IOT Based Fire Detection Robot

Satya Ranjan Das, Santosh Kumar Behera, Mihir Narayan Mohanty

Abstract— This paper presents a robot based on IOT having capability to detect and fight against fire in our houses, industries as well as offices where accessibility of human is not possible. The new and non-obviousness in this device is the robot which is free to move in the region of fire either in our homes or our offices where human's feasibility is not possible. This robot will fight against fire as well as harmful gases using Infrared sensor and gas sensor and when robot detects any fire or gas inside the building of any houses or offices it will fight with harmful gas using appropriate sensor and simultaneously sent the message to user by using SMS services or GPRS Packs. Robot is controlled by IOT server with the help of computers, laptop or mobile.

Keywords- IOT robot, Global processing system (GPS), short messages services (SMS).

I. INTRODUCTION

With the advancement of technology, the people are motivated to use automation system. The automation system makes the task easy and reliable [1]. Different people use the automation system for different purposes according to their comfort. Some of them use it for making their life more comfort like developing automatic door closer, automatic fan speed controller, home automatic system etc, and some of them make the use of automation for making the task easier such as automatic railway crossing gate controller or in metro, the automatic smart card detection system [2],[3],[4]. But the operation of all these systems or devices is not possible without the use of internet of things (IOT).

The designs which are developed is based on GSM and GPRS innovation and Public subservience items for communication [5]. It is a Gas or Fire battle Robot which can be used for either prevent our homes or industries, offices etc from fire or from harmful gases. The new and novel thought behind this research is that our robot will move in the area of suffocated fire or harmful gases in our homes or in buildings of other offices, when nobody is at home and offices. This robot will find the presence of fire using infrared sensor LM35 and gas sensor MQ6 and when the flame or fire is observed by the robot, it will battle with detected fire using fans and send the message in a form of signal to a server of IOT. These Gadgets can be used at various places where feasibility of human is very difficult. Wireless network has proclaimed its incoming on vast stage and thus the whole world goes dynamic. It is need to regulate all the things without disturbing the ecosystem. This construction and design of fire or gas battle robot is remotely controlled by using GSM module embedded in Arduino UNO. The employment of "Embedded System in Communication" gave rise to several attention-grabbing applications which assured comfortless and safety to our life. The main object of this paper is to construct a SMS based Fire/Gas battle Robot tools that may replace conventional flame battle device. The tool detects the flame thereby sending message to landlord of the house, this device is made more efficient by SIM card installed in users phone for sending messages so that user got alert during fire [6].

II. SYSTEM DESCRIPTION

The GSM modem transmits the data collected using sensors mounted on the robot. The robot is semi-autonomous, so responds to the data with some specific actions for which it is programmed. For example, fan starts when data indicates that there is fire or gas leakage. The Attention commands are transferred to the electronic devices. In reverse, the electronic device transfers the stored messages from the wireless module. The micro controller checks the IoT command and after validating the command it performs further certain task on the robot or device [7],[8]. The micro controller used here in this project is ATMEGA 328 incorporated in an Arduino UNO board. The whole device will actuate when the user need information or data in a form of messages like work like" Harmful threat detected" through the SIM card which is inserted in the mobile phones or smart phones [9],[10].

- *Block Diagram of the system*

The block diagram of iot based firefighting robot is shown by fig.1, which consist of plurality of sensors, Arduino uno, dc motor and gsm module.

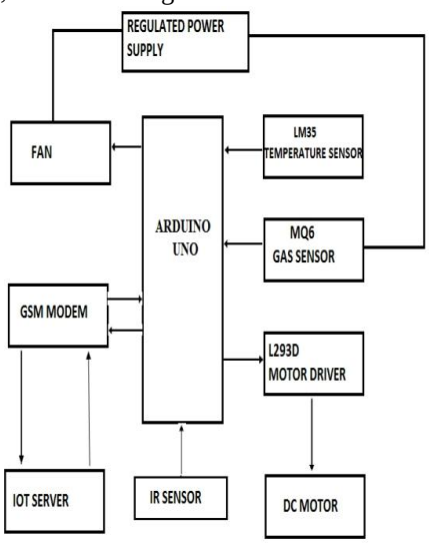

Fig.1 block diagram

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Power offer could be a regard to supply of electricity. A device which provides electricity or different kinds of power to drive an output load or various number of installed components. The supply is mostly ordinarily injected to voltage consuming component, less typically to mechanical parts, and barely other parts. In this device a 12V DC power is offer to all electronics related component. For this purpose, there is a requirement to step down electrical device, rectifier, transformer, and filter circuit for smoothing generated 12V DC power.

