IoT Based Smart Kitchen

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Abstract: *India is a developing nation, there is constant demand for good household with top amenities. Kitchen is heart of the house. Kitchen is also one of the places where there is a good chances of accident due to the availability of high voltage appliances like refrigerator, oven, toaster, inductions and fuel like LPG gas cylinder and different high flammables like cooking oils. To prevent this type of accident it is important to secure the kitchen by monitoring the kitchen environment and taking quick action upon detection of any such accident. People tends to prefer a modern and a convenience way of doing things, automation and IoT has bought the convenience in hand. By automatically turning the lighting upon detection of presence of human and controlling different appliances remotely it is possible to make the kitchen more effective, efficient and smart. By monitoring the kitchen environment, automation of different aspects and IoT application we can make the kitchen more secure and smart.*

Keywords*:* Kitchen ,High voltage appliances, Monitoring, IoT application, Automation

I. INTRODUCTION

IoT or Internet of Things is currently one of the most discuss topic in almost all industrie.The subject and it's usability is vast and the possibilities are endless.The technological advancement over the past decade has made it possible to produce super cheap computer chip that made it possible for a even a small device to connect to the internet.IoT has made it possible to connect with the machine and make it more smart by introducing exchange of information over the network.Recent development on communication protocol have empowered IoT even more allowing multiple devices to communicate with each other even if they have a different communication protocol.Proposed system will take the advantage of IoT applications in the kitchen of the house to make it more secure and more smart.

1.1 Objective

- To make the kitchen more secure by constantly monitoringthe kitchen environment.
- To make the kitchen more smart by automation and controlling the kitchen appliances remotely
- Scope
- The proposed system can be introduce in every household .This system can play vital role in businesses where food is prepared and served to a large number of people.The system can also be introduce in corporate canteens since companies has a huge resources and protection of this resources are important for the company.This system can also be advanced in fast food chain since there is constant movement in the kitchen and mismanagement can result in huge disaster which makes constant monitoring and immediate action an absolute necessary at such places.

1.2 Limitation

The only limitation is the requirement of an active internet connection for remote monitoring of the kitchen environment and controlling the kitchen appliances.
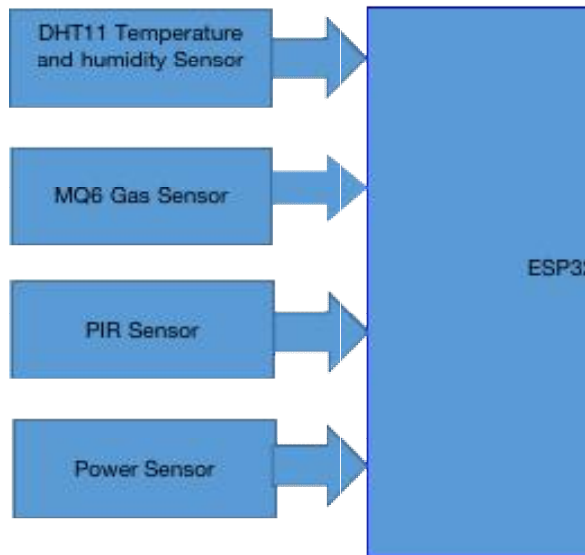
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Fig.1 Block Diagram of the proposed system

II. MATERIALS

The proposed system addresses the problem of kitchen safety and making it more efficient and smart. The materials used in the system consists of a Node MCU ESP32,which is the heart and brain of the system. We have use three different sensor for the monitoring purposes. The first sensor is DHT11 Digital temperature and humidity sensor which measure the temperature and humidity of the environment. The second sensor is the MQ6 gas sensor which measures the air quality index. The third sensor is PIR sensor which detects the presence of human. Other materials used in the system includes an LCD display, buzzer, led bulb, exhust fan and four channel relay module. We have use arduino ide for programming the system and android studio for creating a dedicated application.

