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INTELLIGENT SECURITY SYSTEM FOR INDUSTRIES

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Abstract: Now days the technology is increasing rapidly, that leads to an up gradation in industrial security system. Automation in security sector makes it more authentic. There are many electrical equipment's are available in industry which are in necessity of monitoring from a remote area all at a time. In this paper a smart industry and security system is proposed along with the GSM detection technique. A stand-alone system through Internet of Things as a network of communication is implemented. Arduino is used as controlling unit coded in c language.

I. INTRODUCTION

Automation is one of the increasing needs with in industries as well as for domestic applications. Automation reduces the human efforts' by replacing the human affords by system which are self-operated, The Internet is one way of the growing platform for automation, through which new advancement are made through which on easily monitor as well control the system using internet. As we are making use of Internet the system becomes secured and live data monitoring is also possible using IoT system.

Within industries the various hazardous gas is being processed, hence to provide security to those employ working within those industries, it becomes important issue to work on their security, if leakage of gas takes place, then these system alerts by turning ON alarm which notifies the employers. This system also helps us take some crucial decision from any point of the world within internet network. Wi-Fi shield is being used to act as service point between network and connecting network.

An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, and store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighborhood traffic control systems, etc.

Embedded system implementation: An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, and store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighborhood traffic control systems, etc.

Objectives

The objectives of this study are:

- 1) To detect fire, gas and vibrations in Industries.
- 2) To send Alert message to user through GSM
- 3) Providing flexibility and security to the employs

Methodology

Gas and Fire sensor, are used in this project in order to detect fire and harmful gases in the industry and automatic alert to the authorities Using GSM and also Buzzer will activate and the values are uploading to cloud server. MEMS is used to detect the natural calamities like Earthquakes and alert the authorities.

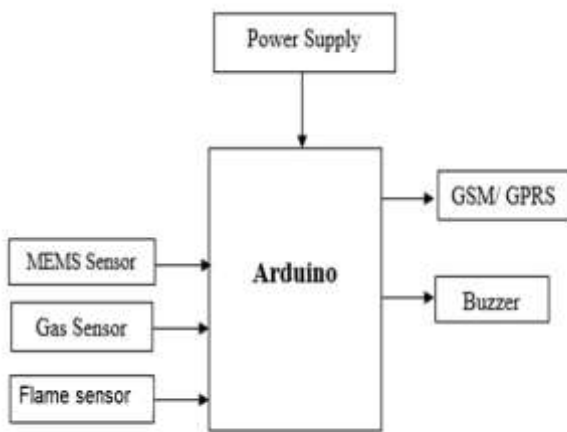


Fig 1 Intelligent Security System For Industries

II. LITERATURE REVIEW

1. The paper [1] proposed an intelligent door system using Internet of Things, which detects and send the email notification to the owner about the intrusion. It logs all the intrusion data into Google spreadsheet of owner's Google drive account. ADXL345 accelerometer detects the change in motion of the door. Raspberry pi has been used to read sensor data. Sensor data is sent to the Amazon Web Services Internet of Things (AWS IoT) console. AWS Simple Notification Service (SNS) will send out email notification to the concerned owner based on the AWS IoT console message based on the messages from the AWS IoT console. All the intrusion logs are also stored in Google spreadsheet by OAuth2.0 protocol to access related Google Application program interface (APIs). The proposed system can be used as a prototype in strengthening door security in many applications such as bank burglary, home invasions, Ram-raiding, office door breaching and lock picking.

The paper [2] proposed IoT based attendance system. Attendance system is designed with the use of micro controller ESP8266 12e and OLED display. OLED display shows the names of the students whose fingerprint is scanned. A fingerprint module R305 has been used to scan and recognize the fingerprints. Other components used are wires, switches, and PCB. The system has a transmitting module to send the fingerprint matched ID. A server in attendance system receives fingerprint matched ID from the transmitting module. After processing the data, student attendance is calculated in percentage. A student can check their attendance through the android application provided by the system. This application facility sends push notifications when assignments are issued by teachers or the attendance of particular student is low. The System can be used for security purposes where high-level security is desired.

