



GSM BASED MINIMUM SPANNING TREE ALGORITHM USED FOR SOLVING VEHICLE EMISSION

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ABSTRACT: In developing countries the new emerging problem is pollution emission through vehicles. This problem is largely occurring in metro cities like Mumbai, Delhi and Pune etc. to control the pollution the monitoring system needs to develop. There are various projects on the pollution emission monitoring in various countries but due to the technological, economical differences of developed countries and developing countries these projects cannot be implemented in developing countries. Another aspect of system is cost, the cost of system should be low this can be achieved by using low cost components. In this paper a cost effective solution to monitor vehicle pollution and automatic traffic management is discussed. The problems regarding detection of emissions in vehicles can be overcome by proposed system. The RFID technology is used for detecting the pollution of the vehicle and GSM is used for send information to the remote user.

Keywords: LPC2148, GSM module, RFID module, smoke sensor.

INTRODUCTION

Now a day's number of vehicles are increasing day by day. In cities like Pune, Mumbai and Delhi number of vehicles is far more. Due to incomplete combustion in the engine of a vehicle the pollution through vehicle increases. In US 27% of CO₂ emission occurred through vehicles [1]. as shown in pie chart.

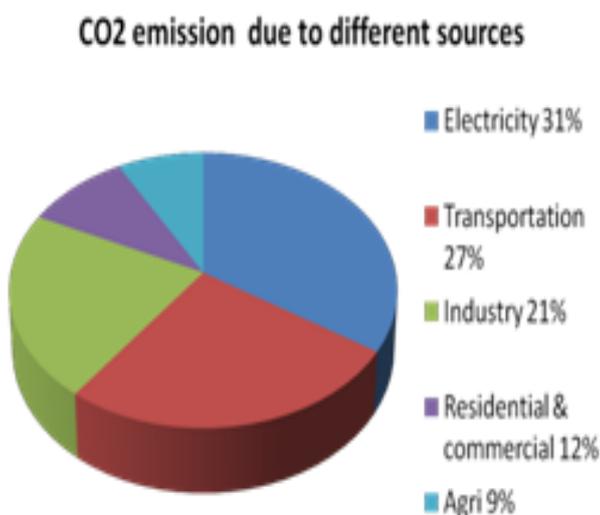


Chart-1: CO₂ emission due to different sources [1].

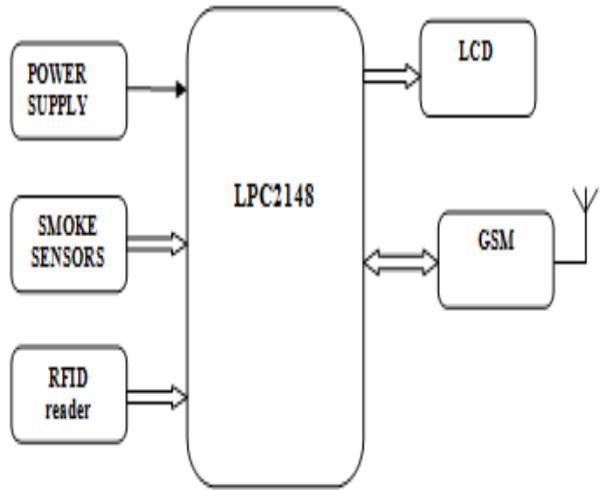
Day by day number of vehicles are increasing tends to increase CO₂. According to Mumbai pollution control board logs, pollution levels particularly NO_x, and SPM suspended

particulate matter increased rapidly. SPM shot up to as high as 286 µgram/cubic meter and NO_x 211 µgram/cubic meter. SPM anything above 100 µgram/cubic meter and NO_x 88 µgram/cubic meter is very bad for health. The main sources of pollution in metro cities are vehicles. The SIAM (society of Indian Automobile manufacturers) has scenario is as follows In India, the idle emission test has been introduced since mid eighties. CO emission through vehicles has been tested with limit 3%. A vehicle with improper combustion is in most cases likely to fail the idle CO test. Thus the vehicle could be advised to go to a workshop for suitable maintenance. From October 2004 HC (hydro carbon) is also measured. PUC vehicles are used to measure vehicle emission but this is very time consuming method. The system need to develop which will measure pollution through vehicles without taking time of vehicle owner. This system contains few smoke sensors with RFID tags. The RFID reader continuously measures the status of the tags of the different vehicles. Whenever emission is high the reader read the tag status send to micro controller. The micro controller sends the information to the authorized person.

II. SYSTEM DEVELOPMENT

The detection of pollution in vehicles by using this system has low cost and efficient. This system is following blocks.

