INDUSTRY BASED SECURITY SYSTEM USING GSM AND ARDUINO

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Abstract: This paper describes the design of a simple low cost GSM based security monitoring system using GSM technique. The security monitoring system using GSM undergoes analog to digital converter and with GSM Modem the message is send to mobile. ADC is used because Arduino works with digital inputs. GSM modem can be used at the transmitter side, the user sends an SMS to the GSM modem using. The fire sensor is an integrated circuit sensor that can be used to detect the fire. The fire sensor is connected to Arduino and varying fire condition is sent to GSM modem, which is simultaneously performs the operation of sending message to a particular SIM number. GSM technology provides users with high quality signal, giving them access to high quality digital communication. GSM network operators can provide their customers with cheaper text messing options.

The approach to industrial automation and security system design is almost standardized nowadays. We have tried to increase these standards by combining new design techniques and developed a low cost industrial automated security systems. Everyone wants to be as much as secure as possible. The design of simple hardware circuit enables every user to use this wireless industrial security system with vibration sensor, Motion sensor, Fire sensor, Door sensor and Main fuse Failure Detector at Industries.

Keywords: *Arduino, GSM, Door Sensor, Vibration Sensor, Motion Sensor, Fire Sensor, Buzzer, Pump, Relay, LED.*

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I INTRODUCTION

Security is the main concern for every industry. Every industry wants to work in safe and secured that are beneficial for the Employs and specially for their production process say for raw materials in the industry. Every industry want their workers to keep safe and secured from various incidents like accidents caused due to Fire detector or accidents due to fire in their go down or their machinery department.

Industry security is the most significant one for every industry owner. To get the absolute peace of mind whether you are at industry or out of industry you must ensure that your industry is installed with the perfect industry security monitoring system. This GSM Bases industrial security system can be used to provide security system for home, industrial, office, School, Collages using GSM technique. Security systems are certain electronic devices which are used to detect intrusions in industry. The basic components of a industry automation security system are motion detectors, fire detectors and motion detector. It is cheaper and maintained easily than any other security device.

All the sensors are activated on the Security system. Whenever systems experiences a abnormal condition in the industry like any fire/smoke occurs in the industry and any intrusion into the industry the Security system alerts the security personnel as well as the owner of the industry by sending SMS alerts to the users of the industry. The system operates with the help of sensors installed in this system.

II LITERATURE SURVEY

Rozita Teymourzadeh, Salah Addin Ahmed, Kok Wai Chan, and Mok Vee Hoong suggested Smart GSM

Based Home Automation System.This research work investigates the potential of 'Full Home Control', which is the aim of the house Automation Systems in near future. The implementation of the house automation technology using Global System for Mobile Communication (GSM) modem to manage home appliances like security system via SMS, light conditional system. The proposed research work is targeting functionality of the GSM protocol, which allows the user to manage the target system faraway from residential using frequency bandwidths. The concept of AT commands Nd serial communication has been applied towards development of the smart GSM-based home automation system. Home owners are going to be ready to receive feedback status of any home appliances in check whether switched on or off remotely from their mobile phones. PIC16F887 microcontroller with the mixing of GSM provides the smart automated house system with the specified baud of 9600 bps. The proposed prototype of GSM based home automation system was implemented and tested with maximum of 4 loads and shows the accuracy of ≥98%

Arbab Waheed Ahmad , Naeem Jan, Saeed Iqbal and Chankil Lee proposed Implementation of ZigBee-GSM based Home Security Monitoring and Remote Control system. Home security and control is one among the essential needs of mankind from youth. But today it's to be updated with the rapidly changing technology to make sure vast coverage, remote, reliability, and real time operation. Deploying wireless technologies for security and control in home automation systems offers attractive benefits along side user friendly interface.

In this paper, implementation of a completely unique security and system for home automation is presented. The proposed system consists of an impact console interfaced with different sensors using ZigBee. Suspected activities are conveyed to user through SMS or Call using GSM technology. Upon reply, the user can control his premises again through GSM-ZigBee combination. Besides, traditional burglar alarm enhances security just in case of no acknowledgment from remote user. This system offers a coffee cost, low power consumption and user friendly way of a reliable portable monitoring and control of the secured environment. Using the concept of

Serial communication and mobile phone AT-commands the software is programmed using C-Ianguage. The design has been implemented within the hardware using ZigBee EM357

Module, Atmega128 MCU (microcontroller unit) and Sony Ericsson T290i mobile set.

Index Terms: ZigBee, MCU (Microcontroller), GSM, Home Security and Automation.

