



## HOME AUTOMATION USING IOT

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**Abstract-** With advancement of Automation technology, life is getting simpler and easier in all aspects. In Today's world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology. Internet of things is a growing network of object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities. Wireless Home Automation system(WHAS) using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. In this paper, Home automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection. This paper represents the controlling and monitoring of the home environment using wireless sensors. An automated system is represented which can be used to visualize and monitor the power consumption online on a Smart phone using mobile application, to detect the gas leakage using LPG detector and a smart refrigerator module is presented which is capable of sensing and monitoring its contents and also provides advantageous features.

**Keywords:** Refrigerator, Raspberry pi zero, Aurdino UNO, Temperature sensor module

### I. INTRODUCTION

IoT is an expanding network of physical devices that are linked with different types of sensors and with the help of connectivity to the internet, they are able to exchange data. Through IoT, internet has now extended its roots to almost Every possible thing present around us and is no more limited to our personal computers and mobile phones. Homes of the 21st century will become more and more self- controlled and automated due to the comfort it provides, especially when employed in a private home. A home automation system is a means that allow users to control electric appliances of varying kind. Many existing, well-established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. But for already existing buildings the implementation cost goes very high. In contrast, Wireless systems can be of great help for automation systems. With the advancement of wireless technologies such as Wi-Fi, cloud networks in the recent past, wireless systems are used every day and everywhere. Gas Leakages in open or closed areas can prove to be dangerous and lethal. The traditional Gas Leakage Detector Systems though have great precision, fail to acknowledge a few factors in the field of alerting the people about the leakage. Therefore, we have used the IoT technology to make a Gas Leakage Detector having Smart Alerting techniques.

Refrigerator Is the most frequently used domiciliary/kitchen electrical appliance all over the world for food storage. Principally this appliance is used for various tonalities like storing vegetables, fruits etc. Smart refrigeration module is designed to convert any existing normal refrigerator into a smart and low cost machine using sensors. Smart refrigerator compares the status of the food for e.g. weight, quantity etc. Significance of this work will be removable of food spoilage, reduce illness and make healthier lifestyle of modern age human being.

## II. METHODS

The system is divided into different module; in our project we make use of three modules that is Refrigerator module and Gas Leakage module. Each module will be having different functionalities. The components used in the system are:

**Raspberry Pi Board:** The Raspberry pi is a single computer board with credit card size that can be used for many tasks that your computer does, like games, word processing, spreadsheets and also to play HD video. The raspberry pi board is a portable and low cost. Maximum of the raspberry pi computers is used in mobile phones. In the 21st century, the growth of mobile computing technologies is very high, a huge segment of this being driven by the mobile industries.

**Gas leakage module:** The prototype of gas detector system here uses gas leakage detector with the help of which we can check if there is any leakage in gas pipe. This module helps To bring a revolution in the field of safety against the leakage of harmful and toxic gases to minimize and hence nullify any major or minor hazard being caused due to them. The versatile nature of this system become the same system with a change in the type and number of sensors can be used in different places. They can be used at homes, buildings, industries for detecting LPG or any other harmful gas leakages.

**SD card:** Raspberry PI has no storage on board. SD/micro SD Card stores the OS. The total memory of the SD card is about 8GB.

**Power supply:** A micro-usb plug power supply that supplies at least 1A of power is used. It also runs on a battery.

**Camera:** It captures the image of the items in refrigerator and sends the image to the Android application through Raspberry Pi zero camera.

**Monitoring the food items inside the refrigerator:** The Raspberry Pi camera used in this module helps in checking the expiry of food products and the spoilage of eatable items. It will be smart enough to notify the current status of food items through an android app on our mobile phone, and will also remind us about the items are going to spoilage before they actually get rotten. Thus, it will save the money and food wastage as well as help us to live a healthier lifestyle. The temperature sensor used in this module helps in maintaining the threshold values of the food items, if any product is exceeding the mentioned threshold value it sends an alert Message to the user's mobile for maintaining the temperature.