III. BLOCK DIAGRAM



A. ARM 7 Microcontroller

In this project, ARM-7 microcontroller acquires and stores different parameter of vehicle. The main block of Intilligent vehicle parameter monitoring system is ARM-7 micro controller which is heart of the system which provides monitoring and controlling actions. It senses signals from input blocks and processes output blocks. The software program is stored in ARM-7 microcontroller on chip memory, according to which it provides the controlling actions. The on chip ADC converts these parameters into digital form and gives to the ARM-7 microcontroller. The status of sterring grip i.e. whether the sterring is gripped or not is sensed by sensor gives the corresponding signal to microcontroller. The features of this micro controller is

- It has 32 bit GPIO pins used for both input as well as output.
- It has data memory 16 KB on-chip Static RAM.
- It consists of on-chip Flash Program Memory with 128/256kB in size.
- It accelerates operating speed of 60 MHz range of frequency
- In-System Programming (ISP) and also In-Application Programming (IAP) via on-chip boot-loader software.
- It has 2 CAN communication protocol, interfaces for control of several devices.
- It has PWM unit (6 outputs), RTC, Watchdog and two 32-bit timers (with 4 capture and 4 compare channels),

- It has multiple serial interfaces including two UARTs, Fast I2C (400kbps)
- It 2 SPIs and 2 CAN 60 MHz maximum CPU clock available for programmable on-chip Phase-Locked Loop with settling time of 100ms.

B. RIFID module

The RFID Reader which is used for the identification of the vehicles crossing the toll gate. Here we use Son Micro Electronics Module (SMI25-MI) and IC (SMI25-IC) for 125 KHz RFID applications. SMI25-MI, 125 KHz RFID module, is integrated with SMI25-IC chip, few passive components those are required to complete a reader and aRS232 signal level converter (optional) at the bottom layer of the PCB. The main core, SMI25-IC chip is designed with Cypress Programmable System on Chip architecture over the years of experience and Son Micro's intellectual property. SMI25-IC was formerly called CY8COI04, has been in the field for years proving the reliability and availability. The Single-Chip design integrated with RF circuit and microcontroller is only provided by Son Micro worldwide. It reduces overall cost and speed up the product design dramatically.

The Theory and Design of RFID Communication is a Radio frequency device that operates at 125 KHz. It reads the data from the passive RFID tag placed in the human body and converts the data into digital format. The format data can be read using the Microcontroller program and sent to the PC via the RS232 port. An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be attached to an object to be tracked. An RFID transponder is a special kind of radio transmitter and receiver. It is activated when it receives a signal of a specific kind. RFID transponders are present in smartcards and Radio Frequency Identification tags. flexible, paper-thin smart labels that are applied directly to library items. Each RFID tag contains a tiny chip, which is both readable and writable and can store information to identify items in your collection. In library applications, it also stores a security bit and if needed, information to support sorting Systems.

C. GSM (Global system for mobile)

It is a long distance communication device used to interact similar like our mobile phones. The modem is used for voice (call), send and receive depending upon require application. The ARM 7 have two serial ports i.e. UART0 and UART1. By using these two serial ports we are easy to communicate with GSM. We can simultaneously send and receive data to ARM 7 microcontroller and perform the task depending upon application. This Modem used to get



alertness whenever a robot detect crack in the railway track.

D. smoke sensor

It is a digital sensor, used for detecting the smoke of vehicles. The output of the sensor logic 0 and logic1. The sensor is fixed with some threshold voltage. This sensor converted the emission of smoke into equivalent electrical signal. Whenever smoke detected the sensor send signal to the controller.

IV.SOFTWARE REQUIRMENTS

Embedded C:

The C programming language is a general purpose programming language that provides code efficiency, elements of structured programming, and a rich set of operators. Its generality combined with its absence of restrictions, makes C a convenient and effective programming solution for a wide variety of software tasks. Many applications can be solved more easily and efficiently with C than with other more specialized languages. Cx51 is not a universal C compiler adapted for the target.

To make micro controller work we need to write the code in machine language. Machine language is complicated to write or understand. In such case we are writing our code in high level language like C and we are converting our C language code to machine language. Keil compiler is used to convert the C language code into the machine language code. After compiling C language code HEX file is generated. Flash magic is used to dump our HEX file into micro controller. Keil and flash magic are two software tools used.

V. ADVANTAGES

The main advantage of this system is reducing the cost of the system so vehicle owner will ready to mount the system on his vehicle. As the GSM is used for wireless communication between system and user, RFID is used for detecting the pollution. Co2 emission occurred in vehicle more than threshold level the system send information to the user by using wireless sensor network.

VI. CONCLUSION

This system is cost effective solution for vehicle emission problem and can be used for other application once it mounted on vehicle. By effectively managing traffic co2 reduction can be done also as the data regarding all vehicle owners is in server so it can be utilized for further application. A RFID and GSM is used to collect information regarding emission and then this information transferred to micro controller which is situated at the server and then the values of emission compared and message sends to vehicle owner.

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