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Research Paper

POLLUTION MONITORING AND CONTROLLING CAUSED BY AUTOMOBILE EXHAUST GASES USING ZIGBEE TECHNOLOGY

A Arularasi[1]*, S Divya[1], K Meena[1] and J T Vasuki[1]

*Corresponding Author: **A Arularasi** ✉ arularasiece@gmail.com*

Steganography is derived from the Greek word steganographic which means covered writing. It is the science of secret communication. The goal of steganography is to hide the existence of the message from unauthorized party. The modern secure image steganography presents a task of transferring the embedded information to the destination without being detected byGases emitted from automobile exhausts have been monitored and controlled using a gas sensor arrays. The information from the sensor array has been transmitted to a remote location by ZigBee wireless technology. Quantitative and qualitative analysis of gases has been conducted at the remote location by a computer. Results indicate that unlike the automobiles using natural gas the unleaded and premium unleaded fuel automobiles can have significant effect on the environment conditions due to their high level of toxic gas emission. The engine of the vehicle is turned off to reduce and control the gas emission. the attacker. Many different carrier file formats can be used, but digital images are the most popular because of their frequency on the Internet. For hiding secret information in images, there exist a large variety of steganographic techniques some are more complex than others and all of them have respective strong and weak points. In this project we proposed an image based steganography that Least Significant Bits(LSB) technique, pseudo random encoding technique and partial optimization technique on images to enhance the security of the communication.. We proposed a new method called Partial Optimization Technique, in the proposed approach all of the image pixels are classified into eight regions and then the eight distinct ordering coding are applied to each region by the developed partial optimization encoder.

Keywords: Zigbee, Transmitter, Receiver, Gas sensor, Microcontroller, Solenoid valve, GSM.

INTRODUCTION

Generally, the pollution has been defined as the presence of a substance in the environment that because of its chemical composition or quantity prevents the functioning of natural processes and produces undesirable environmental and health. In other words, pollution can causes instability, disorder, harm

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[1] Narasu's Sarathy Institute Of Technology, Salem, Tamilnadu, India.

or discomfort to the physical systems or living organisms. With the fast development of the industrialization and urbanization process in the world, environmental pollution problems become one of the common topics in all country of the world. At present, there are air pollution, water pollution and soil pollution in worldwide. This thesis only discusses air pollution. Air pollution is the presence of contaminants or pollutant substances in the air that interfere with human health or welfare, or produce other harmful environmental effects. These pollutant substances usually result from vehicle emissions, Industrial emissions and volatile organic compounds. There are various issues of air pollution, and Most of all are health-related issues. In other words, clean air is a basic condition for health. The health issues caused by air pollutants may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions. The World Health Organization states that 2.4 million people die each year from causes directly attributable to air pollution, with 1.5 million of these deaths attributable to indoor air pollution. Based the fact above mentioned, the human should focus on air pollution monitoring.

In the area, there are two methods to use to monitor air pollution at present. The one is passive sampling (non-automatic), and the other is continuous online monitoring (automatic). The advantage of the passive sampling method

lies in that the monitor equipment is simple and inexpensive, but it can only get on-site monitoring parameters in a certain period, cannot provide real-time values. Meanwhile, the results of monitoring effect by the man factor largely and it will seriously damage the health of the

monitoring man in the site of high concentration of harmful substances. The procedure of continuous online monitoring method is as follows: use sensors to monitor the parameters, and then send to the control center by network. The way of data transfer include both wired and wireless. The wired way usually uses public telephone network, or fiber-optic to realize data transmission. Although this method is stable and reliable, with high speed of data transmission, but the shortcomings of the method is also obvious in a wide and dynamic range, such as complex network cabling expensive, etc.

PROPOSED METHODOLOGY

In this proposed methodology an outdoor air pollution monitoring and controlling system which uses ZigBee networks for monitoring air pollution. This system integrates wireless sensor board and gas sensors which also integrates with the dust, temperature, humidity and ZigBee module. Compared to the advantages of ZigBee with Wi-Fi and Bluetooth zigbee gives a wireless solution based on ZigBee technology for air pollution monitoring.
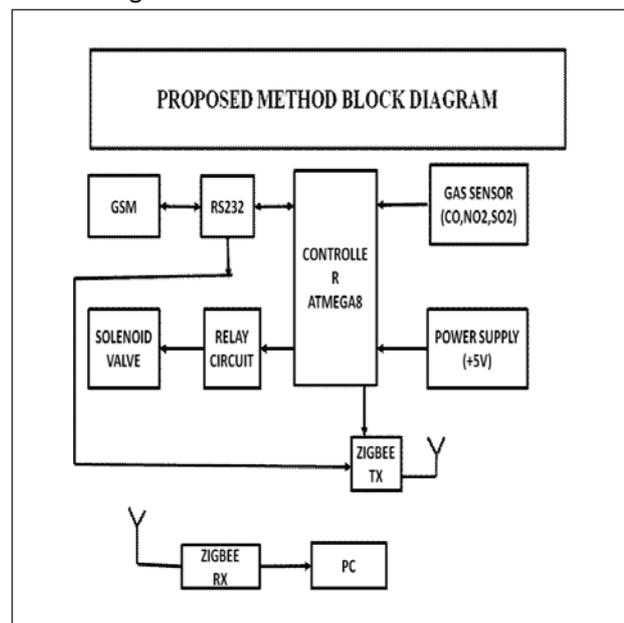
BLOCK DIAGRAM DESCRIPTION

