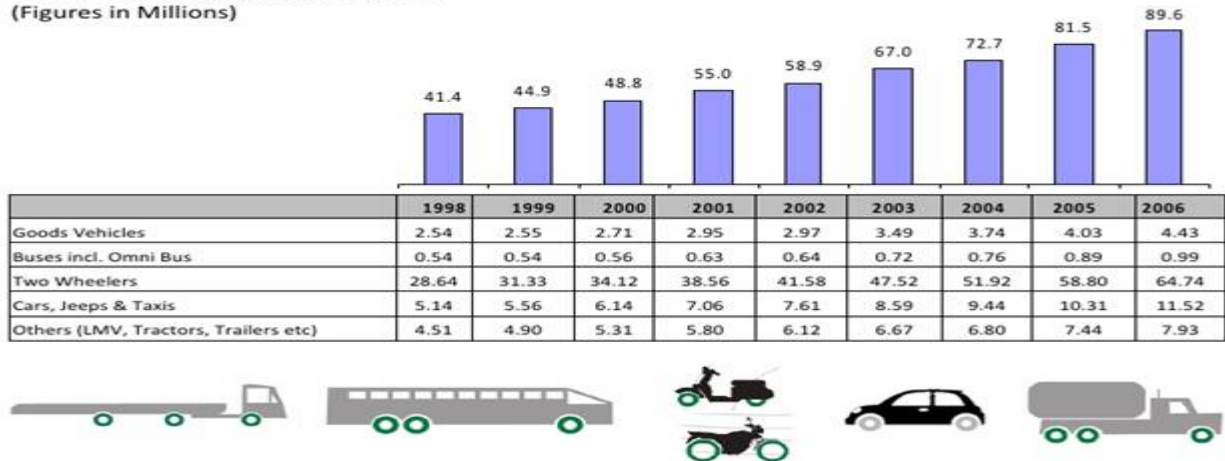
The prospect of making this system is to develop a hardware that can act as transportable system enforced on vehicle to stay on trailing concerning pollution parameters from that vehicle. Environmental observation may be a systematic approach for observant and learning the condition of surroundings. For any individual need inhaling a clean air however because of increasing the transit, contemporary air gets contaminate. Transport system makes the impact on environment on which we tend to live. Increase in vehicle number increases the traffic and exponentially increases the amount of emission caused by the vehicles. Therefore, to trace the result of this pollution on atmosphere and health of individual it's necessary to trace the amount of pollution in urban and sub urban areas where the amount of pollution is more. Several health connected problems square measure are arising from pollution. Major root of pollution is road traffic emission that emits the ninety-seven percent of CO. Therefore, air quality tracking is required so as to produce helpful info concerning the pollution and may take applicable measures to mitigate the negative impact. The aim of tracking the air quality isn't solely to gather the information however additionally give the data that is needed by the person, planners, policy manufacturers to form a choice on rising and managing the atmosphere. The mission of air quality tracking network is to record the concentration of Pollution and alternative parameter relating to the pollution and deliver these info or information to the people to warn against the any danger. As industrialization is growing very extensively pollution is additionally getting introduced at massive manner. At present there's air pollution, Water pollution, Soil pollution etc worldwide. This paper is only regarding on air pollution. Air pollution is the presence of contamination or minute particles that interfere with human health and environment. These pollutants primarily result from vehicles, industries. The Majority of the existing vehicles now a days are two wheelers. There are around 6% three wheelers, 11% cars and 8% goods vehicles and buses playing on Indian roads. The worthiness and situation of many vehicles on road are not good enough leading to road accidents and higher exhaust emissions.