P. Satya Ravi Teja, A. Sai Srikar, V. Kushal, K. Srinivasan proposed Photosensitive Security System for Theft Detection and Control using GSM technology. The proposed system consists of an LDR sensor which acts as an electronic eye for detecting the theft, and signaling procedure supported SMS using GSM (Global Systems for Mobile communications) technology. The GSM based communication helps the owner and anxious authorities to require necessary and timely action so as to stop the theft. The LDR (Light Dependent Resistor) circuit is interfaced employing a relay circuit with an Arduino microcontroller board. Efficacy of the proposed system are often seen in its immediate intimation regarding the incident. The proposed designed system is very effective and inexpensive. Index Terms— Arduino microcontroller, LDR, GSM module 300, Security system, Photosensitive.

A. Alheraish are designed by Design and Implementation of Home Automation System. M2M Wireless communication of varied machines and devices in mobile networks could even be a fast growing business and application area in industry, customer services, maintenance business, and security and banking areas. This paper presents design and implementation of remote system by means of GSM cellular communication network. The design integrates the device to be controlled, the microcontroller, and therefore the GSM module in order that it are often used for a good range of applications. Detailed description and implementation of every design element are presented. To verify the operation of the M2M design, two home applications are practically tested using PC-based environment.

R.Anandan, Mr.B.Karthik and Dr.T.V.U.Kiran Kumar proposed Wireless home and industrial automation security system using GSM. The system is fully controlled by the 8 bit P89V51RD2

microcontroller are used. All the sensors and detect are interconnect to microcontroller by using various types of interface circuits. The microcontroller will continuously monitoring all the type of sensors and if it senses any security problem detect then the microcontroller will send the SMS to the user mobile through Microcontrooler to GSM modem. The Microcontroller also turns ON and OFF the electrical appliances in home as well as industry based on SMS received from the respective user.

III BLOCK DIAGRAM
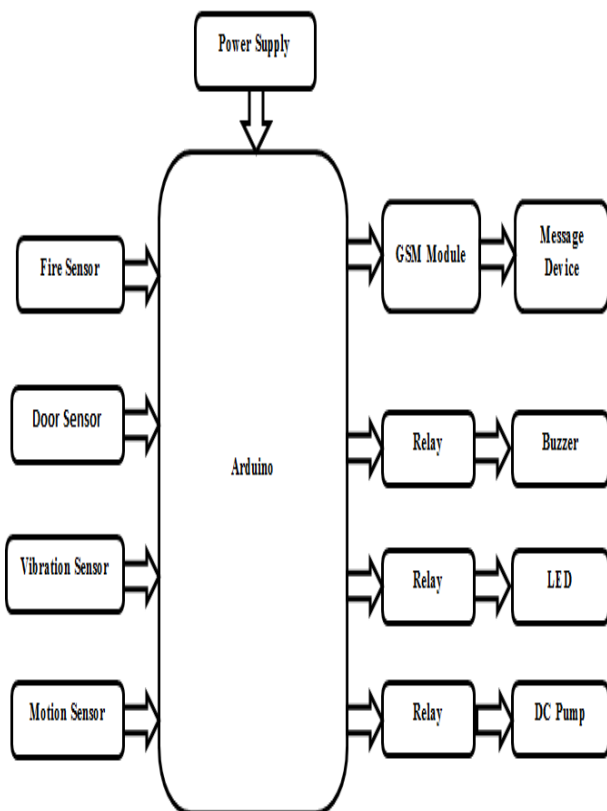
Block Diagram 3.1

3.1 Block Diagram

We are using voltage convert adapter to convert 230 voltage AC supply to 12V DC supply and it is used for Relay.

Further we have used IC LM2576D2TR4-5g for converting 12 voltage DC to 5 Voltage. Which is used for GSM Model, 5 voltage conversion 3.3 voltage for Arduino using IC LN1117

Fire Sensor (Smoke Detector):-

We are using 2351e smoke sensor. It is connected to Arduino Pin no 27.In fire Sensor pin no 3 is an output

pin. Required supply:-12 volt. When a fire accident occurs the two resistors which are in serial detects the smoke and the signal is passed to arduino (pin no 27). Arduino activates all three relay which are further connected to buzzer (Pin no 26), LED (Pin no 25) ,DC Pump (Pin no 24). Arduino sends the signal to GSM model through Pin no 9 and Pin 10 and sends a messages to end user.

Motion Sensor:-

We have used Dual element PIR motion sensor. Detection Range: - 15mtr. Detection Angle: - 110 Degree. Power supply: - 10 -15 voltage. Motion sensor is connected to pin no: 28 of Arduino. Motion sensor is basically used for security purpose in industry level sensors can be used under almost all environmental and climatic conditions. Motion detect the motion and pass the signal to arduino. Arduino activates the relay which are further connected to buzzer Pin no 26, LED Pin no 25, Arduino Pin 2&3 send the signal to GSM model through Pin no 9 and Pin 10 and send a messages to end user.

