IMPLEMENTATION AND DESIGNING OF ADVANCED FIRE ALERT SYSTEM USING GSM MODULE

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Abstract: The epidemic is causing problems throughout the country. The system is capable of detecting an erupting fire, alerting residents, notifying the relevant philanthropist, and extinguishing the source of the fire before a similar danger occurs, so providing an ultimate prevention of fire breakouts and losses, thereby saving lives and property. This design primarily utilises the dominant wireless communication network, employing a GSM module to alert concerned residents via textbook dispatches whenever the detectors detect dangerous gas leakage, heat, or fire, in order to reduce the rate at which people lose lives and property due to fire hazards. Affair and input device are both displayed in an interactive format to demonstrate how the microcontroller controls the design.

Keywords: *Fire, Sensor, Control Panel, Power supply, Detector, Sim900 GSM module Resistors ,Capacitor, LED, Piezoelectric buzzer, USB Ports*

I. Introduction

There is a lot of effort put into developing automatic detection systems for home fires in the most advanced countries. A fire alarm system should notify building inhabitants in a fast and reliable way of the presence of fire indicators, such as bank or high temperatures. A fire sensor is often employed as a bank detector because to its early fire detection capabilities, rapid response time, and low cost. Detection systems based on gas or temperature detectors need a single detector, often a bank detector, and have a high false-alarm rate due to temperature changes. In remote locations with little human trade, GSM-based fire alarm devices are a godsend. Mining, factories, and artificial environments may all use similar technologies. We're well aware that owls are notoriously nocturnal. When a fire breaks out in the middle of the night, the GSM-based Fire Alarm System can assist keep people safe by sending out alarms. Automated fire detection is becoming more significant in order to reduce the risk of fire in the structure as well as the time it takes to respond to a fire. An autonomous fire alarm system provides a method for real-time observation and monitoring. One of the most critical components of fire safety is recognising a rising fire emergency and informing the structure's inhabitants and the fire emergency organisations in a timely manner. This is a part of the detection and alarm systems for fires that are in place.

When one of the four basic features of combustion — heat, bank, honey, or gas — is detected early, most fire sensors are set up to do the same thing. As a result, this study discusses the development and implementation of a system that can automatically detect fire breakouts and send out alerts to concerned donors over a wireless network, potentially saving both lives and money.

To reduce the rate at which people lose their lives and packages to fire threats, this article uses a GSM module to notify worried residents through automated dispatches if the detectors detect harmful gas leaks, heat, and fire.

II. Components of Fire Alert System

1. Flame Sensor

Honey detectors are intended to detect and react to the presence of honey or fire in the terrain where they are utilised. Using a microcontroller, it is possible to set the device so that it responds to a certain location of fire or honey, depending on the

application. According to its area of action, a fire extinguisher may be activated, an artificial alarm can be played to raise fire awareness, or a propane or natural gas line can be smothered. It's faster and more precise than other high-temperature sensors like heat sensors because of its medium.

FIGURE-1: FLAME SENSOR

2. MQ – 2 Sensor

In places where LPG gas is utilised, such as in our homes, gas stations, storage tanks, and vehicles that run on LPG, an LPG detector is a device that can detect leakage of the gas. Liquefied demitasse (Liquid demitasse display) and seven-member displays may be used to alert the user to the presence of LPG leakage or to provide a visual indication of the LPG attention. When a combustible gas is present, the detector's conductivity increases in direct proportion to the rate at which gas concentrations rise. It can detect bank in the range of 300-ppm and provide an analogue affair voltage of 0 to 5v depending on the amount of bank detected (CBG13). Clean air has a lower conductivity for SnO2, the substance utilised in this experiment. A similar analogue voltage is generated at the affair as the conductivity rises in response to the growing interest in combustible feasts.

FIGURE-2: MQ-2 GAS SENSOR

3. LM-35 (Temperature Sensor)

The LM35 is a grounded I.C (integrated circuit) detector that may be used to measure temperature with an incoming voltage proportional to the temperature (in °C) and a scale factor of.01 V/ °C. When measuring temperature, it is more accurate than a thermistor. The detector electronics is sealed to reduce oxidation's impact. When compared to thermocouples, the LM35 generates a higher affair voltage and may not tolerate redundant affair voltage adjustment. Because the LM35 draws such a little current (60 micro amps) from its force, it is less vulnerable to tone-heating.

