

Haze Monitoring Using GSM with Arm7

T. Kalyan Sundar

M.Tech Student

Department of ECE,

Malla Reddy Institute of Engineering and Technology.

Dr.M.Narsing Yadav,M.S,Ph.D, U.S.A

Professor & HoD,

Department of ECE,

Malla Reddy Institute of Engineering and Technology.

ABSTRACT:

This project is designed to monitor heavy haze, described as a pall of smoke caused widespread health problems especially among the elderlies, 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 project 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). This project uses ARM7 as heart of entire system.

Introduction

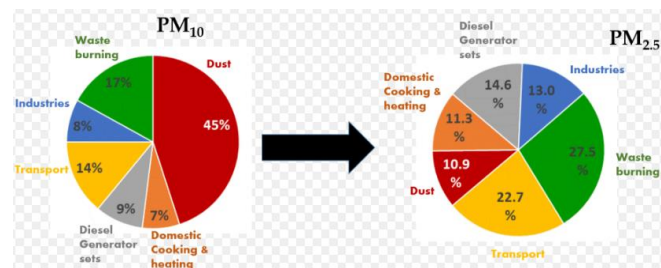
Haze refers to a light cloud of fine particles that consequently reduces visibility. The extent of the visibility loss depends on the amount of particles in the air and the thickness of the haze.

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.

LITERATURE SURVEY

The “natural” hazy smogs have long hung over heavily forested and sunlit topographies like that of the Smoky Mountains of Western North Carolina or the basins of southern California, air pollution as we think of it with all its complexities and intensity has evolved along with human exploitation of combustion. The smoky fires of early cave and hut dwellers choked the air

inside their abodes and often blanketed their villages. As communities grew and exhausted available wood supplies, peat and coal came into use to provide fuel for heating and cooking. Access to cheap sulfurous coal launched soot throughout the local ambient environment, fouling the air and settling as a shadowy coat on local structures.

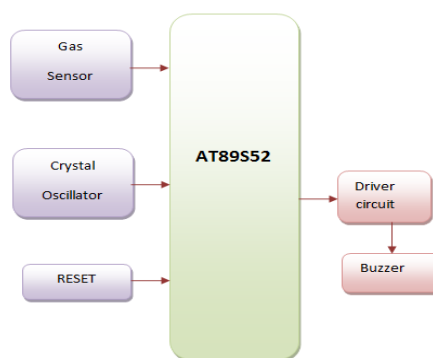


Daily dose of Air pollution

Existing method

A gas sensor is mounted to measure the smoke particulates emitted in selected region known to have heavy unhealthy particles in the air. This project presents monitoring system developed to detect the level of haze particulates. Data collection was achieved with the use of gas sensor, and buzzer alert is provided to inform others about the dangerous gas. This project uses AT89S52 as heart of entire system.

BLOCK DIAGRAM:



Drawback: Buzzer alert is given at the detected place itself.

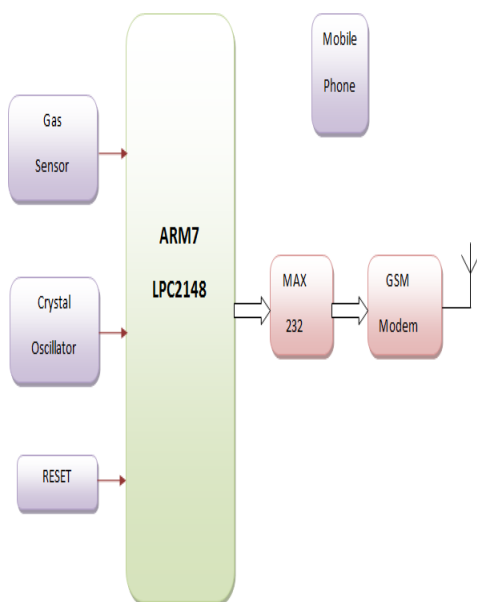
Proposed method

This project is designed to monitor heavy haze, described as a pall of smoke caused widespread health problems especially among the elderlies, 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 project 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

Hardware requirements

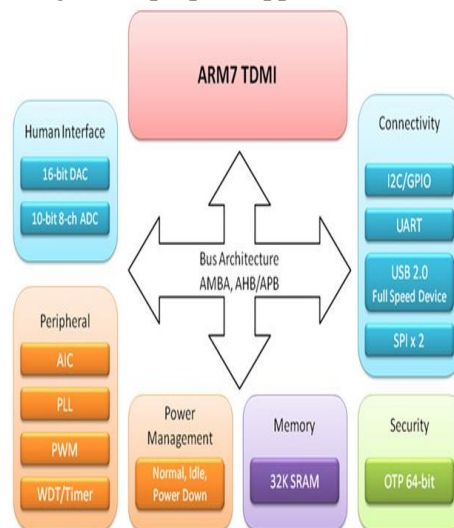
(GSM) connection and Short Messaging System (SMS). This project uses ARM7 as heart of entire system.