Door Sensor:-

Door Sensor work by using magnets and a magnetic sensitive switch. A magnet is placed in the top corner of the door and the switch is placed in the door frame, exactly opposite to the magnet .When the door is closed, the switch takes rest i.e switch and the magnet path vies open, When the door opens, this unstable magnetic field is disrupted, closing the switch and at that instant the signal is passes to arduino. Arduino activates the relay which are further connected to buzzer Pin no 26, LED Pin no 25, Arduino Pin 2&3 sends the signal to GSM model through Pin no 9 and Pin 10 and sends a messages to end user.

Vibration sensor:-

In industry level every machine is placed in plane platform for smooth and balance working. There may be a situation occur when the platform becomes unstable and the machine starts vibrating. If the situation continues. These vibration may damage, the internal parts of the machine. To avoid these problem vibration sensor are used. Vibration sensor sense the vibration, which are out of limit and sends the signal to arduino through pin no 5. Arduino activates the relays which are further connected to buzzer Pin no 26, LED Pin no 25, Arduino Pin 2&3 sends the signal

to GSM model through Pin no 9 and Pin 10 and sends a messages to end user.

3.2 Circuit Diagram
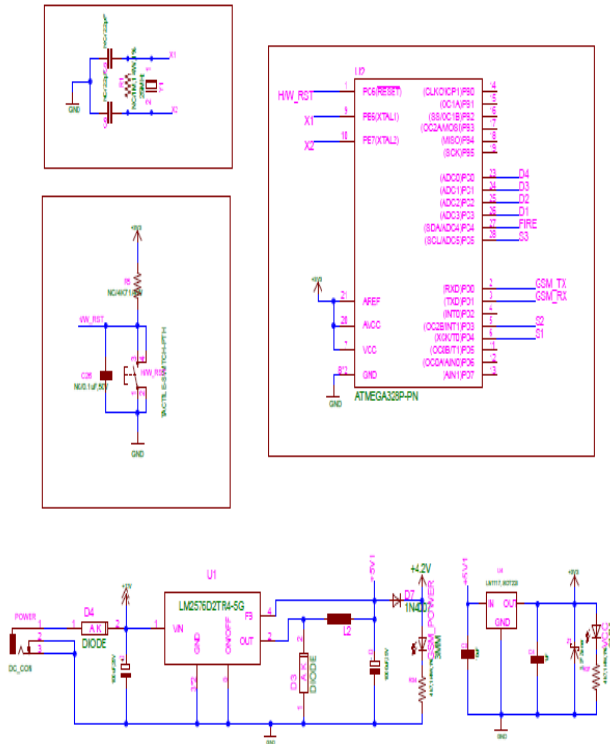
Circuit Diagram 3.2.1
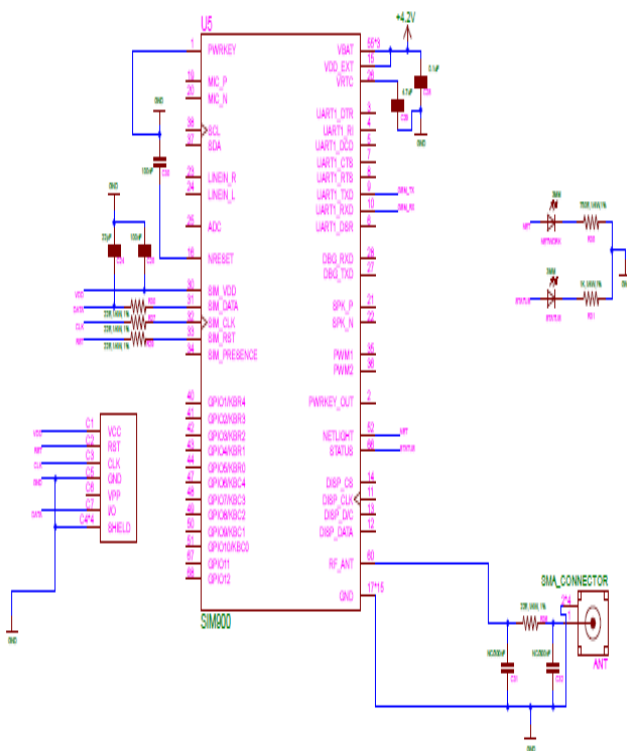
Circuit Diagram 3.2.2

IV DESCRIPTION

4.1 GSM Modem: GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). The Theory of GSM was developed at Bell Laboratories in 1970.Mobile communication system is used widely throughout the world. GSM is an open and digital cellular technology used for transmitting data and mobile voice operates at the 850MHz, 900MHz frequency bands. For communication purposes GSM system was developed as a digital system using time division multiple access technique. A GSM digitizes and reduces the data, then sends the data through a channel with two different streams of client data, each in its own stream of data the digital system can carry 64 kbps to 120 Mbps of data rates.

