

“ UNIVERSAL REMOTE CONTROL SYSTEM FOR KITCHEN AUTOMATION USING IoT ”

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ABSTRACT

The importance of embedded system is growing continuously, A new system is proposed from the inspiration of the above system to monitor the various parameters in the kitchen. The development and design of the wise monitoring and controlling system for kitchen environment instantly continues to be reported within this project. The device can observe the status of kitchen and send alert information through IOT network instantly, when the conditions get abnormal. The ARM7 is utilized within the implementation of sensor module. The Wi-Fi is a excellent option for this because of its extensive coverage. Since, IOT is really a web based protocol, the most fundamental web server systems might have an ease of access status from the products or make changes on these states. The machine primarily observes kitchen atmosphere parameters like fire detection, light intensity, motion recognition and LPG gas level, temperature detection and continues to be developed. Wireless kitchen automation system using IOT is a system that uses computers or mobile devices to control the basic kitchen functions and features automatically through internet from everywhere around the world.

Keyword: - Embedded Web Server¹, ARM7 Microcontroller², Gas Sensor³, Temperature Sensor⁴, Fire Detector⁵, LDR⁶, PIR Sensor⁷, GSM Module⁸, LCD Module⁹.

1. INTRODUCTION

Kitchen atmosphere monitoring is among the important measures to become carefully supervised, we are at safety, security, and luxury of individuals. The innovators and researchers are always trying to find new things and new technologies to satisfy the people but the process is still infinite. In the 2000s, Internet connectivity became the type for various applications and today is expected as part of many project, industrial and consumer goods to provide access to information.

Enormous increase in users of internet and modifications of internet working technologies enable networking of everyday objects. We have designed and implemented a compact wireless sensor network with internet capability. The user directly log in and interact with the embedded device in real time without the need to

maintain an additional server. It has a variety of features such as energy efficient, low cost, portability and high performance.

2.LITERATURE REVIEW

A. SMART HOME MONITORING AND CONTROLLING SYSTEM USING ANDROID PHONE.

This project describes a zigbee module and android based home monitoring system for security, safety and healthcare for human. The existing system provides security and safety or healthcare system but in my project provide combination of these two systems. This system is more flexible and can be implemented in many research areas. This paper introduces a smart home system which could manage household appliances remotely and realize real-time observing of home security status through mobile phone. This paper mainly focuses on the monitoring and control of smart home remotely and providing security, when the user is away from the place. The personal computer is used to observe the various factors in the proposed system. In this system android phone is used to observe and manage the various parameters. Android phone is main advantage compared to personal computer for using any place. To observe the various factors using zigbee, that has viewed by lab view and then controlled using android phone.

B. SMART KITCHEN CABINET FOR SMART HOME.

This paper describes a theoretical design of a Smart Kitchen Cabinet, a system for maintaining inventory status of grocery items in the kitchen automatically. This system incorporates grocery item identification, inventory management of grocery items and automatic generation of shopping list. Individual grocery items can be prepared with sensors to detect how full they are. The Smart Kitchen Cabinet consists of two different parts each leveraging two sensing mechanisms: weight sensing and level sensing. Level sensing section consists of fixed size container having RFID tag defining container size with product description, RFID tag reader, and an Ultrasonic level sensor for measuring the level of contents in the container. On the other hand the weight sensing section consists of RFID tags with similar container requirement and content identification, RFID tag reader, and weight sensor measuring all the contents on that shelf. The embedded sensors evaluate the weight or the level of the items which is updated to the list whenever grocery items are located or taken out for cooking. When the items reach the predefined threshold level, the system generates the automated shopping list.

C. DESIGN AND IMPLEMENTATION OF KITCHEN MONITORING SYSTEM BY USING WIRELESS SENSOR NETWORK.

The design and improvement of a smart observing and controlling system for kitchen environment in real time has been reported. The system principally observes kitchen environment parameters such as light intensity, room temperature, fire detection, motion detection and LPG gas level, has been developed. The system can monitor the status of kitchen and send an alert SMS via GSM network automatically, if the conditions get abnormal, to a related authorities mobile phone. The concerned authority can control the system through his mobile phone by transferring AT Commands to GSM MODEM or by taking the essential steps in user SMS. Users can monitor and control. This system finds a large application in areas where physical occurrence is not possible all the time. The GSM and LPC2148 (ARM7) microcontroller are used in the implementation of sensor module. The system offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of kitchen. A prototype model is developed and tested with high accuracy result.

