

Smart Kitchen Using IOT

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Abstract

In recent years there has been rapid development in technology which has made human life easier in several aspects. In this project, we will build an IoT Based Smart Kitchen. The kitchen is one of the important places in a house. The safety factor is the main aspect that must be taken into account during the activity in the kitchen. The existence of gas leakage, water leakage, uncontrolled fire, excessive temperatures & a moist environment must be quickly identified and addressed. Security at home has been a major issue where gas leakage and water leakage can cause dangerous consequences which will further lead to dangerous situations. The Gas leak can cause fire explosion and suffocation. The Water leak can cause the short circuit at our places and can also cause the flood or water overflow at home. If water comes in contact with a live wire then it may lead to the fire. Our system will detect water and gas leakage so we can save many homes from such situations. In order to monitor the food poisoning, the new implementation has been made by using IoT. The monitoring system is based on many embedded sensors like thermostat, odour sensor, biosensor, pH sensor which depend on the out coming electric signals or digital value of the quality factors. In this the biosensor plays a vital role to detect the bacterial contamination in food sample. Based on the combination of the sensor outputs quality of the food should be detected which is reported to the health center through IoT. The user must be notified when the system detects odour of rotten vegetables or fruits. The system should be able to detect the presence of ice tray and notify the user with the information. In this paper, IoT technology to efficiently monitor the air quality. Monitor the Air Quality (Ethanol Gas) using MQ-3 Gas Sensor. The existence of gas leakage, water leakage, air quality must be quickly identified and addressed. The purpose of this research is to make prototype of kitchen security system using Internet of Things. The system is designed using 4 types of sensors and Arduino Mega. DHT 11 sensor is used to monitor temperature and humidity, MQ-6 LPG Gas sensor is used to detect Gas Leakage, MQ-3 sensors are used to detect ethanol gas, and water level sensors are used to detect water leakage in the kitchen. The sensors output are then connected to the Arduino which will control the relay. The relay acts as a fan switch in the event of a gas leak, uncontrolled fire and excessive temperature increase. Under these conditions, Arduino will also turn on the alarm and the led, and send information to the server. Whenever leakage of gas, water is detected, the user will be alerted through SMS and call so that the user can turn off the gas valve immediately. Temperature and gas sensors are designed to detect and respond to the presence of flame, fire, and gas leakage. The buzzer is triggered whenever it encounters leakage of gas and Fire Detection

Keywords: Arduino, MQ-6 sensor, MQ-3 sensor, DHT-11 Temperature Humidity Sensor, Gas Sensor, Buzzer, Water Level Sensor.

I. INTRODUCTION

The kitchen is the place in the house that requires a huge mechanism and all the work should be carried out with full care. An important factor that comes into the picture is handling all the stuff with care. This project is centred on thinking of all the children, young and old people in the house. Although much of the work has been done until today to realize the Internet of Things (IoT) into practice, The Internet of things (IOTs) is a network of physical objects or things embedded with electronic, software, sensors and connectivity to enable objects to exchange data with manufacturer, operators and connected devices. Our project is based on IOT that is Smart Kitchen using IOT. According to news: from 2013 to 2017, the BFP recorded a total of 77,724 fire incidents, or an average of 15,545 fire incidents every year or 42 fire incidents a day. It was discovered by investigation that LPG is one of the major cause of fire. The project entitled "Smart Kitchen" will be a great help to the people in their day to day life in terms of preventing any danger caused by gas leakage. The purpose

