

Model of Fire Alert System using Arduino Nano Pro



Sai Kumar Garre, M. Leena Reddy, N.V.K Ramesh

Abstract: Now-a-days, fire accidents are occurring very frequently in public transport system which causes the loss of most valuable human lives and the government property. There are so many methods to avoid fire accidents and to lessen the ruthlessness of loss in case of fire accidents in public transport system. It can be done climatic conditions also [6]. So, it can further reduce the loss caused by fire accidents in trains if it is able to inform the respective establishments directly after the chances and open the emergency door automatically. In this it is proposed and design for the problem that in case sudden fire has been evacuated and when it reaches to Roof top where we place smoke and temperature sensor. And sends the location and information of issue to higher authorities and fire fighters through GSM module and GPS. When the temperature reaches maximum then automatic fire extinguisher and water sprinklers on ceiling got activated and perform their task also works according to it and in some cases if the water in the sprinkler tank getting less known by the ultrasonic sensor then the water from regular usage tanks get connected and blow off the fire. And saves property and lives.

Keywords: GSM module, GPS, Accidents, Smoke, Temperature, Communication, Authorities.

I. INTRODUCTION

Journeys and trips are one of the most memorable things in one's life. So, to make any journey comfortable, a good transportation with all safety measurements is needed. But mostly the accidents take place are fire accidents. We have to think on the ventilation when the fire evacuated in trains [11]. Which ultimately lead to saves the human life and as well as government properties. We are implementing it with some sensors and some communication modules to send the affected data. It can perform the entire task notifications using mobile applications[8].The compartments in train has to follow cubical rule[12]. The process to be done in this project was entirely embedded systems [5]. Its having backdrops and no failures. Once the entire setup is ready then we can set them according to sensitivity with the potentiometer on the back of the sensor basing on the height of the roof or estimated distance of the sensor kept spot. If this implemented well even, they are at any place it will be notified and it will send the notification about the problem to

the authorities at any time whether it may be at any location along with GPS location.

II. SYSTEM ARCHITECTURE

In this we are using Arduino nano pro as it is more efficient and occupies less space and performs all operations as what normal Arduino perform. As the product developer our product has to satisfy some needs like occupies less space, low cost, highly efficient, low delay. All these are connected accordingly with 12volts power supply, all these boards and modules are shorted to supply enough current. When it senses fire or gas it activates the motor and sprinkle the water on fire and if the water in one tank is emptied then the water from regular water tank came into motor and sprinkle. Similarly, at that time the message is sent to higher authorities as it was danger and GPS location to their respective numbers.

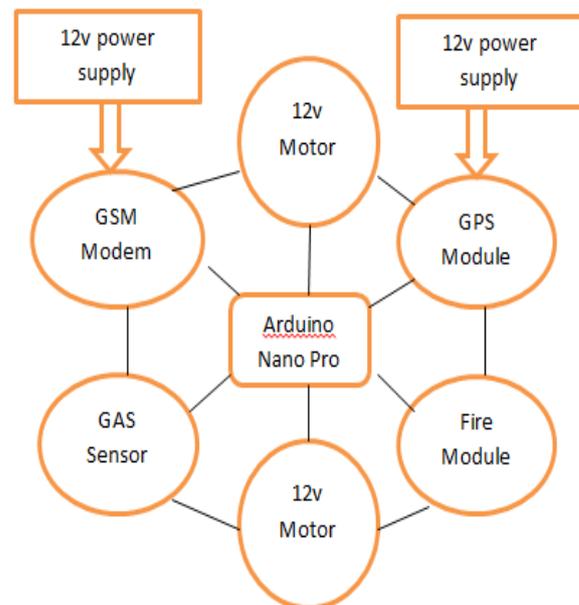


Fig 1: Architecture of model

III. COMPONENT DETAILED VIEW

A. Arduino Nano Pro:

The Arduino pro mini may be a microcontroller board based totally on the ATmega328. It has fourteen digital enter/output pins (of that half-dozen may be used as PWM outputs), half-dozen analog inputs, Associate in Nursing on-board resonator, a push button, and holes for mounting pin headers. A six pin header could also be associated with Associate in Nursing FTDI cable or Sparkfun gaolbreak board to supply USB power and communication to the board. The Arduino professional mini is supposed for semi-permanent started in objects or exhibitions.



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The board comes while not pre-installed headers, permitting the usage of numerous styles of connectors or direct attachment of wires. The pin format is well matched with the Arduino mini. There are models of the pro mini. One runs at three. 3V and eight rate, the opposite at 5V and 16 Mhz.