D. WIRELESS SENSOR NETWORK BASED SMART HOME: SENSOR SELECTION, DEVELOPMENT AND MONITORING.

The ubiquitous nature of tiny wireless sensors and rapid developments in the wireless network technology has revolutionized home monitoring and surveillance systems. The new means and methods of collecting data efficiently and have led to novel applications for enclosed wireless sensor networks. The applications are not limited to only monitoring but can be extended to behavioral recognition. This can be of great value with the elderly as it can allow anomalous behavior to be detected and remedial actions taken accordingly. This paper details the installation and design of unobtrusive sensors in an elderly person's house - a smart home in the making - in a small city in New Zealand. The overall system is envisaged to use machine learning to analyze the data generated by the sensor nodes. The innovation of this project is that instead of setting up an artificial test bed of sensors within the University premises, the sensors have been installed in a subject's home so that data can be collected in a real, not artificial, environment.

E. WEB-BASED SMART HOME AUTOMATION: PLC-CONTROLLED IMPLEMENTATION.

The most important resource of inspiration in continuity of technological developments is to upgrade human living standards. The technological development provides and increases human-beings' safety and comfort directly and indirectly. Developing technologies for this purpose directly affects the life standards by means of smart home systems design. It is possible to categorized smart home systems into two as local and remote. In this study, a smart home automation system design was carried out by using Delta DVP28SV model PLC (Programmable Logic Controller). Smart home system can be restricted in two different ways either by any internet-connected device or an operator panel assembled on PLC. Control of the ventilation, lighting and security units in the smart home were carried out. Immediate states and variations of the smart home system which is feedback based are observed and can be changed from the user interface prepared with the C# programming language. Unusual situation occurred in security units have been reported to the user with SMS (Short Message Service).

3.BLOCK DIAGRAM

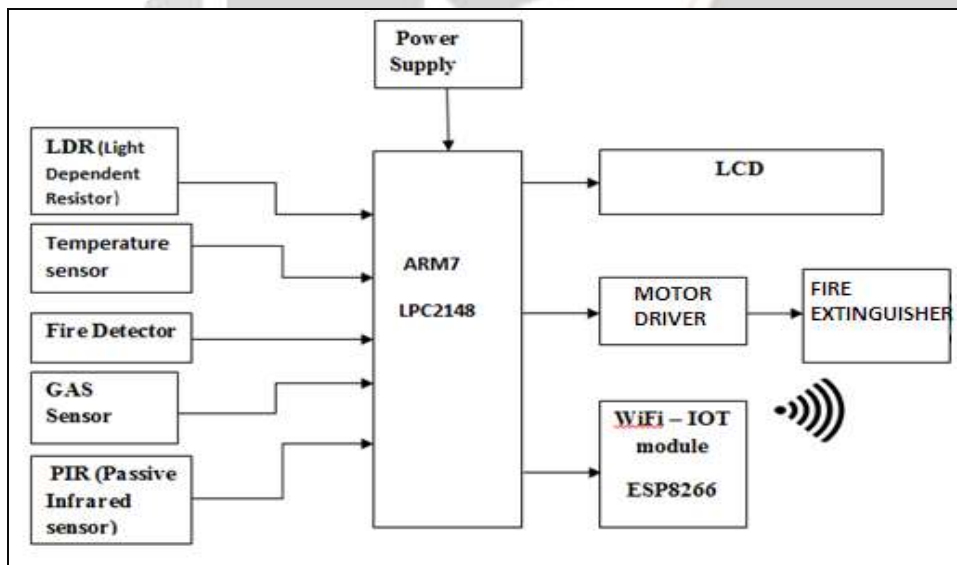


Fig 1: Block Diagram of Design and Implementation of Kitchen Monitoring System by Using Wireless Sensor Network

In this Project, there are five types of sensors i.e. LDR Sensor, Temperature Sensor, Fire sensor, Gas sensor and PIR Sensor, LPC2148 i.e. ARM7 Microcontroller is used. Inputs are given through sensors and output shows with the help of LCD, GSM and IOT module. If light intensity increases and temperature increases then microcontroller commands the outer device and through GSM and alert SMS is send on mobile and output displays on LCD and IOT.

4. HARDWARE IMPLEMENTATION

To implement the overall system we used different hardware's, which are described in this section:-

I) ARM7 (LPC2148) Microcontroller:

ARM stands for ACORN RISC machine is a family of instruction set Architecture for computer processors based on a reduced instruction set computing (RISC) Architecture and in simple word ARM is "Processor Architecture". Many of newbie's and students have misunderstanding that ARM is microcontroller or processor, but actually ARM is Architecture which is used in many processors and microcontrollers.

There are 3 types of profile available:-

(i)A-profile, the "Application" profile: Cortex-A series. This is Cortex architecture in which we port operating system mostly different embedded Linux. And make embedded system by OS system programming. Practical development of these types of profile is Friendly.

(ii)R-profile, the "Real time" profile: Cortex- R series. This is Cortex architecture which mostly used for real time reason where application abort is critical condition.