of this project is to detect gas as a part of the safety system. If there is LPG detection an alert (mail) will inform the authorized user about the gas leakage in order to prevent any harmful effects due to gas leakage. We used gas sensor to monitor and detect the gas. The maximum chance of accidents in the kitchen is due to gas leakage. In our project, if the gas leakage is detected by the gas sensor, the Gas sensor sends an alert message to the registered mobile number and hence then the knob of the stove will automatically turn off. In order to make our day-to-day life easier, a combination of technical and imagination skills makes things easier. The main aim Internet of things is to make life easier by automating every task around us. The IoT plays a major role in automating works in Electronic Media. Some of the add-on benefits are enhancing the existing safety standards. LPG cylinder used as a Fuel in Cooking purpose in home and several areas. Safety has been an important thing for designing home, buildings, cities and Industries. The Usage of the Gas cylinder is rapidly increased but at the same time it is extremely dangerous, it has the ability to cause fire accidents. Although the steps taken for this issue even though accidents are gradually increased due the leakage of gas. This Work is one step for avoiding fire accidents due Leakage of gas. Internet of Things aim towards making life simpler by automating every small task around us. As much is IoT helping in automating tasks, the benefits of IoT can also be extended for enhancing the existing safety standards. Today, a large portion of the human population around the globe has no access to freshwater for drinking, cooking, and other domestic applications. Water resources in numerous countries are becoming scarce due to over urbanization, rapid industrial growth, and current global warming. Water is often stored in the aboveground or underground tanks. In developing countries, these tanks are maintained manually, and in some cases, water is wasted due to human negligence. In addition, water could also leak out from tanks and supply pipes due to the decayed infrastructure. To address these issues, researchers worldwide turned to the Internet-of-Things (IoT) technology to efficiently monitor water levels, detect leakage, and auto refill tanks whenever needed. Gas stoves are one of the most important assets in the kitchen. All the cooking activities are carried out with the help of this apparatus. In India almost all the peoples are using Liquefied Petroleum Gas (LPG) as a fuel for cooking. But in this field the steps taken for safety purpose is very less. LPG is flammable gas, it has the potential to cause fire accidents heavily. In order to avoid fire accident, many researchers are applied their effort to design new prototype model. IoT based gas leakage detection and gas knob to avoid the fire accident in the kitchen. Safety, the elementary concern of any project, has not been left untouched by IoT. As technology progresses towards simplicity, the already solved problems remain to be improved. Additionally, the problems are constantly evolving and growing, especially in environments where the human safety factor is included. One such environment is the industrial kitchen, where many people are working with a chaotic tempo. Thus, the possibility of the almost inevitable incidents is always there. The applications of Information communication technology have brought a sea change in human life. The present day society is moving towards the adaptation of the digital environment. The earlier 'internet of computers' transformed into 'internet of people' by introduction of social websites. The next wave is mobile computing. The different generations of internet connection have made it possible for faster accessibility accompanied by better quality. The further advancement of this technology is the 'Internet of Things' through which, the interoperability and intelligence can be achieved. This is possible through communication between certain devices that are connected through the internet, wireless sensor networks and smart phones. These devices in the system are able to perceive, process and deliver the product as per the programming. The technologies such as sensors, Cloud Computing, Networking Technology and Nanotechnology have been used. The applications of IoT can be observed in number of areas in various kitchens. Kitchen is the unique place, called the main hub or the heart of the home or hotel industries. It is the place where one of the basic needs i.e. food is prepared. It is the common centre of social activities of all the family members who share their feelings or emotions. It is equipped with all basic amenities. Smart Kitchen is a technologically advanced system that incorporates interactive services. It is a built in system which consists of a dangerous items like electric stove, Gas cylinders, Fridge, oil and etc. The reader and tags to provide all the necessary information regarding the safety level of all the items in kitchen. The water supply shortage has increased in recent years due to overpopulation, climate change and obsolete water facilities, where deteriorated pipes cause most of the water leaks. The problem is not the size of the leak, but the time it takes to detect it. This paper presents the implementation of a system installed in the hydraulic facilities of a residence, to detect water leaks. The system consists of a water sensor installed by a water reservoir of interest, a microprocessor to interpret the data and evaluate whether it is a water leak or not, an SMS alert message, and an electrical actuator to shut off the main water supply to avoid leakage. In this paper the different technologies, and applications involved in IoT, in different fields and a special mention regarding its role in Smart Kitchen has been discussed. We used sensor for leakage detection and buzzer as a sounding alarm. When the level of gas goes below the normal weight of cylinder, an alert message (via mail) will go to the authorized user to give a remainder for booking of gas. We used load cell to measure the weight of the gas cylinder. Also we will continuously analyze and examine the humidity and temperature of the surrounding. For this we used DHT11 humidity and temperature sensor to monitor humidity and temperature.