FIGURE-3: TEMPERATURE SENSOR

4. Microcontroller (AURDINO UNO)

Sensor data is processed and controlled using an Arduino microcontroller coded in the C programming language. In addition to Java, C, and C++, the Arduino platform has an integrated development environment (IDE). With the ATmega32 you may get the following benefits. A “32 kilobyte Flash Program Memory” with “Read-While-Write capabilities, 1024 bytes EEPROM, 2 kilobyte SRAM, 32 general-purpose I/O lines, 32 general-purpose working registers, a JTAG interface for boundary-checkup, On-chip Debugging support, and programming capabilities”. In addition to the USB connection, the Arduino UNO may be powered by an external power source. The source of electricity is automatically identified.

FIGURE-4: AURDINO UNO

5. Indicator & Buzzer

The system has one index for easy searching. The buzzer is activated by pressing the button. The next section goes into further depth about the buzzer's function. There are several types of buzzers. Buzzer alerts, timers, and confirmation of user input such as a mouse click or keyboard are the most common applications of the buzzer. For this project, an Arduino microcontroller drove a piezoelectric buzzer as part of the electronic buzzer.

FIGURE-5: BUZZER

6. GSM SIM-900

In an SMT module, the SIM900 may provide a comprehensive quadrangle-band GSM/GPRS solution. GSM/ GPRS 850, 900, 1800, 1900 MHz performance for voice, SMS, data, and fax is provided by the SIM900 through an assiduity-standard interface. Despite its little size, SIM900 can accommodate practically any M2M operation's space requirements, particularly those requiring a sleek and compact design. The AMR926EJ-S core of SIM900 is a very essential single-chip CPU. GSM/GPRS quad-band module measuring 24mmx24mmx3mm in size. Suit of the SMT kind for use by the client. An important mound for the TCP/IP protocol that is bedded.

FIGURE-6: GSM (SIM-900

7. Power & VIN

A USB connection or an external power source are both acceptable methods of powering the Arduino UNO microcontroller board. The source of electricity is automatically identified. Additionally, an AC to DC appendage (wall-nodule) or a battery may provide external (non-USB) power. A 2.1 mm centre positive draw may be used to connect the appendage to the

board's power socket. The GND and VIN leg heads of the power connection may accept leads from a battery. An external voltage of 6 to 20 volts may be used to power the board. While this is true, if the 5V leg is provided with less than 5 volts, the board may become unstable, resulting in 13 Using more over 12 volts may destroy the board's voltage controller. 7 to 12 volts is the recommended voltage range.

When utilising an external power source, the arduino board's input voltage (as opposed to 5 volts from the USB connection or other regulated power source). This leg may be used to deliver electricity or, if using the power jack, to access it. The board's microprocessor and other components are powered by regulated electricity. The on-board controller or USB or any regulated 5V supply may also provide this, in addition to VIN. 3.3 volts of force created by the on-board controller on the motherboard. A maximum of 50 mA of current may be drawn.

FIGURE-7: POWER SOURCE

III. PROJECT WORKING

Working of Gas Sensor

When a metallic oxide demitasse, such as SnO2, is heated, the detector's glass face absorbs the negative-charged gas. While the electrons are being transferred to the adsorbed oxygen, a sub-caste of space charge is left with positive charges. This face capacity may prevent electrons from accessing the circuit. The gadget's confluence zones enable electrical current to overflow (grain 5 boundary). Grain barriers, which absorb oxygen, hinder carriers from moving easily. The lowered height of the disabled access minimises the detector's resistance.

Working of Flame Sensor

Fire Pointers celebrate through ostensibly optical means like as ultraviolet (UV) and infrared (IR) spectroscopy and visual fire imaging. Flares at a refinery, for example, are often fuelled by hydrocarbons, which, when combined with oxygen and an ignition source, produce heat, carbon dioxide, and other combustion byproducts. The expulsion of UVA, UV and IR radiation characterises the remarkable reaction. Allowing them to split off in the midst of flares and false alarm sources.

Working of GSM & Arduino Board

Through the position shifter IC Max232, a GSM modem was appropriately connived to the MC. When a SIM card-mounted GSM modem receives a number instruction through SMS from any mobile phone, it sends that data to the MC via periodic communication. During the execution of the software, the GSM modem gets the order' STOP 'to generate an affair at the MC, the contact point of which is utilised to deactivate the ignition switch. As a result, the stoner's instruction is based on a proposal submitted by him using the GSM modem'ALERT'a programmed communication only if the input is driven low. The Arduino datasheet describes a microcontroller board that is based on the AT mega 328. (datasheet). There are 14 digital input/output pins on the board.