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Vehicles Growth in India, 1998-2006
(Figures in Millions)



Graph 1. Tabulated Vehicle growth in India

II. RELATED WORK

The World Health Organization states that 3 million individuals die every year because of high impact by air pollution. Based on the very fact above mentioned, the human should target air pollution monitoring and control measures. There are two ways for monitoring air pollution at present. One is passive sampling (non-automatic), and alternative is continuous on-line monitoring (automatic). The Passive sampling uses straightforward instrumentality however it doesn't give the real time values. The procedure of continuous on-line monitoring uses sensors to observe the parameters, and then send real time data to the regulated center by network. The manner of data transfer includes wired and wireless systems. Even though systems are reliable they have short comings at large and dynamic range, such as complicated network cabling, cost etc. With extensively developing communication technologies, now a day's air pollution monitoring system is commonly designed in wireless mode. At present, the wireless mode in air pollution monitoring deals with GSM, GPRS, etc. But these modes are high in price in both installation and maintenance. But on the opposite hands Wireless detector networks are rapidly developed during recent years and used on the large scale at military, industries too. Based on these benefits, it is currently being applied in environmental monitoring.

III. PROPOSEDSYSTEM

In order to implement this system single chip microcontroller along with array of sensors, Bluetooth module and an android mobile phone is used. This system measures concentration of gases equivalent to CO, CO₂, Ammonia, Sulfide Benzene using gas sensors. The hardware unit gathers air pollutants levels also pack them into the frame with GPS physical location then frame is uploaded to the Bluetooth modem and transmitted to mobile application via Bluetooth. Android mobile phone is equipped with GSM, GPS, and Bluetooth connectivity. Using all these facilities we can display values of pollutant of air on LCD of hardware and also GUI of android application. Also using GPS, we can locate the position of Vehicle causing pollution.

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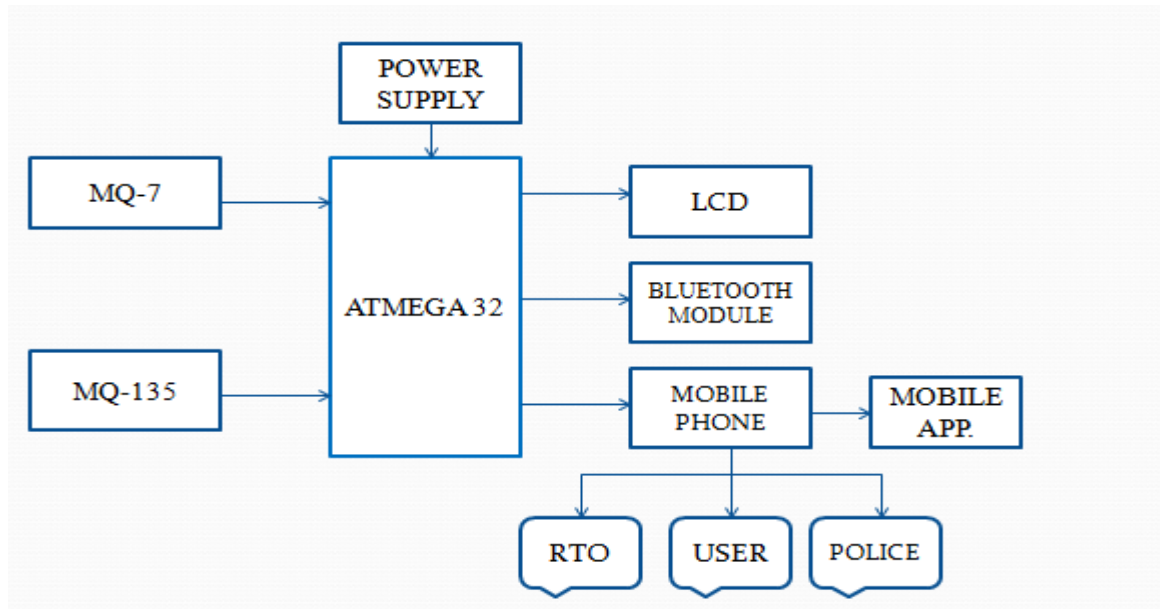


Fig.1 Block Diagram of System.