BLOCK DIAGRAM:

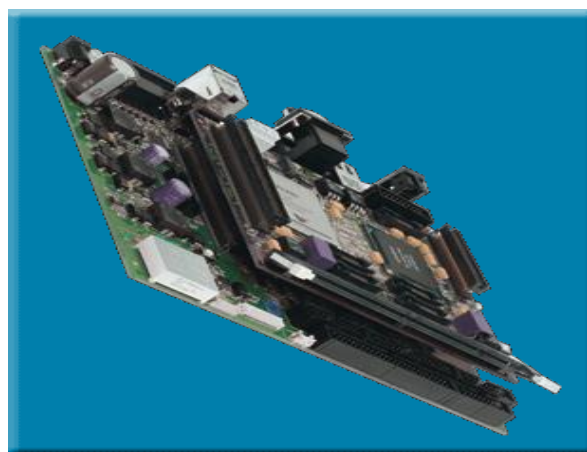


The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory.

A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



ARM PROCESSOR



ARM7TDMI Processor Core

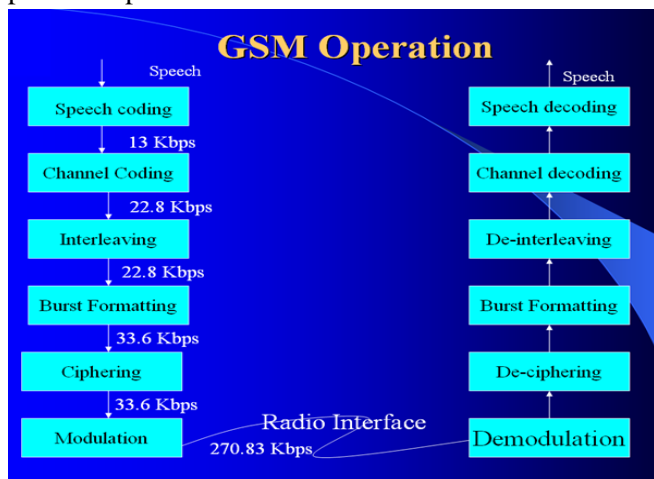
- Current low-end ARM core for applications like digital mobile phones
- TDMI
 - T: Thumb, 16-bit compressed instruction set
 - D: on-chip Debug support, enabling the processor to halt in response to a debug request
 - M: enhanced Multiplier, yield a full 64-bit result, high performance
 - I: Embedded ICE hardware
- Von Neumann architecture

Global System for Mobile Communication (GSM)

Definition:

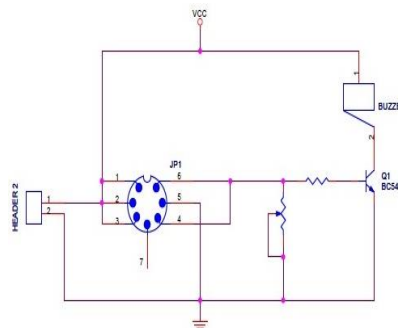
GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will join the GSM partnership.



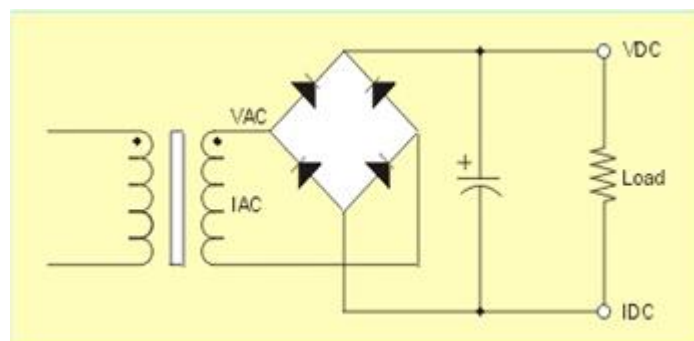
MQ-2 SENSOR

Schematic representation of sensor



Sensitive material of MQ-2 smoke sensor is SnO₂, which with lower conductivity in clean air. When the target combustible smoke exist, the sensor's conductivity is higher along with the smoke concentration rising. Please use simple electro circuit, Convert change of conductivity to correspond output signal of smoke concentration. MQ-2 smoke sensor has high sensitive to LPG, Propane and Hydrogen, also could be used to Methane and other combustible steam, it is with low cost and suitable for different application.

This project uses regulated 3.3V, 500mA power supply. Unregulated 12V DC is used for relay. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.



Hardware Used

- Microcontroller unit
- Smoke sensor
- GSM modem

Software Used

- Keil Compiler
- Embedded C

Advantages

- It reduces the man power
- Smoke detecting efficiency is high
- Accuracy is high

Application

- Hospitals
- Mines detection
- Industries

Conclusion

This project presents a high sensitive sensor based SMS alert. Experimental work has been carried out carefully. The proposed method is verified to be highly beneficial for haze monitoring.

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