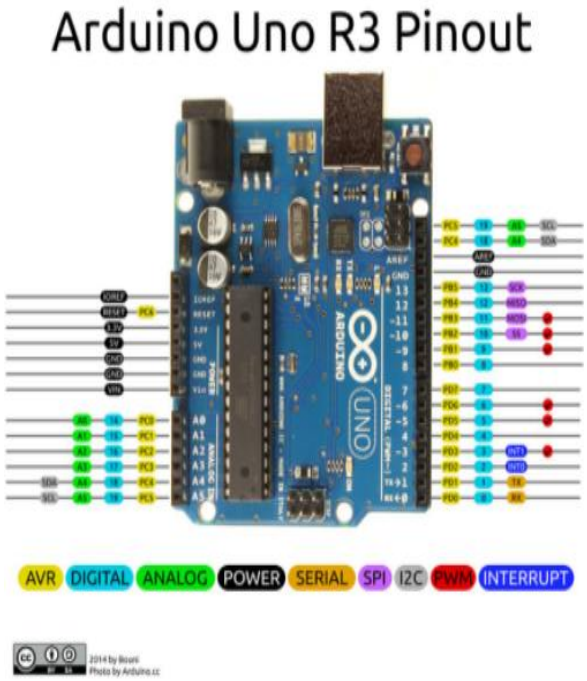

Fig.2. Arduino Uno pinout

Arduino Uno could be a microcontroller board supported the ATmega328P. It has fourteen digital input/output pins (of that half-dozen may be used as PWM outputs), half-dozen analog inputs, a sixteen megacycle per second quartz, a USB affiliation, an influence jack, an ICSP header and a reset button [11].

III. CONSTRUCTION AND WORKING & RESULTS

IoT based firefighting robot designed to detect fire or harmful gas in a certain area and send a signal to the operator. To implement this function, we need to integrate different sensors and systems together. Design and construction of this robot involve usage and integration of Arduino, GSM modem, MQ6 gas sensor, LM35 temp sensor, IR sensor, L293D motor driver and DC motors. All these components are mounted on a motor chassis. This robot is accessed from a remote location using an IoT server. To enable the communication between the all the component and the IoT server programming is required. Necessary programming has done to realize this research.

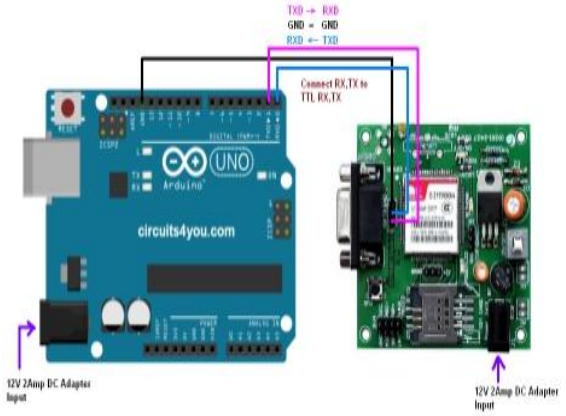

Fig. 3. Arduino and GSM connection

Arduino gathers the information from all sensors. Arduino is programmed to communicate with the GSM modem and send all the data to it. GSM modem is programmed to work as a GPRS module and communicate with the IoT server using internet. The GSM electronic module comprises of antenna to receive and transmit messages from IOT server.