Figure 1: Arduino board

### Raspberry Pi Module



Figure 2: Raspberry Pi

Raspberry Pi zero



Figure 3: Raspberry Pi zero

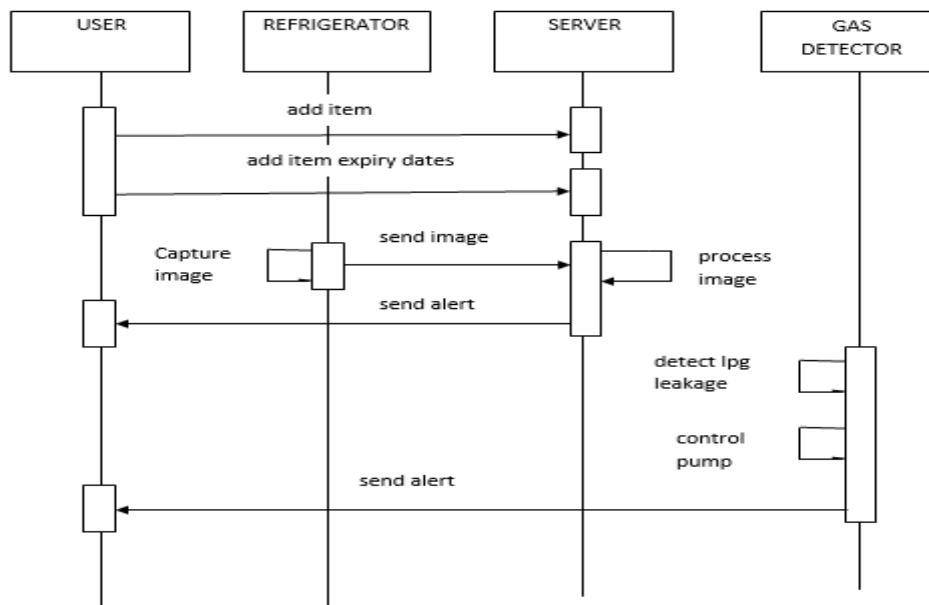


Figure 5: Sequence diagram of home automation system

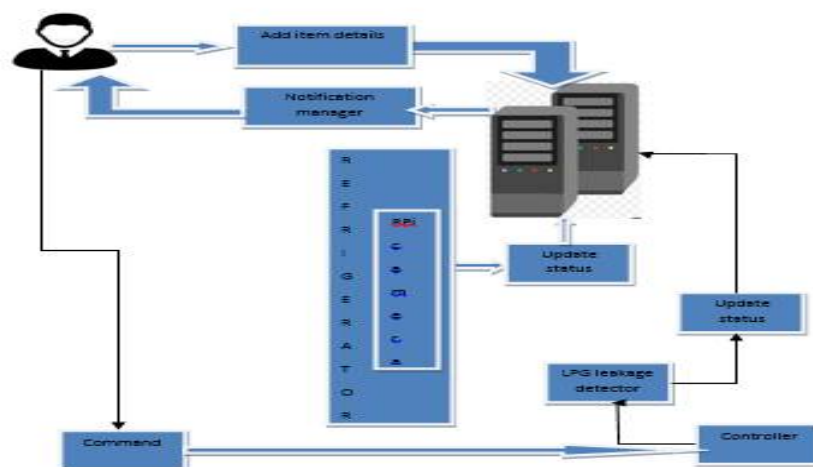


Figure 6: Block diagrams of home automation system

Automation has always been considered as an option to make our home more convenient and comfortable. With the world getting busier day by day, there has been an increase in demand of automation. This paper demonstrates the use of Internet of Things to help in easy monitoring of the home. The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. The designed system monitors the sensor data, like temperature & gas and also sends an updating message for the same to the user mobile application.

Raspberry Pi camera used in this module helps in checking the expiry of food products and the spoilage of eatable items. It will be smart enough to notify the current status of food items through an android app on our mobile phone, and will also remind us about the items are going to spoilage before they actually get rotten. Thus it will save the money and food wastage as well as help us to live a healthier lifestyle. The temperature sensor used in this module helps in maintaining the threshold values of the food items, if any product is exceeding the mentioned threshold value it sends an alert message to the user's mobile for maintaining the temperature. The main objectives of the proposed system is to design and implement a home automation system using IOT that is capable of controlling and automating most of the house appliances through an easy manageable web interface.

### III. RESULTS

The proposed system is a distributed home automation system, consists of server, sensors. Server controls and monitors the various sensors, and can be easily configured to handle more hardware interface module (sensors). The gas leakage detection is done with the help of LPG detector, if there is any leakage in the pipe than it sends an alert message to the user mobile app. The smart refrigerator is capable of sensing and monitoring its contents and also provides advantageous features. The camera fixed inside the refrigerator is capable of monitoring the food items kept inside the refrigerator. This camera detects the items expiry date from the packet and send it to the server, the server sends an alert message to the user mobile app if the date got expired and if only few days are remaining for the item to get expired. We also fix a temperature sensor inside the refrigerator which helps the user to maintain the temperature of the food items according to its need.



Figure 7: Overview of Monitoring food items in Refrigerator.

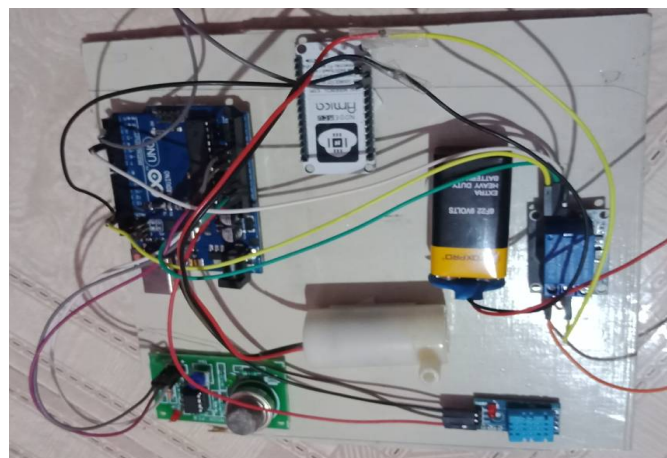


Figure 8: Connection of Gas leakage system





#### IV. CONCLUSION

This module consists of Raspberry pi zero camera and MQ Sensor where Raspberry pi camera will be fixed inside the refrigerator to capture the image of daily food product which is placed. The information of the food item that is in what condition the food item is, all the information is sent to the server via the Arduino UNO board, and the status will be sent to the android application via server. In which the user will be able to get the notification of the food item, in what condition the item is, he will be getting the notification through his android application which is installed in his mobile phone. So the user will be able to take precaution like to replace the food item or use it before it gets expired, for the gas leakage detection we are using MQ sensor in which it is used to check the gas leakage, whether the gas is in normal condition or is there an leakage occurred and the notification will be sent to the android application

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