

Embedded System for Hazardous Haze Detection using Wireless Technology

Kannan T. ^{a*}, S. Suresh ^b

^a Department of VLSI Design, Gnanamani College of Technology, Namakkal, Tamil Nadu, India

^b Department of Electrical & Electronic Engineering, Gnanamani College of Technology, Namakkal, Tamil Nadu, India

Article Info

Article history:

Received 2 February 2015

Received in revised form

20 February 2015

Accepted 28 February 2015

Available online 6 March 2015

Keywords

River Ramganga,

TDS,

EC,

Discrete Meyer Wavelet

Abstract

Safety plays a major role in today's world and it is necessary that good safety systems are to be implemented in places of education and work. This work modifies the existing safety model installed in industries and this system also be used in homes and offices. The advantage of this automated detection system over the manual method is that it offers quick response time and accurate detection of an emergency and in turn leading faster diffusion of the critical situation. 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. 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. If these gases exceed the normal level then an alarm is generated immediately and also an alert message (SMS) is sent to the authorized person through the GSM. 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).

1. Introduction

The increase in the development of technology and the human race, we failed to take care about the surroundings in which we live in. Thus we polluted the environment and thereby reducing the quality of the place we live. Even though there are several aspects of pollution such as soil, air and water pollution, out of these air pollution acts as the serious aspect as the other can be detected visually and by taste, but the polluted air cannot be detected as it can be odourless, tasteless and colourless. Hence there is a growing demand for the environmental pollution monitoring and control systems. In the view of the ever-increasing pollution sources with toxic chemicals, these systems should have the facilities to detect and quantify the sources rapidly. Toxic gases are one that causes serious health impacts, but are also used in industries in large quantities.

Fresh breathing air has always been a basic requirement for human beings; however with current global trends are beginning to lose this most basic privilege. Air pollution is a growing issue and a significant risk to the state of our environment, our livelihood and future generations. Billions of dollars are spent every year by all levels of government in health bills and other costs related to air pollution. Motor vehicles are the largest contributors to air pollution in most urban environments and there are no signs of this trend changing in the near future. Medical studies are continually showing the importance of having clean air to breathe. Our environment is becoming polluted with toxic gases such as ozone, carbon monoxide, nitrogen dioxide, sulphur dioxide and particulate matter. All these toxic gases

have the potential to cause mortality and significantly reduce the life expectancy of any society. Current air quality monitoring systems are either too expensive or too few and far apart to use in any reliable sense. A new style of air pollution monitoring system is proposed which brings the monitoring units to motor vehicles, the main source of the toxic pollutants. With this new system inaction we can begin to take the first steps to an improved and healthier world.

2. Literature Survey

The purpose of the Literature Survey is to give the brief overview and also to establish complete information about the reference papers. The goal of Literature Survey is to completely specify the technical details related to the main project in a concise and unambiguous manner. "Intelligent Residential Security Alarm and Remote Control System Based on Single Chip Computer", LIU zhen-ya, WANG Zhen-dong and CHEN Rong. This paper focuses on, Intelligent residential burglar alarm, emergency alarm, fire alarm, toxic gas leakage remote automatic sound alarm and remote control system, which is based on 89c51 single chip computer. The system can perform an automatic alarm, which calls the police hotline number automatically. It can also be a voice alarm and shows alarm occurred address. This intelligent security system can be used control the electrical power remotely through telephone. In-depth study on various alarm device, we have designed intelligent residential security alarm and remote control system on the basis of single chip computer. The system is based on 89C51 single chip computer, has intelligent residential burglar alarm, emergency call alarm, fire alarm, toxic gas leakage automatic alarm and remote control. It is able to call

Corresponding Author,

E-mail address: tkannan@gmail.com

All rights reserved: <http://www.ijari.org>

the police hotline number. It is able to use voice alarm and show alarm occurred address. Users can set up and modify password for it. It can be recordable and voice suggestion and make use of the telephone to remote control. Calling when is not at home, it can use password to enter remote deployment and remote control the power of electronic appliance.

3. Existing 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. This process is depicted as shown in figure

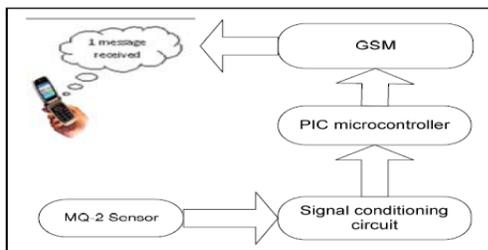


Fig. 1. Block Diagram of Haze Monitoring Process

4. Proposed System

Previous work reported in implemented haze monitoring using a gas sensor and data was transmitted to a receiving station or personal computer. Thus, this project introduced method of haze monitoring using data obtained using gas sensor and sent it to mobile phone subscriber.