IIII. METHODOLOGY

Methodology is the steps applied to the field of the study that took one to the result.The methodological flow that was used in this project is given figure below.
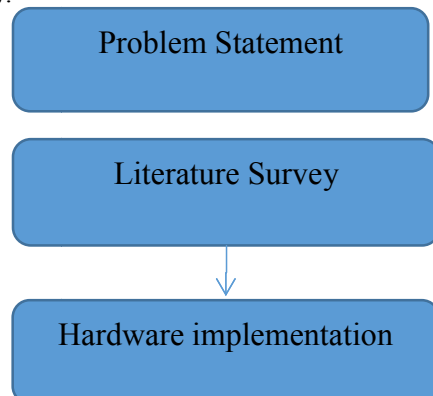

Fig 2. Methodology Flow

3.1 Problem Statement

Kitchen is an important part in any household and in many places where food is cooked like restaurents, canteens, fast food chains etc. Kitchen is one of the places where there is a good chance of accidents due to availablitiy of high voltage appliances like refrigerator, toaster, induction and fuel like LPG gas cylinder and different high flammables like various cooking oils. Automation has makes the work more effective, there is also recent development in the field of IoT based application. So, combining both it is possible to create a system that can make the kitchen more secure, efficient and smart.

IV. LITERATURE SURVEY

Previous work in this field includes the introduction of gas leakage detection which uses the air quality index in the kitchen environment, sudden rise in kitchen temperature, fire alarm, cylinder booking etc. Some has their attention more on the security of the kitchen and some on it's efficiency. Most of the system where based on an arduino board while the proposed system directly uses a Node MCU ESP 32 board. The proposed system focus on both, improving the security of the kitchen and improving the efficiency of the kitchen. The proposed system can monitor the kitchen environment, display the kitchen environment over the dedicated application and LCD display, take immediate action upon detection of leakage of gas and rise in temperature, alert the user, control the lighting of the kitchen automatically and gives user acces to the kitchen appliance remotely by providing dedicated On and Off button in the application.

V. HARDWARE IMPLEMENTATION

Unable to stimulate the hardware at proteus software due to library support limitation the connections are as per the diagram show below.
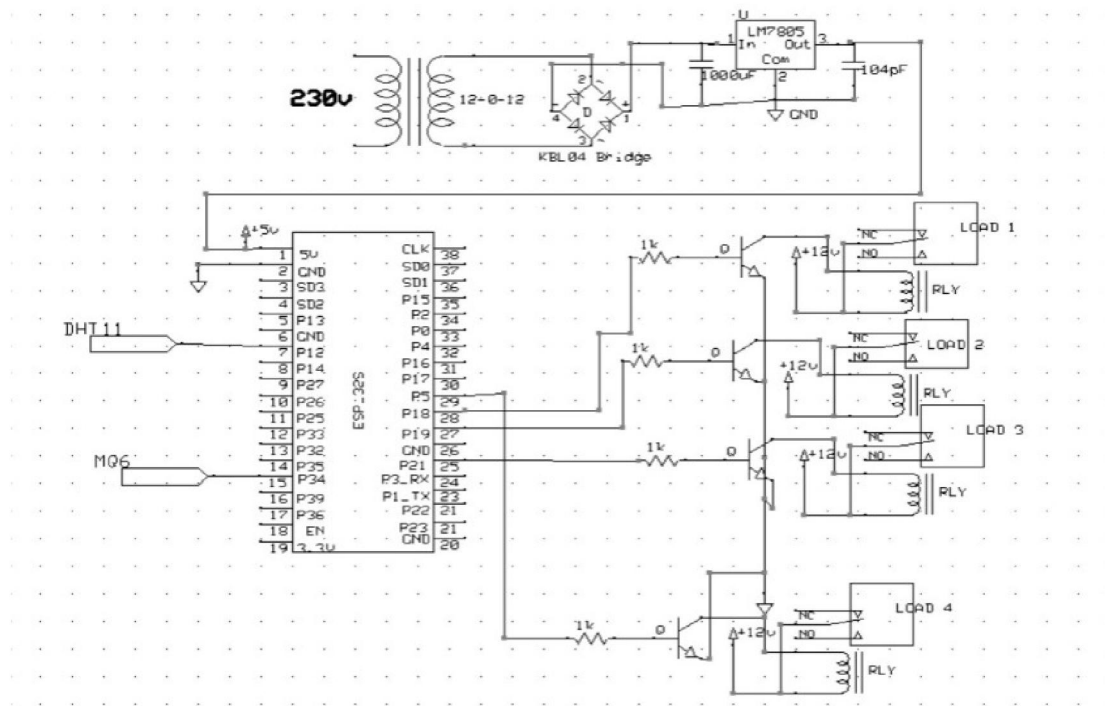