The system is low value and battery operating. Bluetooth module is employed here as it has low installation and maintenance value. Over Passive sampling (non-automatic) method of pollution measurement, we have chosen continuous online observation (automatic) technique here. The Passive sampling uses easy instrumentation however it does not offer the real time values. The procedure of continuous online monitoring uses sensors to observe the parameters, and then send to android application. Here we have used continuous online methodology therefore we get the real time values of concentration of pollutants. Depending on concentration of CO from the vehicle we have set three warnings. First two warnings are as reminder to the vehicle owner for servicing his or vehicle and After third warning vehicle engine automatically gets off and sends two SMS along with the GPS location of the vehicle to the RTO authority and another to the traffic police . All these warnings are sent and initiates android application using GSM modem of mobile phone. Additionally we have set to use AVR microcontroller that has in-built ADC. As we have decided to use electrochemical sensors the system can be energy economical and low cost in terms of sensors. System measures the concentration of gases resembling CO using MQ7 and CO₂, ammonia, sulfide etc. using MQ135 sensors. The designed sensor array consisting of MQ7 and MQ135 was interfaced through a signal conditioning circuit to the AVR (Atmega16) microcontroller.

IV. EXPERIMENTAL RESULTS

The Bluetooth modem from mobile phone receives the transmitted data from the Bluetooth connected to the system side and the pollutant data is displayed on the GUI of air pollution monitoring app which is designed in an app-inventor as shown in fig 4.

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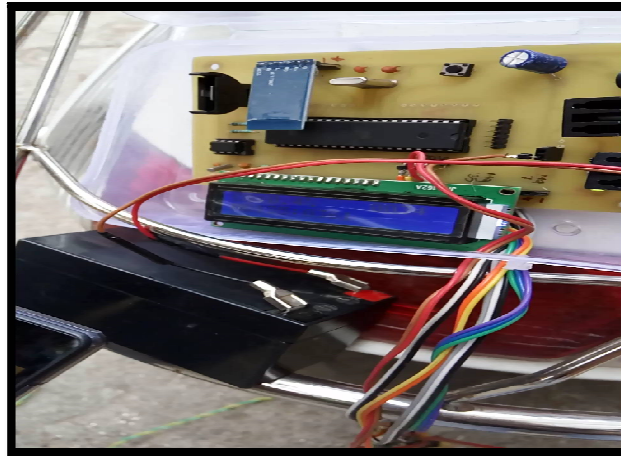


Fig.4 Hardware implementation.

App inventor for android is an application originally provided by Google, and currently maintained by the Massachusetts Institute of Technology (MIT).

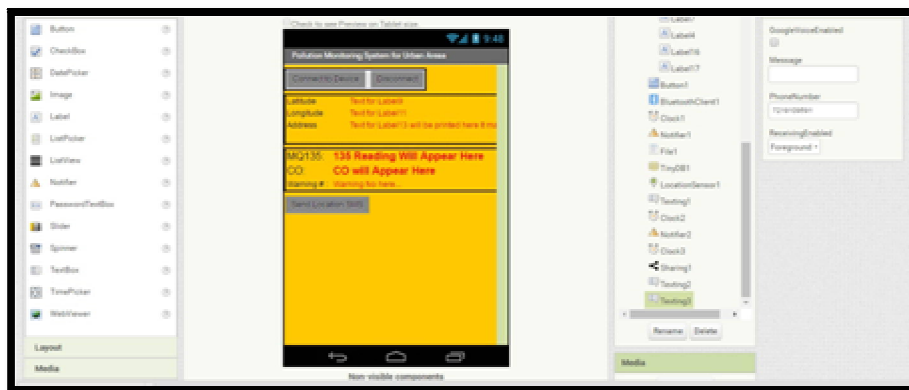


Fig.5. GUI of App.

The CO gases levels are shown in terms of percentage in the atmosphere. The system reports real time pollutants level as long as both system and application is connected by Bluetooth. As soon as the vehicle avoids the warning and the vehicle shutdowns the system is reset after the servicing of the vehicle is done. After implementation of system we observe comparative result with readings taken at PUC test.

V. CONCLUSION

Here a productive platform for controlling and monitoring the air pollution is implemented, which monitors the real time data. As this is a continuous monitoring system here the data is stored in a log file continuously. This data can further used by the RTO authorities and required action can be taken. Now a day the PUC system fails to maintain the check here by increasing the pollution. So now there should be a drastic change in the system and a more scientific and

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realistic system should be implemented. Here we have developed a more genuine methodology for emission testing and control of pollution.

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