II. LITERATURE SURVEY

This chapter comprises of the literature review and theoretical background of the project. The literature review deals basically with related project written by other researchers, the difficulties they encountered, limitations and modifications that should be made.

- 1) IOT in the Kitchen: Monitoring stovetop for fire safety--This paper deals with safety considering the flame sensor at the burner side and it mostly looks for the spillage of flame. And if the PIR sensor detects no motion then an alert message is sent to the user. This system requires internet connectivity. The drawback of the system is that if there is no internet all the devices remain disconnected and hence in such a case there the chance of accident increases. Through our Project, we have tried to overcome this issue by using the GSM module as the communication media between the system and the user device.[1]
- 2) IOT-based Smart Kitchen--This system is fairly applicable to overcome all challenges. It uses SMS to send the alert message to the user but its major drawback is the cost. The cost of the system is high and hence proves to be inefficient due to the user. Our system works on the same principle but the several cost of the project makes the difference. The system implemented by us costs around 4500 Rupee which is 42% less than the earlier system available in the market. [2]
- 3) Automation and Monitoring Smart Kitchen based on IOT--This system deals with all the automation activities carried out in the kitchen. It uses an IR sensor to detect the flame, a PIR sensor to detect the motion, a DHT11 sensor to find the temperature, and MQ235 to detect the gas leakage. This system is App bases and requires continuous internet connection. Continuous internet connection is not possible in rural areas and hence the chances of accident increases. Other than this the system implemented by us is more efficient in terms of cost, reliability, and network issues. [3]
- 4) In the year 2017, Kumar Keshamoni and Sabbani Hemanth, "Smart Gas Level Monitoring, Booking & Gas Leakage Detector over IoT". The main function of this system is whenever the gas leakage starts it have to provide alarm sound in the kitchen and the live data's are deployed in the cloud using WI-FI Module. In 2014, some people introduced the design for safety kitchen using electronic devices. The system will detect the leakage of LPG in the kitchen and alert the user with buzzer. This work was developed with the ARM microprocessor version 7 and simulated with Kiel software.[4]
- 5) In the year 2016, Ashish Shrivastava, Ratnesh Prabhakar, Rajiv Kumar, Rahul Verma, developed a system. They gave security issues against hoodlums, spillage and fire mishaps. In those cases their framework sends SMS to the crisis number gave to it. In the proposed framework we have planned "LPG gas observing and programmed barrel booking with ready framework". These report center around location of financial fills like oil, fluid oil gas, alcohol and alarm the encompassing individuals about the spillage through SMS. It likewise sense encompassing temperature, so no fire mishaps happens. The one more critical element is programmed chamber booking by seeing the present consumption of LPG gas in our everyday life. These tasks alarm the client by sending message to portable through SMS in three conditions. The three conditions are first one is when LPG gas weight compasses to greatest limit esteem. Second one when the LPG gas surpasses its pinnacle esteem. And last one when the temperature surpasses more than room temperature. These venture gives ready message by humming the bell and trough SMS to the house holders. We likewise give programmed entryways and windows opening, with the goal that the compacted gas can spread in to air automatically. Consequently a fire accident does not happen. [5]
- 6) In system ultrasonic systems are attached on top of the container which helps us to monitor the levels of ingredients in container. The sensor senses the level of the ingredients in container and if the level goes below the threshold value then distance of ingredients from top of container is notified to Microcontroller then with the of GSM module from which message is sent to home owner or manager. Although these systems notify the user in one way or another that the gas is leaking, there is no shut-off of the main power supply line. Although these systems notify the user in one way or another that the gas is leaking, there is no shut-off of the main power supply line. [6]
- 7) In "HOME AUTOMATION USING INTERNET OF THINGS", the authors "Vinay sagar K N, Kusuma S M" described about the Wireless Home Automation system(WHAS) by IoT system in which it is sometimes called as s called a smart home. The smart home system is comprised of computers or mobile devices that are used to control basic home functions and features automatically through internet from anywhere around the world. Hence with the help of the smart home system can able to save the electric power and human energy. In this method the authors presented a home automation system (has) using Intel Galileo that employed the integration of cloud networking and wireless communication. The main advantage of this scheme is that, it provided the user with remote control of various lights, fans, and appliances within their home and storing the data in the cloud. Based on the data gathered from the sensor the system will be changed automatically and also this system was designed to be low cost and expandable allowing a variety of devices to be controlled. [7]