Communication

The Arduino UNO can connect with a computer, another Arduino, or other microcontrollers via a number of setups. On

digital legs 0 (RX) and 1, the ATmega328 supports UART TTL (5V) periodic communication. (TX). An ATmega8U2 on the board handles the periodic communication through USB and appears to computer programmes as a virtual com port. The'8U2 firmware does not need an external motorist since it uses standard USB COM motorists. However, on Windows, an in train is necessary. A periodic examiner in the Arduino software allows simple textual data to be delivered to and from the Arduino device. The RX and TX LEDs on the board will flash when data is transmitted over the USB-to-periodic chip and USB connection to the PC (but not for periodical communication on legs 0 and 1). A software Periodical library enables periodic communication on any of the Uno's digital legs. The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino software includes a line library that makes using the I2C machine much simpler.

IV. ARDUINO BOARD PROGRAMMING

The “Arduino Integrated Development Environment (IDE)” often known as the Arduino Software, comprises a text editor for writing code, a message box, a text terminal, a toolbar with basic operations buttons, and a menu system. It connects with the Arduino hardware and uploads programmes to it.

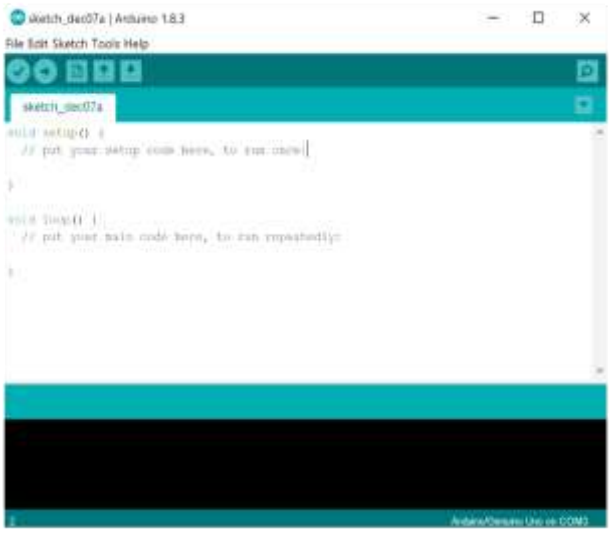

FIGURE-8: PROGRAMMING ON IDE

V. IMPLIMENTATION

When the system is turned on, LM35 will constantly monitor the temperature of the surrounding environment. When a fire, no matter how little, is started, the temperature rises. When this happens, the LM35 can determine the current temperature in an instant. When the temperature reaches 40 degrees Celsius or above, the microcontroller on the Arduino UNO board will send an alarm message to the end user through the GSM module. In the code, the temperature limit that may be triggered by LM35 can be adjusted. There is no limit on how high the temperature may be permitted to climb due to the LM35's large temperature detecting range (-55 o C to +150 o C). When it's sweltering outdoors, Malaysian temperatures may reach about 38 degrees Celsius. As a consequence, given the weather in India, 40 degrees Celsius is a totally adequate detection limit.

FIGURE-9: WORKING MODEL

V. Conclusion

There's an immense need of perpetration of automatic fire extinguishing system to cover lives and means from fire hazards. The perusing of yield voltage from the gas, temperature, fire, vibration and bank detector demonstrates the estimation of centralization of gas temperature, fire, and bank educates people about the position of pitfall by transferring dispatches and dispatch to him and raises signal. A control frame that will respond to the unordinary changes in gas focus and expanding of temperature, fire, and seeing of the bank as the caution frame has been planned in view marker for the people, Information reading from gas detector was effectively changed to visual plant exercising a periodical link and painlessly observed with the backing of line and showed in the frame.

VI. Future Scope

This is a low-cost fire alarm system that works dependably to provide fire safety and may be put in homes, businesses, and warehouses. The disquisition may incorporate a variety of variables such as a security frame or making the frame remote, allowing the import regulator to operate the detecting element. Modified programming may alter the operation of the discovery system and enable the usage of new features. The security aspects of the harmful gas discharge warning frame may likewise be improved by including additional capability to examine the detector's state on the off chance that the detector 36 isn't operating well or if the detector alignment has been loosened.

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