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# IOT based fire department alerting system

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## ABSTRACT

Fires are one of the most widespread cause of deaths by accident. Instant alerting to the fire department is necessary to ensure immediate action. Every minute can save many lives in such situations. So here we propose an IOT based automatic fire department alerting system that instantly and automatically alerts the fire department and informs about the situation so that immediate action can be taken. The system uses temperature sensor (LM 35) to efficiently detect fires and alert fire department over IOT. We use an Arduino no in order to check if a sensor is triggered. Then it reconfirms if it really is a fire outbreak using temperature sensors in order to confirm of fire outbreak. The system now uses a WiFi connection to access IOT server and transmit data about this incident over internet.

## INTRODUCTION

This paper suggests an Internet of Things (IOT)-based intelligent fire emergency response system that can control directional guidance intelligently according to the time and location of a disaster and the design of an integrated control system using wireless sensor networks to address the problems with existing fire emergency response systems in times of fire or building collapse. IOT based fire alerting system uses temperature sensor. There is an ADC convertor, which the analog signal received at the sensor end to digital and then transmits them to the microcontroller, Arduino. The microcontroller is programmed to turn on the buzzer, when the temperature reaches the set point value. At the same time Arduino sends the data to the Wi-Fi module (ESP8266). ESP8266 is a chip which is used for connecting microcontrollers to Wi-Fi network. [1-3].

### Literature survey

In the older fire alerting systems,theyconsist of a sprinkler, buzzer, fire and smoke sensor, LCD display, etc.it will measure parameters like temperature, humidity. The temperature sensor measures temperature and if it is above the set point value, the buzzer will be turned on and then the sprinkler starts to spray water. The LCD display will show the temperature and smoke value in the surrounding area. There are also other projects based on this idea like detecting forest fire, protecting homes from fire,etc.

### Proposed system

The main purpose behind this project is to reduce the loss in terms of life, cost… when the fire accidents occurs this system specifies the time and location using to address the problems in times of fire. In this project the flame sensor detects the fire and it activates the GPS which finds the current location of fire accident area. The location is stored in the cloud and activating message is send to the destination point by the GSM module. So that we can

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reduce the cost and we can save the human life before getting more damage. In generic cases we all finds that fire accident known when half or more lost is happened, so we can all reduce this lost by this project [4-7].

## SYSTEM ARCHITECTURE

## BLOCK DIAGRAM

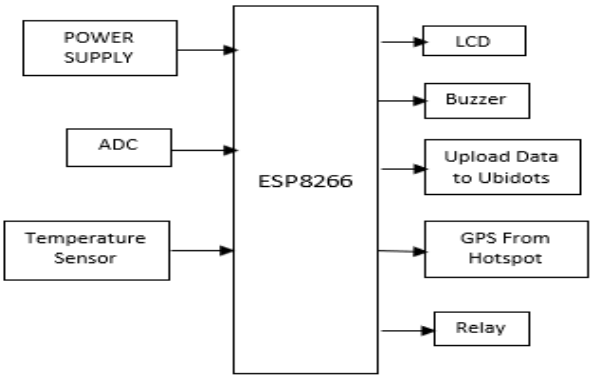


**Fig: 1 Block Diagram**

In this project the temperature sensor senses the surrounding temperature and if the temperature is above set point value, the buzzer will be turned on with the help of relay which acts as a switch here.
The ESP8266 Wi-Fi module is connected to the microcontroller and it transfers the data to the monitoring server. The location of the incident happened is transmitted through Wi-Fi module with the help of GPS and GSM module.
At the same time, it will reduce the fire by co2 regulator with solenoid valve which is attached to the device. Thus, this project is used to take immediate action in case of fire accident happens.

## EQUIPMENT

### Hardware

- **ESP8266**
- **ARDUINO UNO**
- **LM35**
- **CO2 REGULATOR WITH SOLENOID VALVE**

## ESP8266

This gives any microcontroller access to your Wi-Fi network.