The proposed project consists of following components:

1. GSM

2. Microcontroller

3. RS232

4. Solenoid valve

5. Gas sensor

6. Relay circuit

7. Zigbee transmitter and receiver

GSM

GSM (Global System for Mobile Communications, originally Group Spécial Mobile), is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe technologies for second generation (or "2G") digital cellular networks. Developed as a replacement for first generation analog cellular networks, the GSM standard originally described a digital, circuit switched network optimized for full duplex voice telephony. The standard was expanded over time to include first circuit switched data transport, then packet data transport via GPRS. Packet data transmission speeds were later increased via EDGE. The GSM standard is succeeded by the third generation (or "3G") UMTS standard developed by the 3GPP. GSM networks will evolve further as they begin to incorporate fourth generation (or "4G") LTE Advanced standards. "GSM" is a trademark owned by the GSM Association.

MICROCONTROLLER

ATmega8 is the microcontroller, that controller has peripheral features like inbuilt ADC, required to get the signals from the sensors. Maximum clock frequency is 20MHz and hence faster than 8051. It is based on RISC and Hardware architecture and hence even faster. Embedded C is used for programming the microcontroller.

RS232 INTERFACE

RS-232 (Recommended Standard 232) is the traditional name for a series of standards for serial binary single-ended data and control signals connecting between a *DTE* (Data Terminal Equipment) and a *DCE* (Data Circuit-terminating Equipment). It is commonly used in computer serial ports. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pin out of connectors. The serial/Column port of the computer is used for communication with the hardware. The serial port of the computer uses RS232standard for communication. RS232 standard voltages are not compatible with conventional TTL / CMOS circuits. Hence IC MAX232 is used for voltage conversion between RS232 port and the microcontroller.MAX232 enables full duplex communications, while doing the necessary voltage conversions.

SOLENOID VALVE

A solenoid valve is an electromechanical valve for use with liquid or gas. The valve is controlled by an electric current through a solenoid, in the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports. Multiple solenoid valves can be placed together on a manifold. A solenoid valve has two main parts: the solenoid and the valve. The solenoid converts electrical energy into mechanical energy which, in turn, opens or closes the valve mechanically. A

direct acting valve has only a small flow circuit, shown within section E of this diagram (this section is mentioned below as a pilot valve). This diaphragm piloted valve multiplies this small flow by using it to control the flow through a much larger orifice.
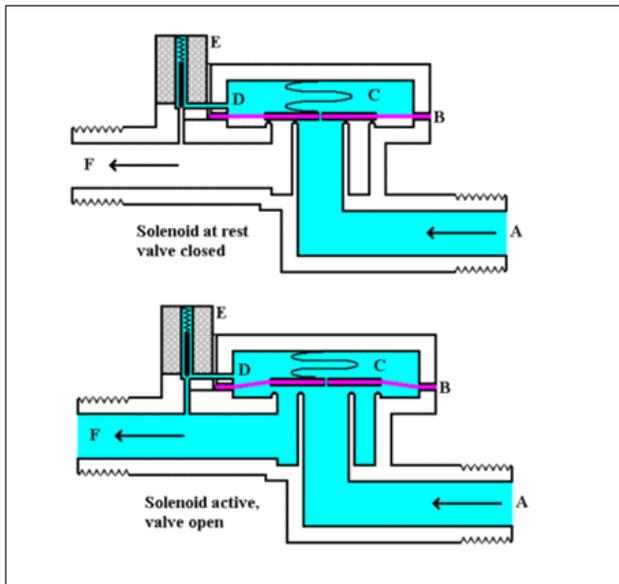
MQ-6 GAS SENSOR

Sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped MQ-6 have 6 pin ,4 of them are used to fetch signals, and other 2 are used for providing heating current. The main features are : * High sensitivity to LPG, iso-butane, propane. * Small sensitivity to alcohol, smoke. * Fast response. * Stable and long life * Simple drive circuit. The main applications are: They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, iso-butane, propane, LNG, avoid the noise of alcohol and cooking fumes and cigarette smoke.

RELAY

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits, repeating the signal coming in from one circuit and re-transmitting it to another. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

ZIGBEE

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on an IEEE 802 standard for personal area networks. Applications include wireless light switches, electrical meters with in-home-displays, and other consumer and industrial equipment that requires short-range wireless transfer of data at relatively low rates. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking. ZigBee has a defined rate of 250 kbps best suited for periodic or intermittent data or a single signal transmission from a sensor or input device.

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