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IOT based Smart Kitchen

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ABSTRACT
The present paper aims to highlight the various aspects of IoT and its role in smart kitchen. The different technologies such as RFID, WSN, Cloud Computing, Networking Technology and Nanotechnology that support the IoT, and their applications in various fields i.e Smart home, Smart City, Smart Grid, Smart Health and Smart Farming have been covered. In addition to this a special coverage has been made with regard to Smart Kitchen. The description of various appliances and their application in the smart kitchen has been enumerated. In recent days kitchen based accident has been increased in both commercial kitchens and domestic kitchens. These accidents can be avoided using IOT technologies like monitoring the entire kitchen from remote areas. In order to implement this research both hardware and software will be utilized. From the hardware side CO2 sensor(gas), Pressure sensor, temperature sensor, humidity sensor, IR sensor has been used. From the software side integrated cloud application and mobile application has been used. All these sensors will be integrate with Arudino uno processor board for cloud data transfer. In added with log reports can be generated using the same methods.
Keywords :— IOT, Cloud Application, Mobile application, Integration, sensor, data transfer

I. INTRODUCTION

The applications of Information communication technology have brought a sea change in human life.[1] 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.[2] 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.[3,4] 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.[5] 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.[6] 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. 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[7].

II. RELATED WORKS

In the year 2009, Kiritsis proposed a new definition of intelligent product based on what happened with us as human being. It suggests closed loop product life cycle management to develop more enhanced product data technologies, which can be used in future to develop smart or intelligent product and also to deal not only with static but of dynamic product data as well. In the year 2009 Eisenhauer et. Al., was published which proposed a platform to create an intelligent application for wireless devices and sensors. This will work as a middleware for the developer to create intelligent application for the embedded systems. It used unique combination of Service-oriented Architecture (SoA) and a semantic-based Model Driven Architecture to build this platform.

In year 2010 Rolf focuses on new security measures and various privacy challenges in the IoT. It focuses on different parameters like attacks, data authentication, access control and client privacy to study the privacy challenges and to build new security model. This paper also describes the importance of establishment of a task force doing research on the legal challenges of the IoT. It also suggests to build a legal framework which will be more flexible and easy to adjust according to specific needs. In 2010 Haller, focuses on

describing all the important terminologies used in the internet of things in detail. This paper tries to bring clarity by describing the most important terms like things, devices, and entities of interest, resources, addressing, identity and more importantly, the relationships between them.

In 2010 HONG et. al, it proposed wireless sensor network technologies on the basis of various standard protocols, internet protocols to facilitate internet of things. It focuses on how to adapt the IP to the space of things. This article introduces the Sensor Networks for an All-IP World (SNAIL) approach to the IoT. It also includes four significant network protocols: mobility, web enablement, time synchronization, and security.

In the year 2013 Tsado et. Al proposed to detect the gas leakage with the help of GSM cell phones. They used two gas sensors; used to detect gas leakages in a particular location. They have also used 8051 microcontrollers programmed in assembly language and a GSM phone. The GSM phone is configured to send gas leakage alerts in the form of a short message service (SMS) message which indicates the exact location to another GSM phone to enable prompt necessary action. This whole system will lead to a faster detection when the gas leakage occurs.

In 2013 Guo et. al, suggest to create an IoT based on the ad hoc, opportunistic networking of devices (e.g., mobile phones and smart vehicles) using short-range radio techniques (e.g., Bluetooth and Wi-Fi). This will create a close relationship between human and opportunistic connection of smart things because it deals with information forwarding and dissemination within and among the opportunistic communities formed based on the movement and opportunistic contact nature of human. This paper suggests a method to create IoT in a different manner so that it can be created whenever needed with the help of radio frequencies. In the year 2014 Apeh et. Al proposed a system that detects gas leakage and alerts the subscriber through alarm and status display and also turning off the gas supply valve automatically. It automatically uses a normally closed solenoid valve for the shutting off of the gas valve before calling for help via visual display and alarm. It automatically opens the valve again for normal operations once the leakage goes below the set point.

In 2014 Bello and Zeadally, focuses on how two devices in any IOT should communicate intelligently because the quality of the information gathered depends on how smart the devices are. In IoT, different devices work on different network standard, so this can lead to several networks challenges & this cannot be solved by traditional routing protocols. So this paper proposed state-of-the-art routing algorithms, which can help to achieve an intelligent D2D communication in the IoT.

