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Air Pollution Monitoring System Using Wireless Communication

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Abstract - Environment observation and forecasting system is an application for monitoring and providing a forecasting about environmental phenomenon. We design an air pollution monitoring system using wireless communication system which involves a context model and a flexible data acquisition policy. The context model is used for understanding the status of air pollution on the remote place. It can provide an alarm and safety guideline depending on the condition of the context model.

I. INTRODUCTION

[Ref 7]After displaying we are going to send message to nearest through a text message by using GSM, at the control station that message a percentage of gases individually is received.[Ref 4] Now if at the control station the person is sitting there, he wants to monitor the control status of particular area at particular time and of particular gas in the graphical form in the PC. Then we have to convert that text message information into graph by using MATLAB coding and we have to do the interfacing with PC to display the graph[Ref 10].

Now in this graph format we are going to show each and every gas percentage individually in the bar format. According to the area and time required to monitor. in this graph there is one red line which has been set according to the standard predetermine d values of gases percentage. If this bar in the graph is exceeding the red line will indicate that which gas is in what percentage more than standard one. From this total system we will come to know that we are getting the current status of any area we want to check and if we have this total information about the polluted gases in particular are then we can try to make efforts to reduce the pollution of one particular or all the gases depends upon the area graph, by creating awareness in the people by conveying safety measures.[Ref 17] Vehicles have become integral part of everyone life. Situations and circumstances demand the uses of vehicles in the fats passed urban life. As a coin has two sides these has its own effects, one of the main side effects being air pollution.[Ref 12] Every vehicle will have emission but the problem occurs when it is beyond the standardize values. In this project we will launch one mechanism at the signal square or in any area where emission of toxic gases takes place there are two sensors namely MQ-6 and MQ-7. MQ-7 is for detection of only carbon mono-oxide whereas MQ-6 detects remaining toxic gases like Methane, CO2, H2[Ref 5],. This sensors are having display on it specifically of LCD type what this total system will do, sensors firstly detects the percentage of this above mentioned gases individually and then it will display the percentage of individual gases on the display.Sometimes because of lack of maintenance of vehicle that vehicle use to emit more gases, so we can message to public for frequent servicing of vehicle. Sothat the emission will be reduced to somewhat extent. By doing all this eventually we can control the pollution to some extent.[Ref 12]

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II. BLOCK DIAGRAM

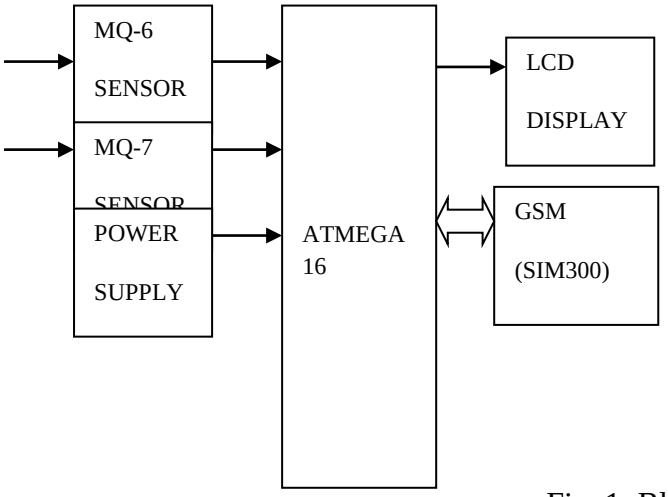

Fig. 1: Block schematic.[Ref3,4]

The system consists of following blocks:[Ref 2]

1. MQ-6 Sensor.
2. MQ-7 Sensor.
3. ARM controller.
4. LCD.
5. GSM (SIM 300).

III. MQ-6 SENSOR:

MQ-06 sensor have sensitive material Sno2 which Is having lower sensitivity. When the target combustible gas exist, the sensor's conductivity is more along the increasing percentage of gases. Using simple electronic circuit the detected gases concentration is converted to equivalent analog signal as a output .MQ-6 gas sensor has high sensitivity to Propane Butane and LPG, also response for natural gas.[Ref 16]

The same sensor can be used to detect methane gas which is especially having lower sen.[Ref 7]

IV. MQ-7 Sensor:

Sensitive material of MQ-7 gas sensor is SnO2, which with lower conductivity in clean air. It make detection by method of cycle high and low temperature, and detect CO when low temperature (heated by 1.5V). The sensor's conductivity is higher along with the gas concentration rising.