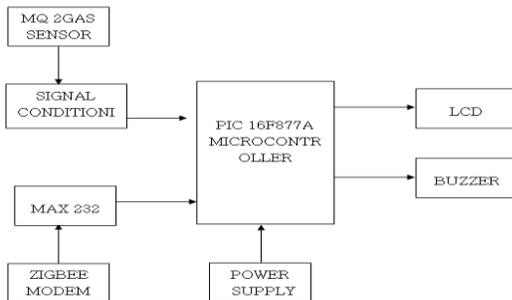


Fig. 2. Block Diagram of Proposed System

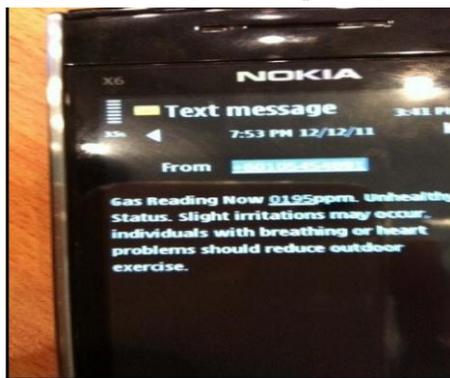


Fig. 3. System of Proposed System

5. MPLAB C Compiler

MPLAB C18 C Compiler is a cross-compiler that runs on a PC and produces code that can be executed by the Microchip PIC18XXXX family of microcontrollers. Like an assembler, the MPLAB C18 compiler translates human-understandable statements into ones and zeros for the microcontroller to execute. Unlike an assembler, the compiler does not do a one-to-one translation of machine mnemonics into machine code.

MPLAB C18 takes standard C statements, such as “if(x=y)” and “temp=0x27”, and converts them into PIC18XXXX machine code. The compiler incorporates a good deal of intelligence in this process. It can optimize code using routines that were employed on one C function to be used by other C functions. The compiler can rearrange code, eliminate code that will never be executed, share common code fragments among multiple functions, and can identify data and registers that are used inefficiently, optimizing their access.

Code is written using standard ANSI C notation. Source code is compiled into blocks of program code and data which are then “linked” with other blocks of code and data, then placed into the various memory regions of the PIC18XXXX microcontroller. This process is called a “build,” and it is often executed many times in program development as code is written, tested and debugged. This process can be made more intelligent by using a “make” facility, which invokes the compiler only for those C source files in the project that have changed since the last build, resulting in faster project build times

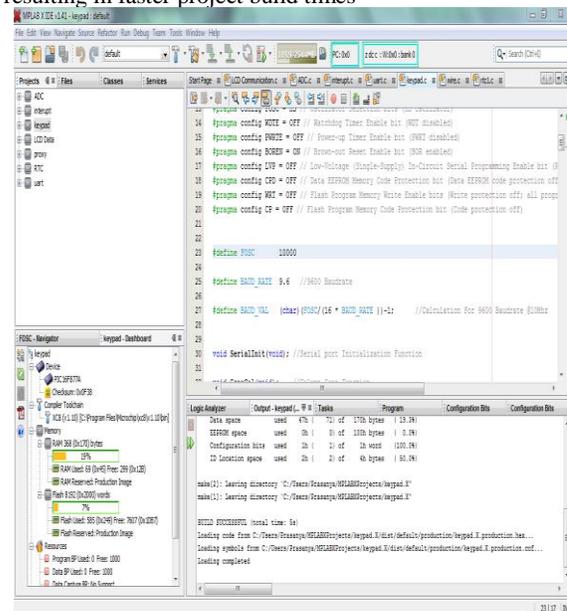


Fig. 4. Simulation output of Haze monitoring system

5. Conclusion

This paper presents a wireless sensor networks system using ZigBee technology for haze monitoring. Testing proved that in the area with lots of vehicles, haze reading is very unhealthy. The data collected can be a useful component to give awareness to the public safety. The experiment showed that the wireless technology can be used to alert the public about the safety of air quality. The

development of this project can be implemented to give the public precautions step to avoid from having any outdoor activities if the level of air is hazardous. Besides, the

References

- [1] K. A. Othman, N. Li, E. H. Abd System in City of Kuala Lumpur Implementation, WCE
- [2] Xu. Chuanyang, Zhongting WaMonitoring Over North China PSymposium (IGARSS), 2012
- [3] De Hui Wang, Li Hua Xia, Monitoring Haze in Pearl RiInternational Conference on Engineering, 2008

developed system is low cost and low power to be implemented in the city of Kuala Lumpur.

ICBBE 2008

- [4] Xingwei He, Yong Xue, Yingj Mei, Hui Xu, Multi-scale AeroData And Its Application On Haz Sensing Symposium (IGARSS)
- [5] Tae-seok Lee, Yuan Yang, A System, University of Korea, 20American Industrial Hygiene Ass Brumfield, Inc., 1960