In the year 2016 Sun et. Al proposed that one can use IoT to make a network of various connected devise and smart sensors, so that this network can able to remember the past & plan for the future. They also argued that to use big data analytics to get the desired SCC. It suggested that one can use mobile crowd sensing and cloud computing to build SCC and suggested that SCC will help to improve livability, preservation and attainability.

III. SCOPE

When things like household appliances are connected to a network, they can work together in cooperation to provide the ideal service as a whole, not as a collection of independently working devices. This is useful for many of the real-world applications and services, and one would for example apply it to build a smart residence; windows can be closed automatically when the air conditioner is turned on, or can be opened for oxygen when the gas oven is turned on. The idea of IoT is especially valuable for persons with disabilities, as IoT technologies can support human activities at larger scale like building or society, as the devices can mutually cooperate to act as a total system. So far, much work has been done on realizing the IoT

IV. APPLICATIONS

1. Monitoring the all sensors and its value for safty detection of gas leakage, temperature and Humidity of room,and daily usage of system to the user.
2. Exhaust fan switched on in case of abnormal readings
3. Stores the data related to the system like daily data monitoring

Intelligent System for Domestic Gas Appliances using IOT. In our day-to-day life there is serious threat about leakage which leads to suffocation when inhaled, when ignited leads to explosion and causes a number of deaths. This project is about designing a LPG leakage monitoring system which is proposed for home safety. This system detects the leakage of the LPG and alerts the consumer about the leak by SMS and as an emergency measure the system will turnoff the power supply, while activating the alarm.

V. PROPOSED WORK

We proposed the design and construction of an IoT based Smart Kitchen System are indicated in Fig.1. Here different types of sensors were used to detect gas leakages, water tank overflow and bucket management system in a kitchen; its outputs are then interfaced with an ATmega32 microcontroller programmed in assembly language.

The GSM phone is configured to send alerts in the form of a short message service (SMS). We can get this and much more safety feature that can be integrated with the automation system includes temperature sensor, weight sensor. Continues monitoring of services in kitchen is performed by this system.

The system is proposed of Android Smartphone user's mobile app will be developed in android. MySQL will be used for