Fig 2: Arduino Nano Pro

B. GSM (Global System for Mobile Communication) Module:

The SIM900 is a complete Quad-band GSM/GPRS solution in a SMT module which may be embedded within the consumer applications. proposing an enterprise-trendy interface, the SIM900 gives you GSM/GPRS 850/900/1800/1900MHz overall performance for voice, SMS, facts, and Fax in a small shape component and with low electricity consumption. With a tiny configuration of 24mm x 24mm x 3 mm, SIM900 can in shape almost all the area necessities on your M2M utility, in particular for slender and compact call for of layout.



Fig 3: GSM module

C. GPS (Global Positioning System) Module:

Global Positioning System (GPS) makes use of alerts sent by way of satellites in space and floor stations on the planet to correctly decide its role on the earth. The NEO-6M GPS receiver module makes use of USART communication to communicate with microcontroller or pc terminal. It gets information like latitude, longitude, altitude, UTC time, and so on. from the satellites within the form of NMEA string. This string needs to be parsed to extract the data that we need to apply.



Fig 4: GPS modem

D. Fire Sensor Module:

Flame Detection Sensor Module is sensitive to the flame, however can also detect ordinary light. normally used as a flame alarm. Detects a flame or a light source of a wavelength within the range of 760nm-1100 nm. Detection factor of approximately 60 degrees, especially sensitive to the flame spectrum. Sensitivity is adjustable, stable overall performance.

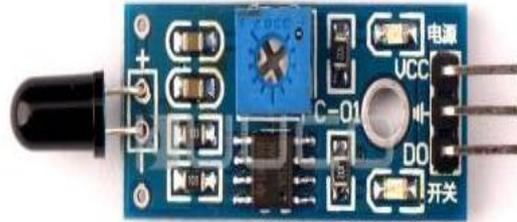


Fig 5: Fire sensor Module

E. Gas Sensor:

Gas sensors play a vital position in lots of applications, and were substantially evolved during the past few decades. this is particularly the case for applications in monitoring automotive exhaust gases and air quality. even though the lambda probe itself can't lessen polluting emissions from vehicles, it allows the adjustment of a stoichiometric mixture of air and fuel. A cutting-edge concept with two lambda probes even permits detection of a defect in a three-way catalyst. AQ sensors can monitor the air quality in homes and automobiles, as well as detecting concentrations of unburnt hydrocarbons, an crucial point in fire prevention. different applications include alerting humans when dangerous gases are in the ambient atmosphere.



Fig 6: MQ2 Gas Sensor

IV. CIRCUIT SETUP

Here the entire circuit has been arranged on a wooden block and all the modules are shorted for power supply of 12volts as all requires the same voltage. So we are providing current from either GSM(Global System for Mobile Communication) or GPS(Global Positioning System).

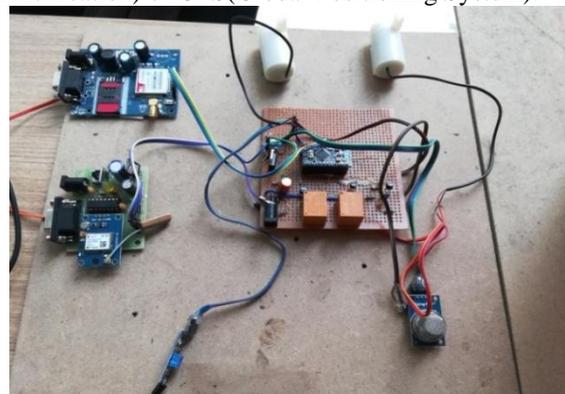


Fig 7: Circuit Setup

V. RESULT ANALYSIS

It shows the alert message to the higher authority about the accident prone through fire or gas can be shown and send to the number associated at the backend along with the GPS location.

I am in Danger
Please save me
Trace Location
<http://maps.google.com/maps/?z=15&mrt=yp&t=k&q=0.00+0.00>

Fig 8: Result Analysis

VI. CONCLUSION

Here in this paper it is used both safety measures for the accident and alert system to higher officials.

Fire and Gas sensors for the detection and water pump for the safety purpose to sprinkle water, GPS for the location, GSM for the communication with fire fighters all these done for the great upgrade for safety measures in transport system.

And it can be upgrade in future with IOT and Artificial Intelligence for better accuracy. To build trust worthy relation between people and government sector. The updating of this project results to detection techniques and power efficient technology [13][14].

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