4.M.Z.ARashid, Marian Sulaiman [ISSN1913-1844, Volumeno.9, 2015]

“Design and simulation study of small four-wheel vehicle chassis for a single driver”

This paper has presented a design for a four-wheel chassis design that can be occupied or driven by a single driver. The chassis structure selected is the space frame type chassis. A static test is also performed on the chassis design using the simulation function in the Solid works software. Then, the basic chassis frame structure is fabricated using the materials selected which is the 25mm x 25mm square mildsteel with a thickness of 1.6mm. The static test conducted using the simulation function in Solid work.

The paper [3] proposed IoT based Intelligent Safety & Location Tracking Device for Old Age & Women. The purpose of the system is to assist parents to locate missing or lost women and children. It works using GPS and SMS and detects the child location. The System sends the location to parents using GPRS module. An application is helpful for parents that will allow them to send a location request to a child side then retrieve the location from the request reply and point it on a map. Another application is also provided for child side that gathers the necessary information of the smart phone that will be used to locate the smart phone. In the case of extreme emergency, An SOS button is available in the system which sends the location of the device to registered mobile for help from parents or person. The System is comparatively low cost solution and performance of the device is accurate and reliable. The web version is used to see current the location and send updated location to server. This system use ARM-LPC2138 as microcontroller and for GPS S1216R module has been used. The server has been created using File Zilla tool. One server collects the data from the system and sends it through GPRS.

Hardware and Software Details

A. Arduino UNO



Arduino Uno

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and

embedded environments

Arduino Uno is a microcontroller board developed by Arduino.cc which is an open-source electronics platform mainly based on AVR microcontroller Atmega328. The current version of Arduino Uno comes with USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output.

B.MQ2 Sensor(Gas Sensor):



MQ2 Sensor

The **gas sensor module** consists of a steel exoskeleton under which a sensing element is housed. This sensing element is subjected to current through connecting leads. This current is known as heating current through it, the gases coming close to the sensing element get ionized and are absorbed by the sensing element. This changes the resistance of the sensing element which alters the value of the current going out of it.



Image Showing Hexapod Structure inside a Gas Sensor

The top of the gas sensor is removed off to see the internal parts of the sensor: sensing element and connection wiring. The hexapod structure is constituted by the sensing element and six connecting legs that extend beyond the Bakelite base.

C.Electromechanical Buzzer



Electromechanical Buzzer

A buzzer is an efficient component to include the features of sound in our system or project. It is an extremely small & solid two-pin device thus it can be simply utilized on breadboard or PCB. So in most applications, this component is widely used.

This buzzer uses a DC power supply that ranges from 4V –9V. To operate this, a 9V battery is used but it is suggested to utilize a regulated +5V/+6V DC supply. Generally, it is connected through a switching circuit to switch ON/OFF the buzzer at the necessary time interval.

C. MEMS Sensor:



MEMS Sensor

MEMS are low-cost, and high accuracy inertial sensors and these are used to serve an extensive range of industrial applications. This sensor uses a chip-based technology namely micro-electro-mechanical-system. These sensors are used to detect as well as measure the external stimulus like pressure, after that it responds to the pressure which is measured pressure with the help of some mechanical actions. The best examples of this mainly include revolving of a motor for compensating the pressure change.

D. Fire Sensor(LM393)



Fire Sensor

A sensor which is most sensitive to a normal light is known as a flame sensor. That's why this sensor module is used in flame alarms. This sensor detects flame otherwise wavelength within the range of 760 nm – 1100 nm from the light source. This sensor can be easily damaged to high temperature. So this sensor can be placed at a certain distance from the flame. The flame detection can be done from a 100cm distance and the detection angle will be 60°. The output of this sensor is an analog signal or digital signal.

This sensor/detector can be built with an electronic circuit using a receiver like electromagnetic radiation. This sensor uses the infrared flame flash method, which allows the sensor to work through a coating of oil, dust, water vapor, otherwise ice.