- 8) In, "INTERNET OF THINGS (IOT) BASED REAL TIME GAS LEAKAGE MONITORING AND CONTROLLING" the authors "Hina ruqsar, Chandana R, Nandini R, Dr. T P Surekha" discussed about xively which is a secured scalable platform that includes directory services, data services, a trust engine for security, and web-based management application. It also helps to provide a general ground through which any external device connected to the internet cloud actually communicates with any other device. Xively is an old fixture within the internet of things ecosystem. Gas sensor senses the gas leakage and alerts the house rescue teams which are buzzer and exhaust fan. From this the gas will be changed and replaced from the interior. A solenoid valve is an electro mechanical device that is used for controlling liquid or gas flow. When the coil is keyed up, magnetic field is created, causing a plunger inside the coil to move. The valve will return to its de-energized state, when electrical current is removed from the coil. Here using this concept one can easily know the exact date and time of the hazard. [8]
- 9) In, "EMBEDDED SYSTEM FOR HAZARDOUS GAS DETECTION AND ALERTING", the authors "V.Ramya, B. Palaniappan" focused on how the microcontroller of designed and worked based on detecting toxic gas and then alerting the system. Here the embedded system technique was used to determine how the hazardous gases like LPG and propane were sensed and displayed each and every second in the LCD display. Then an alarm is generated immediately and also an alert message (SMS) is sent to the authorized person through the GSM when the gas exceeds its normal level. The benefit of this automated detection and alerting system over the manual method is that the response time and accurate detection of an emergency is done very quickly and in turn it also leads faster diffusion of the critical situation. [9]
- 10) In, "GSM BASED LPG LEAKAGE DETECTION AND CONTROLLING SYSTEM" the authors "Prof.M.Amsaveni, A.Anurupa, R.S.Anu Preetha, C.Malarvizhi, M.Gunasekaran" discussed on how to detect and control the LPG gas which mainly comprised with butane and propane. In this scheme the authors used MQ6 gas sensor to detect the leakage of gas. As soon as the leakage is detected the sensor sends a signal to the microcontroller in which it sends an active signal to other devices which are connected externally. Then the alert message has been sent to the user through GSM module. The advantage of this technique is it reduces the concentration of gases. Even though this technique reduces the concentration of the gas the demerit of this system is efficiency of using the microcontroller which is used here is less and also it requires changes in program whenever multiple SMS is to be sent at a time. [10]
- 11) In, "AUTOMATION AND ENERGY MANAGEMENT OF SMART HOME USING Lab VIEW" the authors "J.Ashley Jenifer, T.Sivachandrabanu, A.Darwin Jose Raju" discussed about how the information from the sensors has been fed into the pc. Here in this system the photo voltaic installation is made to tackle the energy. Then the Mikro C IDE was used to bind the sensors actuators and devices. Also the Lab VIEW (laboratory virtual instrumentation engineering) was done to visualize the home automation like lighting, temperature, security, gardening and energy management. [11]

III.EXISTING SYSTEM

Existing gas leakage detection system has fixed in the wall of the home. It gives only alarm and LED output.It can't Use the devices like servo motors to turn off the LPG Cylinder. Servo Motor to be Fixed in LPG Cylinder can Turn-Off the Cylinder when the leakage Occurs.It Cannot identify the Flammable or Inflammable gases.