When high temperature (heated by 5.0V), it cleans the other gases adsorbed under low temperature. Please use simple electro circuit, Convert change of conductivity to correspond output signal of gas concentration.MQ-7 gas sensor has high sensitivity to Carbon Monoxide. The sensor could be used to detect different gases contains CO; it is with low cost and suitable for different application.[Ref 16]

According to the area and time required to monitor. in this graph there is one red line which has been set according to the standard predetermine d values of gases percentage. If this bar in the graph is exceeding the red line will indicate that which gas is in what percentage more than standard one. From this total system we will come to know that we are getting the current status of any area we want to check and if we have this total information about the polluted gases in particular are then we can try to make efforts to reduce the pollution of one particular or all the gases depends upon the area graph, by creating awareness in the people by conveying safety measures.[Ref 17] Sometimes because of lack of

maintenance of vehicle that vehicle use to emit more gases, so we can message to public for frequent servicing of vehicle. Sothat the emission will be reduced to somewhat extent. By doing all this eventually we can control the pollution to some extent.[Ref 12]

V. ARMController

16/32-bit ARM7TDMI-S microcontroller in a small LQFP64 package.8/16/32 kB of on-chip static RAM and 32/64/128/256/512 kB of on-chip flash program.[Ref 8]
In-System Programming/In-Application Programming (ISP/IAP) via on-chip bootloader software. Single flash sector or complete chip erase in 400 ms and programming of 256 B in 1 ms.
EmbeddedICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip RealMonitor software and high-speed tracing of instruction execution memory. 128-bit wide interface/accelerator enables high-speed 60 MHz operation.[Ref 15]
One LPC2138 8-channel 10-bit ADCs offer a total of up to 16 analog inputs, with conversion times as low as 2.44 ms per channel. So due to inbuilt ADC we don't require extra ADC to convert analog to digital reading generated from flex sensor .
Two 32-bit timers/external event counters (with four capture and four compare channels apiece). Power saving modes include Idle and Power-down. Single 10-bit DAC provides variable analog output (LPC2138)[Ref 8]
We also easily interface SD card to store .wave file to produce voice as per gestureperform. Also we can interface LCD display to display word.

VI. GSM(sim 300):

The hardware interface of the SIMCOM; SIM300 module that connects to the specific application and the air interface.[Ref 4] As SIM300 can be integrated with a wide range of applications, all functional components of SIM300 are described in great detail. This document can help you quickly understand SIM300 interface specifications, electrical and mechanical details. With the help of this document and other SIM300 application notes, user guide, you can use SIM300 module to design and set-up mobile applications quickly.[Ref 10]

Liquid Crystal Display:

LCD is used in a project to visualize the output of the application. We have used 16x2 LCD which indicates 16 columns and 2 rows. So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD.[Ref 9] LCD can also used in a project to check the output of different modules interfaced with the microcontroller.

Algorithm:

1. Sense the pollution information via sensors.
2. Convert the Analog reading to Digital readings through AVR micro- controller.
3. Microcontroller yield the data on digital display connected to it.
4. The same reading microcontroller sends to Base station via GSM 300.
5. The received readings are monitored continuously on computer.

VII. Conclusion:

Continuous monitoring the toxic gases level and sending polluted gases readings to nearest stations by wireless communication for monitoring purpose from this we can create awareness and controls the air pollution.

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As the increase of CO2 concentration and deforestation is a major reason to cause a global warming in addition to other pollutants. This paper describes implementation constraints and attributes or measure of various toxic gases using wireless communication system with an efficient way.

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