The pin configuration of this sensor is shown below:

- Pin1 (VCC pin): Voltage supply ranges from 3.3V to 5.3V
- Pin2 (GND): This is a ground pin
- Pin3 (AOUT): This is an analog output pin (MCU.IO)
- Pin4 (DOUT): This is a digital output pin (MCU.IO)

GSM Module:



GSM Module

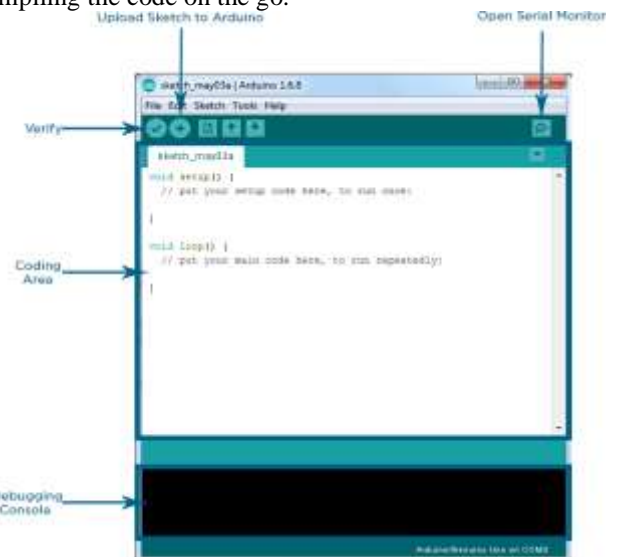
An expansion of the GSM arrange is GPRS or General Packet Radio Service. GPRS is an incorporated piece of the GSM organize that gives a productive method to exchange information with the equivalent GSM arrange assets.

A GSM/GPRS module is an IC or chip that utilizes a SIM (Subscriber Identity Module) and Radio Waves to interface with the GSM arrange. Basic radio frequencies are 850MHz, 900MHz, 1800MHz and 1900MHz in which a run of the mill GSM module works. It comprises of the GSM/GPRS module, SIM card addition space, PC or microcontroller association RS-232 interface, LED flag status, control supply and mouthpiece and speaker association arrangement. Each GSM/GPRS module is remarkable and its IMEI number makes it conceivable to separate it. IMEI or International Mobile Equipment Identity Number is a one of a kind 15-digit number for cell phones, satellite telephones and other GSM organize gadgets. With the help of this GSM/GPRS Module, we can do the following tasks.

- Make, receive or reject voice calls
- Send, receive or delete SMS messages in the SIM Card
- Add, read and search the contacts in the SIM Card
- Send and receive data to / from the GSM/GPRS Network through GPRS

Arduino IDE:

Arduino IDE where IDE stands for Integrated Development Environment – An official software introduced by Arduino.cc, that is mainly used for writing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.



Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module.

- It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process.
- It is easily available for operating systems like MAC, Windows, and Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment.
- A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more.
- Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code.
- The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board.
- The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module.
- This environment supports both C and C++ languages.
- The button appearing on the top right corner is a Serial Monitor – A separate pop-up window that acts as an independent terminal and plays a vital role for sending and receiving the Serial Data. You can also go to the Tools panel and select Serial Monitor, or pressing Ctrl+Shift+M all at once will open it instantly. The Serial Monitor will actually help to debug the written Sketches where you can get a hold of how your program is operating. Your Arduino Module should be connected to your computer by USB cable in order to activate the Serial Monitor.

III. RESULT AND DISCUSSION

This system detects the Hazardous Gases, Fire and Vibrations in Industries and gives alert through SMS to user.

Supervising System using Arduino has been experimentally proven to work satisfactorily by connecting required sensors and they were successfully monitored remotely through internet.



IV. CONCLUSION

Supervising System using Arduino has been experimentally proven to work satisfactorily by connecting required sensors and they were successfully monitored remotely through internet.

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