Fig 2.Connections in Proposed System

We have use a Node MCU ESP 32 which is connected to DHT11 sensor,MQ6 gas sensor,PIR sensor,LCD display,buzzer,LED and exhust fan.As we bring the candle near the DHT11 sensor the temperature rise is observe on the LCD display and on the application,at exactly 35 degree celcius the buzzer start ringing and the exhaust fan automatically turns On.The same is with the case when we bring a gas perfume near MQ6 gas sensor,the threshold is set at 3000.With PIR sensor when a person is detected in the kitchen the led bulb automatically turns on and turns off when there is no one

in the kitchen.Exhaust fan and LED bulb are both connected to two of four relay .In the application one can monitor the kitchen environment and control upto two appliances which is possible by setting two relay as manually operational.

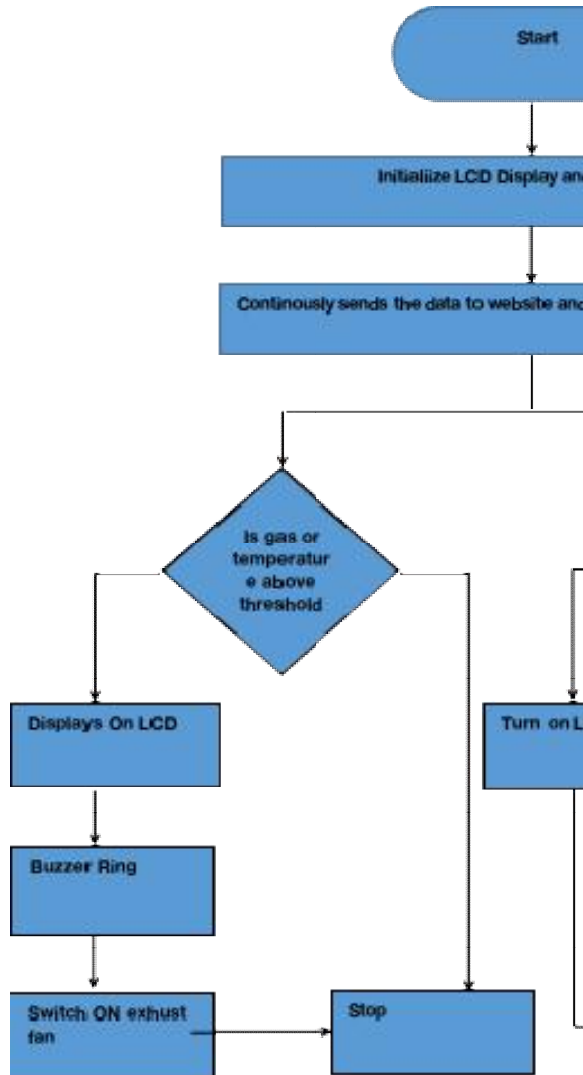## VI. SOFTWARE DESIGN

Flow Chart

Fig.3 Flow chart of the proposed system

VII. RESULT AND DISCUSSION

In this project we have built an IoT based smart kitchen,in which we have used a Node MCU ESP32 with DHT11 temperature and humidity sensor,MQ6 gas sensor,PIR motion detection sensor as an input and LCD display,buzzer,LED light and exhaust fan as output.
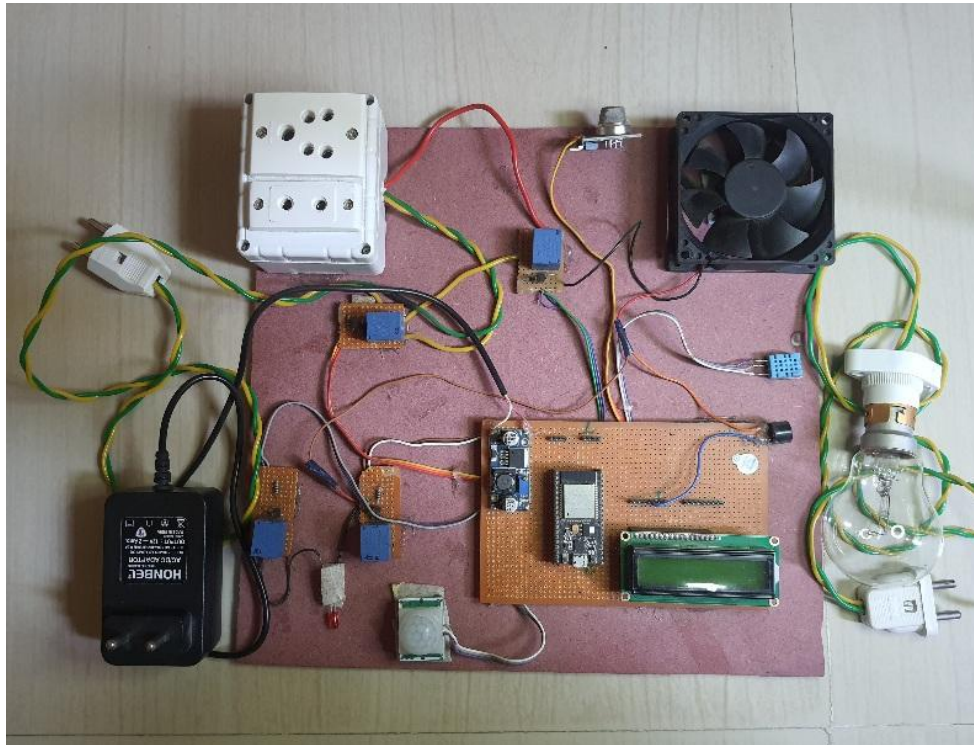
Fig.4 Hardware Setup

All the sensor data can be monitor on LCD display and in the IoT based application.

Fig.5 LCD Display showing the kitchen environment

The kitchen environment can be observed in the application in realtime
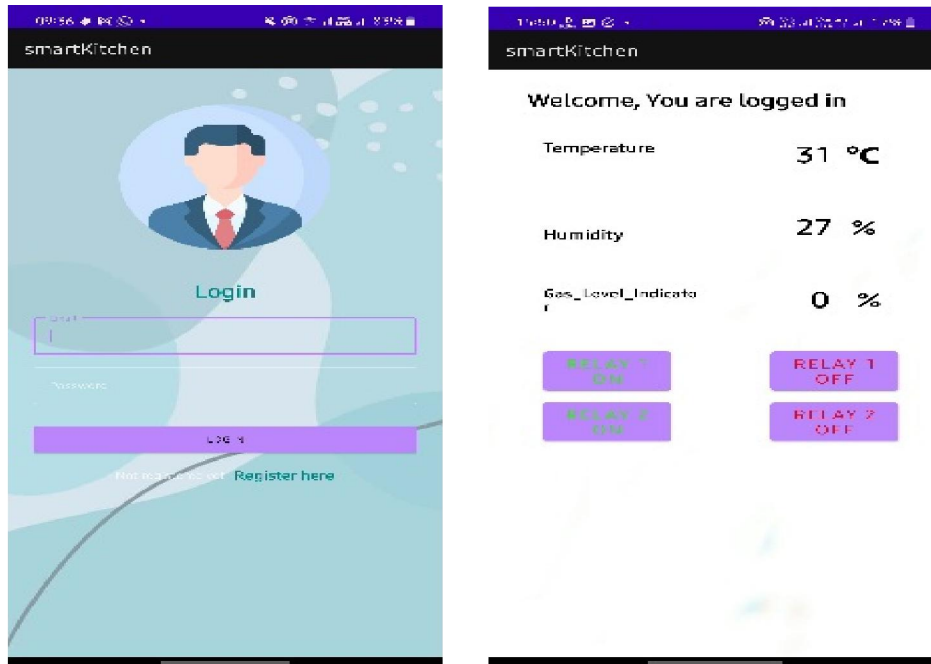
Fig.8 Application user interface
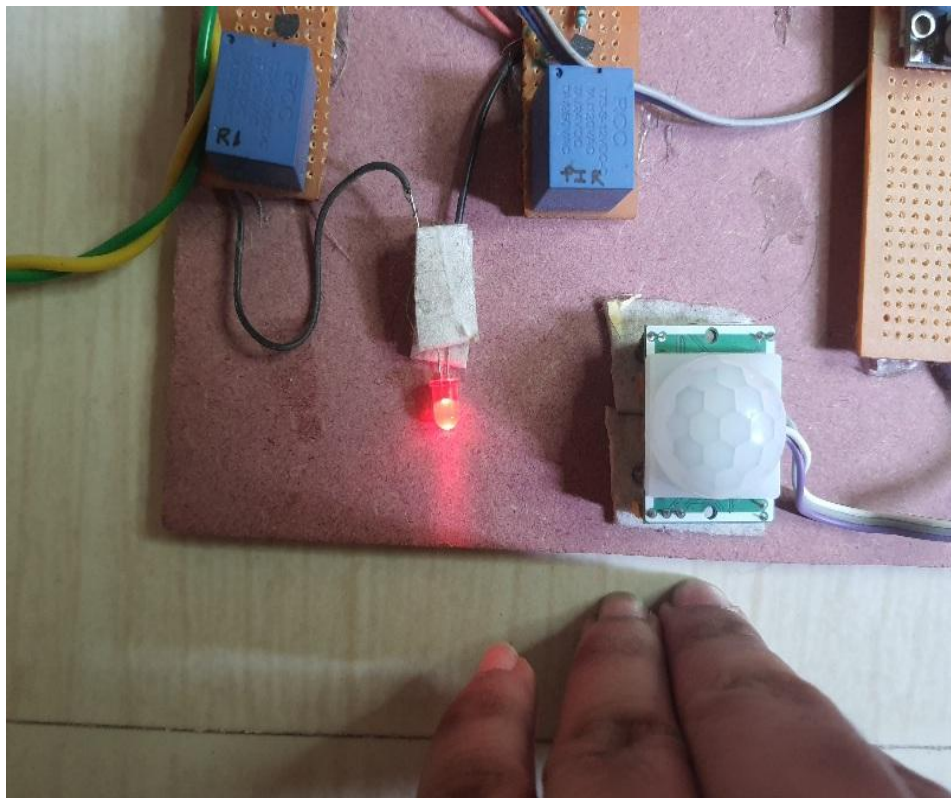
When a person is detected the LED turns on

