Trackbot Assistance for Industries

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Abstract- A large number of safety measures have been implemented in today's society, one of which is industrial safety. Industrial explosions have been increasing rapidly today. Most of the industrial explosions happen due to the negligence of people shown towards the atmosphere that is present in the industry. The most effecting parameters in the industry that lead to explosions are temperature and the harmful gas present in the industry. Hence if the atmospheric conditions over there are known industrial explosions can be avoided up to some extent. This paper provides industrial safety and assistance with the help of a track bot, to help the industries to take preventive measures beforehand. The trackbot is a simple RF remote controlled robot which can be used instead of man in dangerous and narrow areas. Temperature and gas are the most frequently calculated parameters in industries to detect any danger. Whenever the concentration of gas is detected as harmful the GSM sends a security alert to predefined mobile number. Similarly whenever harmful temperature is detected GSM sends an SMS alert to the predefined mobile number. As we get a message alert we can take the required preventive measures to get rid from the industrial hazards.

Keywords- Arduino Uno, GSM modem, Gas sensor, Temperature sensor, Trackbot, RF module, Joystick, DC motors, Chassis, Male to Female, Female to Female, Male to Male jumper wires, Li-Po battery, 12V and 5V adapters used for power supply, Embedded C language, Arduino IDE software.

I. INTRODUCTION

The rapid increase of fires and explosions caused by the inflammable gases and temperature has become the most frightening thing for the society.

The working of the present device is the trackbot can be sent into the narrow areas where a human cannot be entered. The existing system has an alert with buzzer but that may not be identified all the time. Hence, the developed system uses a SMS based alert.

The gas sensor interfaced with Arduino can sense content of gas in the atmosphere and gives an alert whenever the threshold is exceeded. The gas sensor (MQ- 6) is used in detecting gas leakage in industries. It detects Liquified Petroleum Gas (LPG), butane, propane, Liquified Natural Gas (LNG).

The temperature sensor (LM35) measures the temperature in atmosphere and provides a voltage output which is proportional to Celsius scale. The GSM which is interfaced with Arduino sends the message whenever a harmful temperature is detected. The temperature sensor interfaced can sense the temperature in the atmosphere in both Celsius and Kelvin and gives the alert to the predefined mobile number when harmful temperature is detected.

A. Material and Methods :

Trackbot assistance for industries interfaced with GSM, MQ-6,LM35 and Arduino Uno is shown in the following block diagram fig.3.

a. ArduinoUno :

The Arduino UNO is an open- source microcontroller board based on the microchip ATMega328 microcontroller and developed by Arduino.cc. It is shown in fig.1.The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable.

Fig.1: Arduino Uno

b. GSM modem

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator as shown in Fig.2. It can be connected to a computer through serial, USB or Bluetooth connection.

Fig.2: GSM modem

Fig.3: Block diagram

c. Gas sensor (MQ-6) :

The MQ-6 module is used in gas leakage detecting equipment 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. It is shown in fig.4. The module gives out the concentration of the gases as a analog voltage equivalent to the concentration of the gases.

Fig.4: Gas Sensor

d. Temperature sensor (LM35) :

The LM35 series is precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. It is shown in Fig.5 The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling.

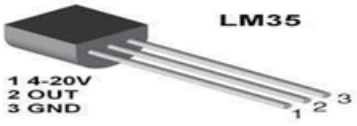

Fig.5:Temperature Sensor

e. 2.5 Trackbot :

Trackbot is a simple remote controlled robot. Its made using Normal
100 RPM DC motors, Advance Robot Chassis, 2cm width Pulleys, Track Belts 2 cm width and a 11.1V 1500 mAh battery. It is controlled through PlayStation Transmitter and receiver with motor driver circuit. The advantage of using track belt is Compared to wheel which provides only one point contact to ground belt provides a large contact area to ground. This provides high traction and also helps going over the obstacles. As this is a track belt driven robot it works on skid steer mechanism. On pressing forward button on remote both left and right motor moves forward so robot goes forward, for backward both motors move backward, for left turn left motor goes backwards and right goes forward and for right turn right motor moves backwards and left motor moves forward.

f. **Operation :**

The trackbot assistance for industries helps us to identify both toxic gas and harmful temperature in industries. The temperature sensor (LM35) interfaced with the Arduino on the trackbot continuously senses the temperature in terms of analog voltage. If the value sened by temperature sensor is greater than the threshold mentioned which is human bearable temperature, then an alert will be sent as SMS to the predefined mobile number which is mentioned in the code. In parallel, the gas sensor(MQ-6) also keeps track on the toxic gases present in the industry like LPG(Liquified Petroleum Gas), butane etc. If the gas sensed by the sensor exceeds the human bearable threshold then an alert is sent to the predefined mobile number using GSM(SIM900A).

g. Hardware of the project :

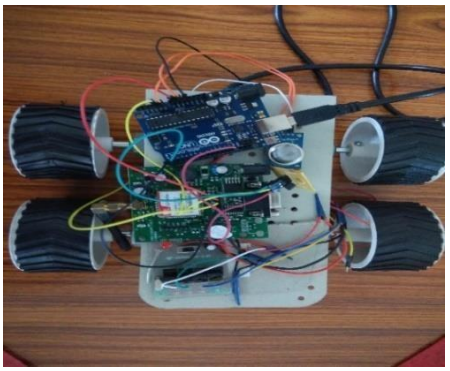

Fig.6: Hardware setup of the project

```
AT+CMGF=1
AT+CMGS= "8xxxxxxxx8"
Harmful Gas Detected681□gas:
672
TEMPRATURE = 107.23*C
AT+CMGF=1
AT+CMGS= "8xxxxxxxx8"
Temperature is high107.23□AT+CMGF=1
```

Fig.7: Result in Serial Monitor

II. RESULTS

http://www.arduino.cc
https://www.inspectorbots.com trackbot.html
https://electronicsmaker.com/gas- leakage-alarm-using-mq-6-sensor
http://www.circuitbasics.com/ Arduino-thermistor-temparature- Sensor-tutorial/
http://1000projects.org/gsm-based- temperature-monitoring-system- engineering-project-report.html

The gas sensed by the Gas sensor is displayed in the serial monitor as shown in fig.7. When the value exceeds the threshold the alert will be sent to the mobile in the form of text as shown in line3 of fig.7. Similarly, the temperature sensor detects the temperature in the analog form and when it is exceeded ,the result will be shown as in last line of serial monitor.

III. CONCLUSION

The future of the society is running behind automation which is the replacement for a man. The main aim behind the trackbot assistance for industries is it replaces the human intervention for industrial activities. This also keeps track on the industrial atmosphere and alerts using GSM modem to the predefined mobile number.

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