



GSM Wireless Technology Implementation in HAZE Monitoring

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Abstract: - Many coteries have periodic problems with air quality reaching hazardous levels because of smoke haze. The heavy haze, described as a pall of smoke caused widespread health problems especially among the elder lies, the young and kids. Haze is an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky. This haze pollution has serious implications to health as well as for the whole environment. This paper described a mobile monitoring system developed to detect the level of haze particulates. Data collection was achieved with the use of gas sensor, and mobile alert implementation was developed with Global System Mobile (GSM) connection and Short Messaging System (SMS). A gas sensor is mounted to measure the smoke particulates emitted in selected region known to have heavy unhealthy particles in the air. The readings produce by the gas sensor is continuous signal which is then processed digitally by a microcontroller of the system. Once the data is processed and evaluated, it is then sent to the GSM modem and ready to be transmitted to the receiving mobile device. Haze monitoring can be stored in SD card. So that we can further observe the haze condition for investigation purpose. For every minute haze condition will be monitored, stored in SD card and if cross the threshold value then that information will be message to user mobile. In this paper micro controller will measure and monitor the GAS level and sends information periodically or sends alert message whenever sensed values goes beyond threshold level. In this we are using ARM7 based LPC2148 micro controller.

Keywords: GSM; SMS; haze; ARM processor; SPI;

1. INTRODUCTION

1.1 BACKGROUND

Haze refers to a light cloud of fine particles that consequently reduces visibility. The extent of the visibility loss depends on the amount of particles in the air and the thickness of the haze. Haze can be classified into four main types namely, pollution, dust, smoke and moisture hazes. The occurrence of haze leads to limitation in visibility besides having unhealthy environment. Sources for haze particles include farming in dry weather, land traffic, industrial fumes, and wildfires. In Malaysia and its surrounding neighboring countries, haze can also be caused by open burning activities to fertilize the soils for crops.

Haze is likely to occur in a relatively dry air whenever dust and smoke particles accumulate. When weather conditions block the dispersal of smoke and other pollutants they concentrate and form a usually low-hanging shroud that impairs visibility and may become respiratory health threat. Industrial pollution can result in dense haze, which is known

as smog. Since 1991, haze has been a particularly acute problem in Southeast Asia, for instance the Indonesian forest fires burnt to clear and clean the land being one of the reasons. In response to this issue, the ASEAN countries agreed on a Regional Haze Action Plan (1997) and later signed the Agreement on Trans boundary Haze Pollution (2002), however the haze pollution is still a problem today.

Healthy environment is very important to ensure healthy living. Human body needs healthy environment to maintain balance for the internal organ systems to function properly. Day by day man improving technology and introducing new technologies to make human lifestyle so simple, safety and secure. But still we have some problem whenever we face situation like pollution. We are losing so many lives because of lack of pollution control.

So in this work we are using the basic microcontroller LPC2148 for cost effective and also for easy understanding. Here we used assembly programming for better accuracy and GPS and GSM modules which helps to trace the vehicle anywhere on the globe. The exact location of the vehicle is sent to our remote devices (mobile phones) using GSM modem.

The NXP (founded by Philips) LPC2148 is an ARM7TDMI-S based high-performance 32-bit RISC Microcontroller with Thumb extensions 512KB on-chip Flash ROM with In-System Programming (ISP) and In-Application Programming (IAP), 32KB RAM, Vectored Interrupt Controller, Two 10bit ADCs with 14 channels, USB 2.0 Full Speed Device Controller, Two UARTs, Two I2C serial interfaces, Two SPI serial interfaces Two 32-bit timers, Watchdog Timer, PWM unit, Real Time Clock with optional battery backup, Brown out detect circuit General purpose I/O pins.

We are using SIM900 GSM modem for Sending and receiving SMS, This SIM900 GSM modem supports quad band frequencies 850/900/1800/1900MHz performance for voice and SMS. The communication protocol it supports is UART with the default baud rate of 9600 bps. GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the Americas (including Canada and the United States) use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were allocated.



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This GSM modem has an antenna too. The Local ambulance telephone number will be stored in the SIM card of the GSM modem. The provision to change the mobile number to which the message has to be sent is also provided in this system.

2 PROBLEM OUTLINE IN EXISISTING SYSTEM

Malaysia has periodic problems with air quality reaching hazardous levels because of smoke haze. The heavy haze, described as a pall of smoke caused widespread health problems especially among the elder lies, the young and kids. Lot of health problems from haze pollution.

3. PROPOSED SYSTEM

A gas sensor is mounted to measure the smoke particulates emitted in selected region known to have heavy unhealthy particles in the air. The readings produce by the gas sensor is continuous signal which is then processed digitally by a microcontroller of the system. Once the data is processed and evaluated, it is then sent to the GSM modem and ready to be transmitted to the receiving mobile device. For every minute haze monitoring data will be stored in memory card.