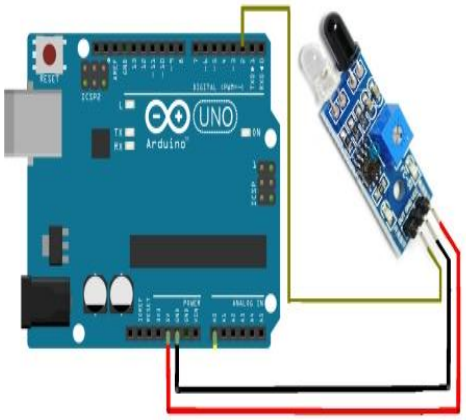

Fig. 4. Arduino and IR sensor connection

IR sensor is used to find obstacle and microcontroller is programmed to avoid the obstacles. Connection is shown in above diagram.5v is supplied to IR sensor for Arduino and ground pin is connected to GND. Signal pin is connected to the any of the digital pin.

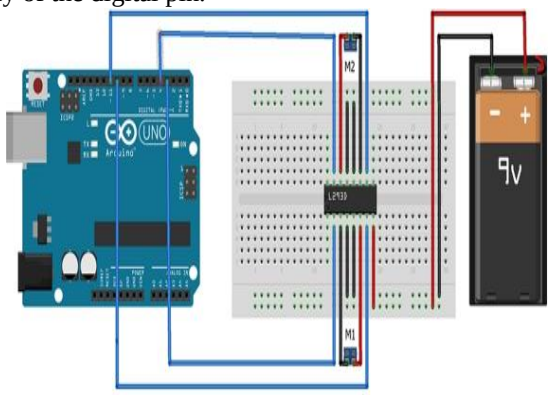

Fig. 5 Connection of Arduino and Motor driver

L293D consists of two half bridge. It is used to control the motion of the two dc motors simultaneously. It is connected to the Arduino with two digital pins each for one motor. Power supply can be given by a separate battery or from a Arduino board. Motor operation is controlled from the server with a robot control panel provided for this purpose.

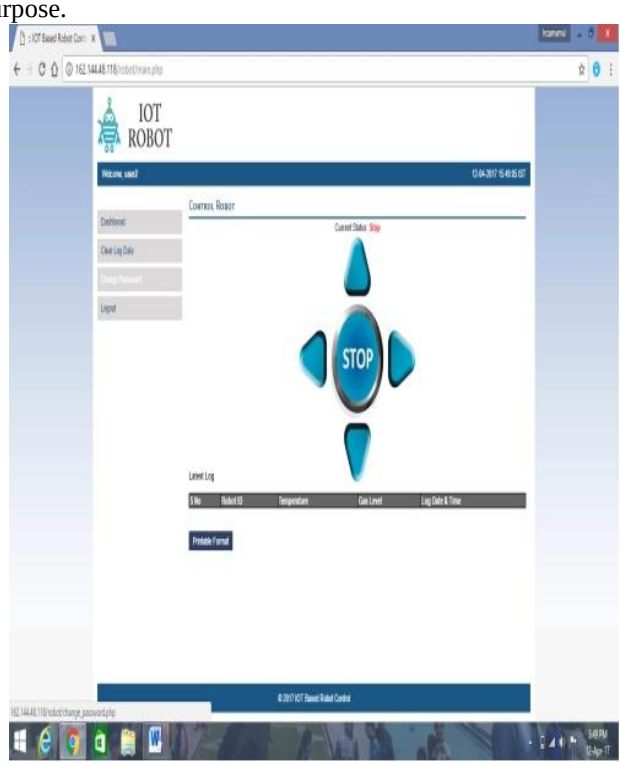

Fig. 6 IoT server and robot controller

In order to control the robot from anywhere in the world, IOT server is designed with appropriate programming. Fig.6 shows IOT web server for controlling robot. By the help of IOT the dc motor integrated with robot can easily be controlled with suitable web server.

IV. CONCLUSION

This paper focus on improving the security of houses and industries against harmful Gas Leakage and fire flame. This device is very robust and help the user to notify about if there is any gas leakage or fire. It alerts the user when a person is not at home or offices directly from the Iot server. The designed robot can be easily controlled by sending the commands to the micro controller from anywhere from the world. These commands can be observed by using Attention commands and acceptable action is taken. The main aim of this paper is to design a semiautonomous electronic IoT based firefighting robot which can replace the traditional human firefighters and prevent them from the danger of firefighter. The robot sends message to controller and will take emergency precautions to eliminate the danger for firefighters. The device is made more efficient by sending the message via SIM card to user so that the user could be automatically alert when he/she is out of home or office.

V. REFERENCES

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