IV.PROPOSED SYSTEM

In our design, Arduino Uno board acts as the heart of our system. Our project is solely based upon Arduino Uno.

1. Arduino
2. MQ-6 sensor
3. MQ-3 sensor
4. DHT-11 Temperature Humidity Sensor
5. GSM Module
6. Buzzer
7. Arduino IDE

The power supply is connected directly to Arduino. The sensor powered from pin 5v (VCC) and pin 3.3 V in Arduino.The sensor used in this system is DHT11 to detect temperature change, Mq-3 to detect LPG gas leak,water level sensor detect water flow.Data received by the sensor will be sent directly to the Arduino via digital or analog pins.

V. CONCLUSION

we calculate complexity of our project algorithm and define it is a NP Complete or NP-Hard problem

Reference

[1] IEEE paper of 'DESIGN OF A SIMPLE GAS KNOB': an application . Implementation of Automatic Safety Gas stove By Ajinkya Yalmar and Mahesh Parihar December 2015 Conference: 2015 Annual IEEE India Conference (INDICON).

[2]. IEEE paper of 'AUTOMATIC GAS STOVE WITH ADVANCED SAFETY FEATURES' Manu Mathew, Neelkantha V. L. International Journal of Recent Contributions from Engineering, Science & IT (ijes). Vol 3 ,No.2, 2015.

[3] IOT based Smart Kitchen: Computer Science and Engineering SNS College of Technology, Coimbatore tamilnadu - India. International Journal of Computer Science Trends

[1] Mohd Zaki Ghazali, Noorhayati Mohamed Noor and Sulastri Putit "Development of Microcontroller Based Mobile Gas Monitoring Sensing Robot" in International symposium on Robotics and Intelligent Sensors 2012 (IRIS 2012)- vol.3 no.9 pp. 1190-1196,2012

[2] Kumar Keshamoni and Sabbani Hemanth "Smart Gas Level Monitoring, Booking & Gas Leakage Detector over IoT" in 2017 IEEE 7th International Advance Computing Conference, vol.7 no.9 pp. 330-332, 2017.

[6] Rosarium Pila ; Saurabh Rawat ; Indar Prakash Singhal, eZaar, the smart container|| IEEE Transaction, 2017 2nd International Conference on Telecommunication and Networks (TEL-NET)

[5] Vinay sagar K N, Kusuma SM. [2015]Home Automation Using Internet of Things". International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056, 02(03) | June-2015 www.irjet.net p-ISSN: 2395-0072.

[6] Hina ruqsar, Chandana R, Nandini R, TP Surekha.[2014] Internet of Things (IoT) based real time gas leakage monitoring and controlling. International Journal of Electronics and Communication Engineering & Technology (IJECET). 5(8) : 208-214.

[7] V.Ramya, B Palaniappan.[2012] Embedded system for hazardous gas detection and alerting". International Journal of Distributed and Parallel Systems (IJDPS).3(3)

[8] M Amsaveni, A Anurupa, R.S.Anu Preetha, C.Malarvizhi, M.Gunasekaran.[2015] GSM Based LPG Leakage Detection And Controlling System. The International Journal Of Engineering And Science (IJES) ISSN (e): 2319 – 1813 ISSN (p): 2319 – 1805 : 112-116

[9] J.Ashley Jenifer, T.Sivachandrabanu, A.Darwin Jose Raju. "Automation and Energy management of Smart home using LabVIEW". 978-1-4673-9925-8/16/\$31.00 ©2016 IEEE.