Literature Survey:

The standards and the timeline for implementation are set by the Central Pollution Control Board under the Ministry of Environment & Forests. Bharat stage emission standards are emission standards instituted by the Government of India to regulate the output of air pollutants from internal combustion engine equipment, including motor vehicles. The first emission norms were introduced in India in 1991 for petrol and 1992 for diesel vehicles. These were followed by making the Catalytic converter mandatory for petrol vehicles and the introduction of unleaded petrol in the market. On April 29,1999 the Supreme Court of India ruled that all vehicles in India have to meet Euro I or India 2000 norms by June 1, 1999 and Euro II will be mandatory in the NCR by April 2000. Car makers were not prepared for this transition and in a subsequent judgment the implementation date for Euro II was not enforced. The standards, based on European regulations were first introduced in 2000. Progressively stringent norms have been rolled out since then. All new vehicles manufactured after the implementation of the norms have to be compliant with the regulations. Since October 2010, Bharat stage III norms have been enforced across the country. In 13 major cities, Bharat stage IV emission norms are in place since April 2010. The phasing out of 2 stroke engine for two wheelers, the stoppage of production of various old model cars & introduction of electronic controls have been due to the regulations related to vehicular emissions.

GSM and GPS based vehicle location and tracking system will provide effective, real time vehicle location, mapping and reporting this information value and ads by improving the level of service provided. A GPS-based vehicle tracking system will inform where your vehicle is and where it has been, how long it has been. The system uses geographic

position and time information from the Global Positioning Satellites. The system has an "on board module which resides in the vehicle to be tracked and a "Base Station" that monitors data from the various vehicles. The On-Board module consists of GPS receiver, a GSM modem.

The purpose of the project is to find the polluted vehicle where it is and locate the vehicle by means of sending a message using a system which is placed inside of vehicle system Most of the times we may not be able to find engine damaged vehicles location because we don't know the place where pollution will happen. In order to give solution, first we need to know where the accident happened through location tracking and sending a message to your related one or to the emergency services. So in this work we are using the basic microcontroller LPC2148 for cost effective and also for easy understanding. Here we used assembly programming for better accuracy and GPS and GSM modules which helps to trace the vehicle anywhere on the globe. The exact location of the vehicle is sent to our remote devices (mobile phones) using GSM modem.

4. HARDWARE IMPLEMENTATION

the Hardware Implementation of the project. It discusses the design and working of the design with the help of block diagram and circuit diagram and explanation of circuit diagram in detail. It explains the features, timer programming, serial communication, interrupts of LPC2148 microcontroller. It also explains the various modules used in this project.

Project Design

The implementation of the project design can be divided in two parts.

- Hardware implementation
- Firmware implementation

Block Diagram:

The block diagram of the design is as shown in Fig. It consists of power supply unit, microcontroller, Buzzer, GSM, Gas/ Smoke Sensor, and LCD. The brief description of each unit is explained as follows.

Block diagram

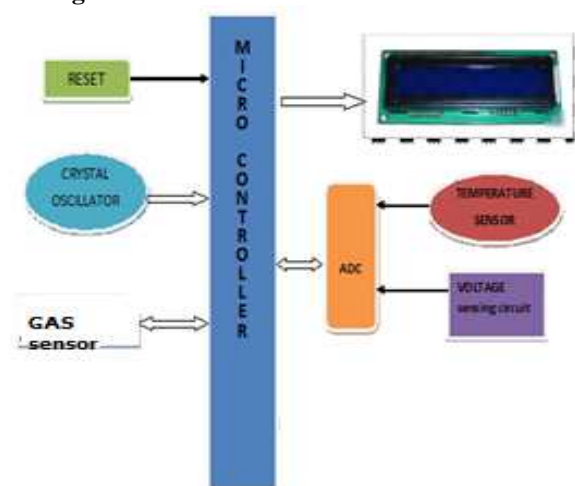


Fig.1: Block diagram of proposed system

GSM Modem

This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control. In GPRS mode you can also connect to any remote FTP server and upload files for data logging. This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 applications. Supports features like Voice, SMS, Data/Fax, GPRS and integrated TCP/IP stack.



5. RESULTS

The implementation of realization of **“GSM Wireless Technology Implementation in Haze Monitoring”** is done successfully. The communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements. Software tools like keil uvision simulator, flash magic to dump the source code into the microcontroller, orcad lite for the schematic diagram have been used to develop the software code before realizing the hardware.

Circuit is implemented in Orcad and implemented on the microcontroller board. The performance has been verified both in software simulator and hardware design. The total circuit is completely verified functionally and is following the application software. It can be concluded that the design implemented in the present work provide portability, flexibility and the data transmission is also done with low power consumption.

6. CONCLUSION

The system was completed and tested successfully and able to detect haze particles data for air quality measuring with the implementation of SMS alert based system. Moreover, this gas/ smoke detect and alert system is more effective in detecting the gas leakage and alerting the people from danger. Cost of this system is less and more reliable.

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