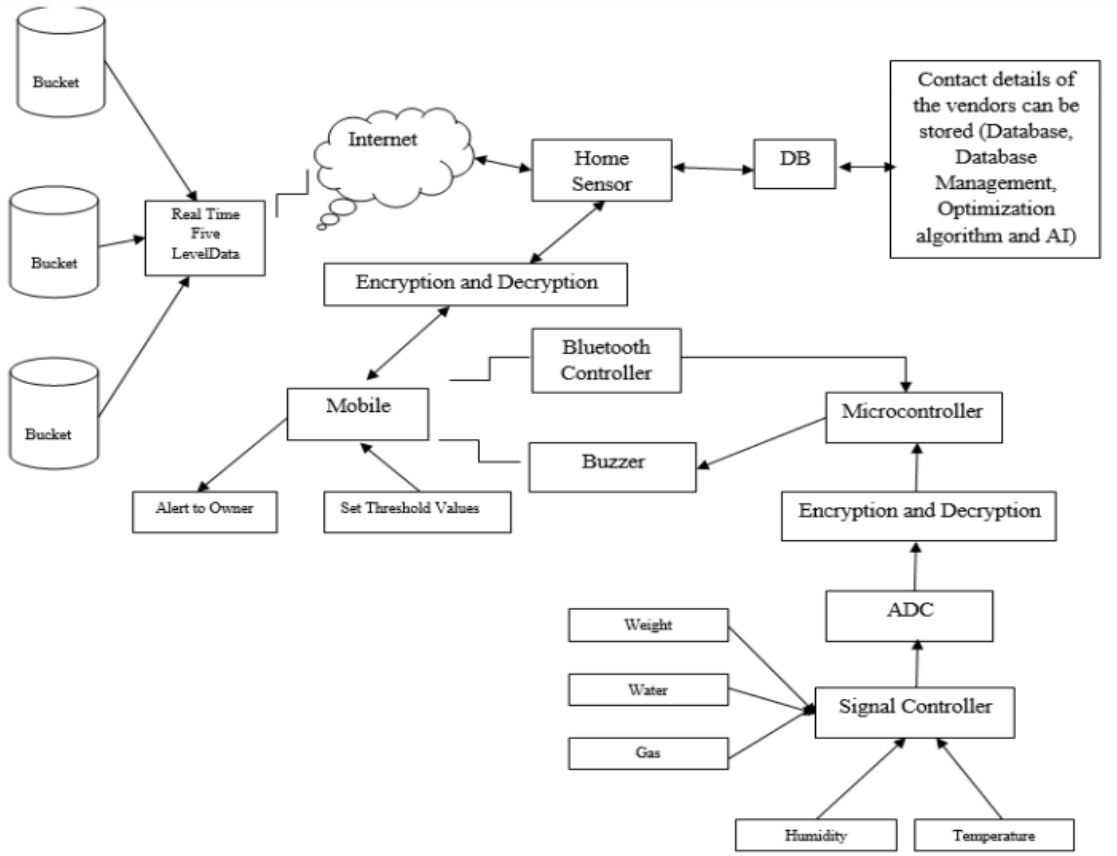

Figure 1 Design of IoT based Smart Kitchen System

maintaining database. In this system, the main concept used is atomization of home appliances using the domain of Internet of Things. For this purpose, a gas cylinder, water tank and bucket are used which is provided with different kind of sensors as mentioned above. The variation in parameters will be observed with the help of the different sensors and the values will be taken according to the variations. For example, reduction in the weight of the gas, water tank and buckets below the threshold value will be sensed by the weight sensor and accordingly message will be sent to the user and also the value will be stored in the database accordingly. Thus, the working of all sensors takes place in same manner.

VI. TESTING AND RESULTS

Hardware and software portions used were separated into units while developing the entire system. Building and testing smaller sections of the system made it more manageable and increased efficiency by decreasing debugging time. The power supply unit in the figure 2 was first tested to ensure it could supply the required power to the circuit. The sensing unit was also tested before interfacing it with the microcontroller and it

was found that it was capable of delivering an output signal wherever there was a gas concentration at its input. The gas sensors was tested with the help of the gas from a simple disposable lighter. The weight sensor was tested with small bucket of grains, As we add or removed grains from bucket reading of sensor changed. The temperature sensor is tested in room. After it was confirmed that the sensing unit delivers output in response to gas at the input, the outputs at both the sensors were conditioned and fed to the microcontroller. The microcontroller monitors the sensors and on receiving signal it sends another signal to the application. after that application send message After the whole system unit had been coupled, the gas leak alert system was tested as a functional unit and was found to be working.

VII. CONCLUSION

Our Smart Kitchen using IoT system with multiregional sensors has been designed, constructed and tested. The result obtained from the tests carried out shows that the system is capable of sending SMS alerts whenever there is gas concentration at the inputs of the gas sensors. Hence this system can be used in homes and public buildings such as hotels and restaurants. Smart kitchen provides you all the automation features that include safety features over gas leakage detection system. For this we are using gas sensors, temperature sensors, weight sensors. Gas sensors are used to detect the leakage of a gas in the system, weight sensors are used to detect the weight of the gas cylinder. Temperature sensors are used to detect the current room temperature. Server stores information and related data are stored in it; it also stores the information about the hardware, sensors, and also maintains the logs and status of system, also stores the room temperature and information about the users. Threshold values are set into the room, when it crosses that values it will send a notification to the user, about the leakage of a gas cylinder and leakage of a gas. Server can communicate with the user through android device. Through email and SMS server can sends a notification to the user which will display on the android devices. It can prevent the accident and hazards. The only way to access the information is if the user is far from the home. It is a cost effective and time-consuming solution. We can use this in various applications like home automation, Hospital management, Military management, industrial applications. One of the modifications is to provide the system with a dual power supply i.e. include a battery power supply source in addition to the utility power supply. Design the sensors that can be used for more kitchen parameters. Apply various techniques to make the system more secure.

VIII. FUTURE WORK

One of the modifications is to provide the system with a dual power supply i.e. include a battery power supply source in addition to the utility power supply. Design the sensors that can be used for more kitchen parameters. Apply various techniques to make the system more secure. Also we can increase some sensors.

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