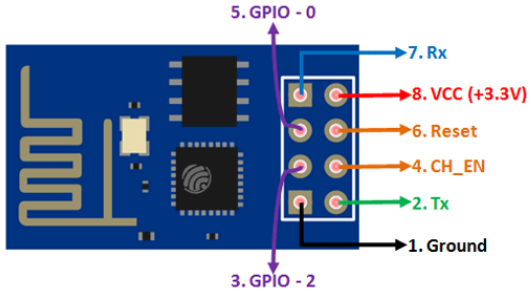


**Fig:2 ESP8266**

The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

## ARDUINO UNO

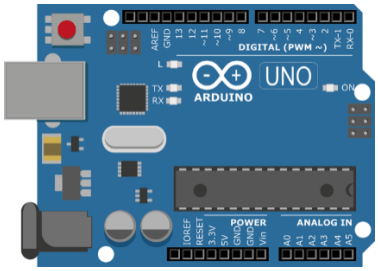


**Fig: 3 Arduino UNO**

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without working too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

LM35

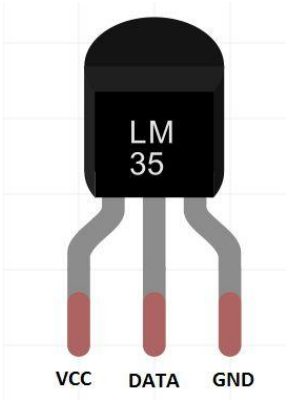


**Fig:3 LM35**

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in § Kelvin, as the user is not required to subtract a large

constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of g (/4§Cat room temperature and g*/4§C over a full b55 to a150§C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 mA from its supply, it has very low self-heating, less than 0.1§C in still air. The LM35 is rated to operate over a b55§ to a150§C temperature range, while the LM35C is rated for a b40§ to a110§C range (b10§ with improved accuracy). The LM35 series is available packaged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-202 package.[8-10].

## CO2-REGULATOR & SOLENOID VALVE

The CO2 Regulator with the Solenoid valve will help you to maintain a healthy growth of all your aquarium plants.

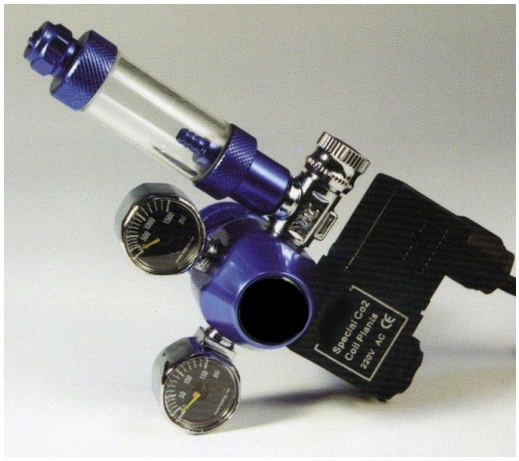

**Fig:4 CO2-Regulator & Solenoid Valve**

Carbon dioxide is integral for all plants whether on land or water, this is a life saver for them but the amount of carbon dioxide or better known as CO2 has to be streamlined to ensure that it is not fatal to the other aquatic organisms in your tank such as fish.

The installation of this CO2 regulator is fairly easy. There is a nozzle provided in the regulator, which can be attached to the CO2 cylinder. This regulator works on an electrical output and you can attach it to a timer. Otherwise you can always do it manually as well. The regulator comes with two reading meters; one of them displays the pressure of CO2 that is present in the cylinder and the other one display the pressure of CO2 present in the tank.

## SOFTWARE

- **LAPTOP/PC**
- **UBIDOTS WEB SERVER**

### LAPTOP/PC

Laptops are computers that you can take everywhere with you without hassle. They can take up very little space and be used for hours without access to power.

### Ubidots web server

Ubidots is a platform for connecting people, processes and things. It allows companies and cities to become more efficient by capitalizing on information from interconnected assets and processes. Ubidots is a cloud service to store and analyze sensor data in real-time, it is free with 30,000 dots/month data-points usage, features as follow: push data from internet enabled device, display sensor data through widgets, data is updated in real time and no need to refresh the browser, trigger alerts when a sensor data hits a value and it has a powerful and flexible API. A dashboard was created on the Ubidots website to provide widgets for monitoring and plotting real time graphs and data of the sensors which are being implemented in the project. It was also used to trigger alarm when a variable exceeds its optimum value. Ubidots offers a platform for developers that enable them to easily capture sensor data and turn it into useful information. We can use the Ubidots platform to send data to the cloud from any Internet-enabled device.