Fig.6 LED turns on in the presence of a person in the kitchen

When the temperature of kitchen rises and gas leakage is detected the buzzer starts ringing and the exhaust fan is turned on.
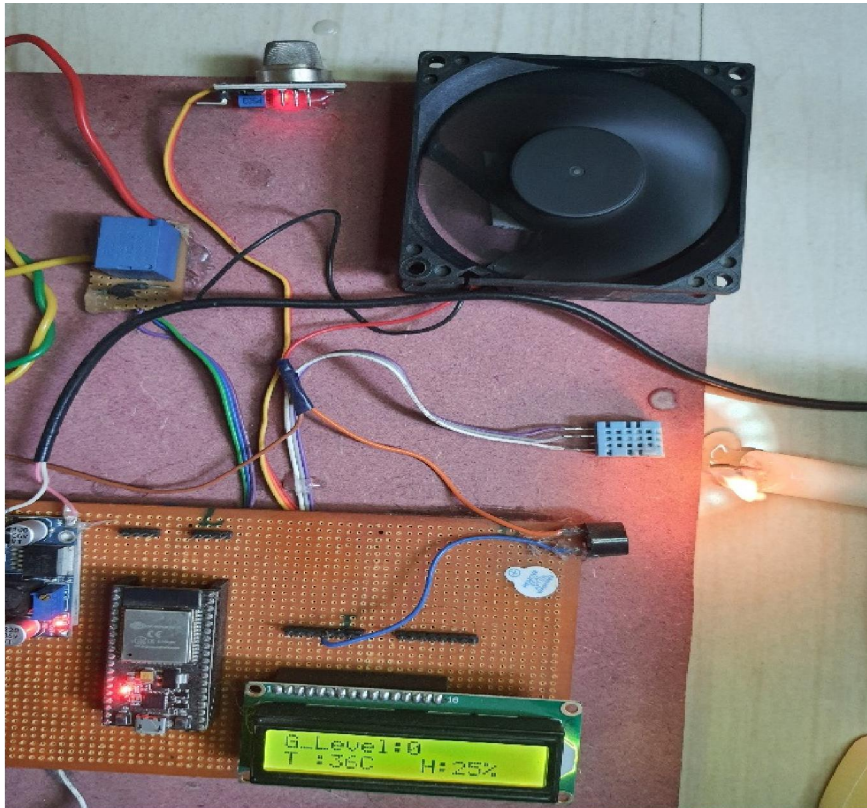
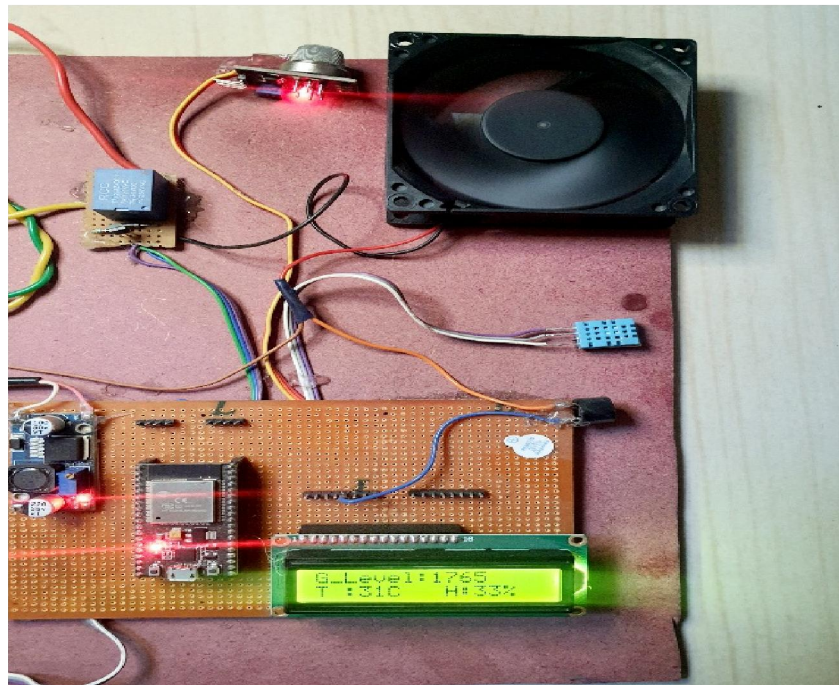Fig.7 Buzzer Ringing and exhaust fan turning on when the temperature rises

Fig.8 Buzzer Ringing and exhaust fan turning on when gas leakage is detected

When user chooses to turn on any appliance in the kitchen,with the option given in the application.It activates the switches.The user can control both the switches remotely
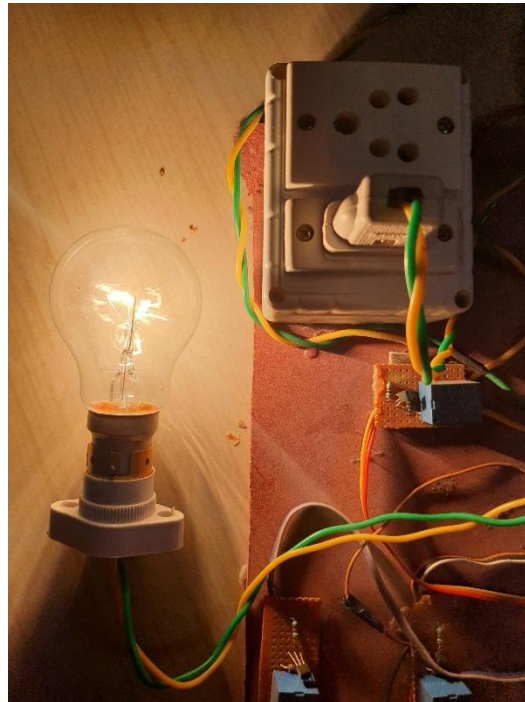
Fig.9 Controlling Light bulb remotely with application

VIII. CONCLUSION

By monitoring the kitchen environment continously, taking immediate steps upon detection of gas or rise in temperature, alerting the user by buzzer and turning on the exhust fan, conserving energy by automatically turning on/of light upon detection of a person in the kitchen and turning the kitchen appliances on/off remotely by the application, the propsed system is very usefull in securing the kitchen and making it more smart. The proposed system can also be use in many places like restaurents, corporate canteen, train kitchen, fast food chain etc.

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