There are various cell sizes in a GSM system such as macro, micro and pico cells. Each cell varies as per the implementation domain. There are various cell sizes in a GSM network namely macro, micro, pico and umbrella cells. The coverage area of each cell varies according to the implementation of the environment.

Figure 4.1.1 GSM Module

4.2 Fire sensor: It uses the fire sensor for detection of fire in the industry or say go down or gas filling chamber. If the fire is detected then in that case the fire detection sensor will sense and will on the water sprayer pump working as fire extinguisher and when the fire is extinguished automatically the water sprayer

pump will be off. No need for manual switching the circuit ON and OFF. It will work automatically.

Figure 4.2.1 Fire Sensor

4.3 Motion Sensor: A motion detector is an electrical device that utilizes a sensor to detect nearby motion. Such device is often integrated as a component of a system that automatically alerts a user of motion in an area. They play an important role for component of security, automated lighting control, energy efficiency, and other useful systems.

An active electronic motion detector contains an optical, microwave, or acoustic sensor and a transmitter. However, a passive contains only a sensor and only senses a signature from the moving object through emission or reflection. Specialized systems are more expensive but have either increased sensitivity or much longer ranges. Tomographic motion detection systems are used to cover much larger areas because the radio waves which it senses are at frequencies which penetrates walls and obstructions, and can be detected in multiple locations.

4.4 Door Sensor: Door sensors are an essential component for your home security system: they let you know when someone is entering your home. These devices are made up of two parts, forming a circuit when they're kept parallel to each other. When the door is opened the switches are separated, which triggers the control panel to sound an alarm. Door sensors are simple to install, it's easy to take these helpful gadgets for granted. But the more you know how your home security system works, the better you can use and maintain them. While there are several different types of door alarm sensors, most use a reed switch and a magnet to determine if a door is open or closed.

Reed switches are used in countless devices, from doorbells to laptops, and rely on a set of electrical connectors. The switch is closed when the two parts settle close to one another, and an electric current can flow. When the switch opens, the two parts separate, causing the electrical current to stop and the circuit to break

When you add a door sensor into your home security system, the device will be provided with both the pieces: a reed switch and a magnet. One piece attaches on the door frame, and the other piece attaches parallel to the first piece on the door itself. The two parts create a closed circuit when the door is closed. When the door is opened the magnet and the switch gets separated causing the circuit to break When the circuit breaks, the sensor sends the signals to the central control panel.

Figure 4.3.1 Motion Sensor

Figure 4.4.1 Door Sensor

4.5 Vibration Sensor: The vibration sensor is also known as a piezoelectric sensor. The piezoelectric effects are used while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge.

The principle of vibration sensor which operates on different optical otherwise mechanical principles for detecting observed system vibrations.

The sensitivity of these sensors ranges from 10 mV/g to 100 mV/g, and there are lower and higher sensitivities which are also accessible. The sensitivity of the sensor can be selected based on the application. So it is essential to know the levels of vibration amplitude range to which the sensor can be exposed throughout measurements.

Figure 4.5.1 Vibration Sensor

4.6 Relay Driver Circuit: Relays are components which allow a low-power circuit to switch a relatively high current on and off, or to control signals that must be electrically isolated from the controlling circuit itself. Here is a quick rundown. To make a relay operate, you have to pass a 'pull-in' and 'holding' current (DC) through its energizing coil. And relay coils are designed to operate from a particular supply voltage often 12V or 5V, in many small relays.

Fig 4.6.1 Relay

4.7 Buzzer: A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, piezoelectric audio signaling device. A piezo electric buzzer can be driven by an oscillating electronic circuit or with other audio signal source. A click or beep can indicate that a button has been pressed.

There are several different kinds of buzzers which are based on their sound levels. The common sizes for Sound Level are 80 dB, 85 dB etc.

Fig 4.7.1 Buzzer

V CONCUSION

The main agenda of our project was to provide a safe environment for the workers several industrial accident like fire and vibration and the incidents of unauthorized access can be resolved using our system A simple system to improve the standards is developed. It is a real time monitor able system developed with simple hardware which simplifies the possibility of error free security system. This system can be easily implemented with maximum reliability and high security with low cost, It is a special enhancement

VI FUTURE SCOPE

Voice announcement system can be added to indicate Status of a device. If we can add voice announcement system with the buzzer so if there are hazardous parameters then that problem is easily detected then accordingly respective voice message will be announced.

We can automatically switch off the extinguisher which we were doing it manually.

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