### Firebase

It is a scalable, real time cloud data service. It is designed for building real-time, collaborative applications. Data in Firebase is standard JSON and developers can access it using a client library or the library, changes to data are synchronized in real-time rest API. When accessed through a client to clients within milliseconds.

## DESIGN SPECIFICATIONS

The proposed project is used for real time data analysis of a few physical variables which is divided among three modules. Such a device would be extremely beneficial to keep a check on parameters where constant monitoring is required and any deviation from such would lead to trigger of an alarm and sending of a notification, such as an email, to the user's email account. 3.1 Module One The first module is used for reading temperature and humidity values of the current environment and relaying that data to the Ubidots server, which is an open source online IoT development platform. The average temperature of the day is also computed using this data. The temperature and humidity values are plotted in a graph which updates real time. A Narcoleptic delay library is used to put the pro mini in a low power sleep mode to conserve battery life during the intervals.

when sensing does not take place. The sensor used to retrieve temperate and humidity values is the DHT22, which is a low-cost temperature and humidity sensor. The sensor is given a 5V input and its output is connected to an analog pin of the Arduino. The module also has two led laser diodes attached which is used in the counter to estimate the number of people entering theroom. These 650nm red laser diodes are fitted in copper head and works with a 5V supply and a power of 5mW. The entire module is powered using a 9V battery. A LM805 voltage regulator is used to supply 5V from the battery to power the LM35 sensor and the laser diodes.

## CONCLUSION

The proposed IoT-based smart fire emergency response system can reduce casualties by determining the point of occurrence of a disaster in a building to prevent directional confusion of the emergency lights and inappropriate evacuation guidance. The intelligent emergency evacuation system can also aid firefighting because it allows for a quick assessment of the exact location of the fire by integrating the intelligent and automated evacuation system with the central national emergency management agency. It reduces casualties and the time required for evacuation by guiding evacuees into dispersed detours that bypass the location of the fire. Future studies will focus on expanding the applicability of this system to not only building disasters, but also various fields such as ocean vessels and evacuation within buildings, disaster safety through Web or mobile application services, and preventive actions for optimal disaster recovery.

## FUTURE DEVELOPMENT

- This project can be enhanced to sense leakage of GAS (LPG).

- We can further extend this project by adding some more features which can make it more efficient and security oriented.
- The camcorder can also be used to track all the activities of the unknown person or intruders.

## REFERENCES

[1]. T Malche, P Maheshwary on I-SMAC (IoT in Social, Mobile 2017 - ieeexplore.ieee.org
[2]. A Imteaj, T Rahman, MK Hossain 2017 International 2017 - ieeexplore.ieee.org
[3]. DC Eisold, B Perkins, P Johnson, P Fairchild US Patent 2009 - Google Patents
[4]. M Mongiello, L Patrono, T Di Noia 2017 7th IEEE 2017 - ieeexplore.ieee.org
[5]. ] S Suresh, NC Lakshminarayan US Patent 9,565,657, 2017 - Google Patents
[6]. CW Zhao, J Jegatheesan, SC Loon - International Journal of Computer 2015 - ijcna.org
[7]. M Ghazal, S Ali, M Al Halabi, N Ali Internet of Things and 2016 ieeexplore.ieee.org
[8]. F Saeed, A Paul, A Rehman, W Hong Journal of Sensor and 2018 - mdpi.com
[9]. R Abhishek, S Zhao, D Tipper 2017 IEEE International 2017 - ieeexplore.ieee.org
[10]. S Kumar, SR Lee The 18th IEEE International Symposium on 2014 ieeexplore.ieee.org
[11]. B RisteskaStojkoska, K Trivodaliev and Mobile Computing, 2017 - hindawi.com.