(iii)M-profile, the "Microcontroller" profile: Cortex-M series.

II) ESP8266 module:

This module we can used to send information on internet directly with serial setting to microcontroller or any processor that we are using.

III) Temperature Sensor:

Thermistors are thermally sensitive resistors whose prime purpose is to exhibit a large, conventional and precise change in electrical resistance when subjected to a corresponding change in body temperature. Negative Temperature Coefficient (NTC) thermistors exhibit a reduce in electrical resistance when subjected to an increase in body temperature and Positive Temperature Coefficient (PTC) thermistors shows an increase in electrical resistance when subjected to an increase in temperature.

IV) PIR Sensor (Passive Infrared):

PIR sensors allow you to sense motion, almost always used to identify Human motion. They gives the output when digital pulse high (3V) when triggered (motion detected) & digital pulse low when idle (no motion detected).They are having range sensitivity up to 20 feet (6 meters). They are small, inexpensive, low-power, easy to use and don't wear out. They are found in appliances and gadgets used in businesses.

V) LDR Sensor (Light Dependent Resistors):

An **LDR** or a photo resistor has a resistor has a resistance which changes based on the amount of visible light that falls on it. A photo resistor is made of a high resistance semiconductor. LDR found in many consumer items such as, Camera light meters, Street lights, Clock radios, Alarm devices etc. The light falling on the zigzag lines of the sensor (usually made of Cadmium Sulphide), causes the resistance of the device to fall.

5. EXPERIMENTAL RESULTS

Output shows on IOT:-

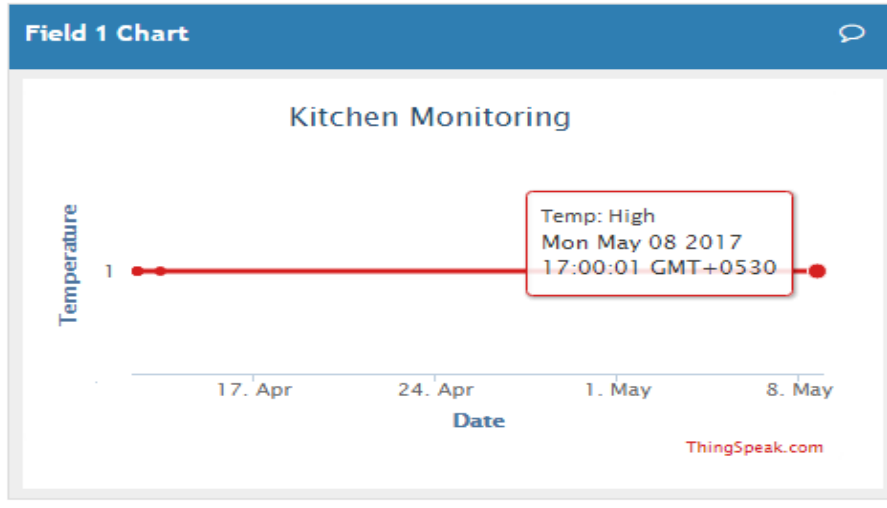


Fig1: Temperature sensor detects the temperature of the kitchen

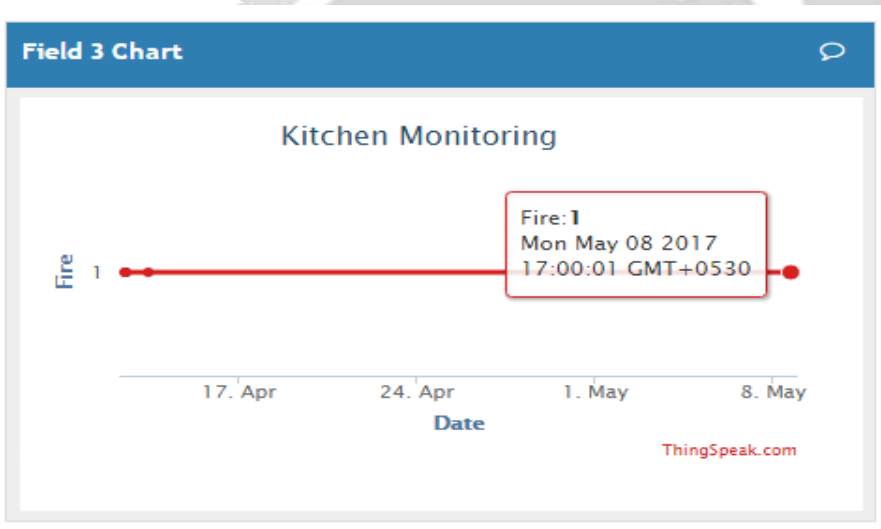


Fig2: LPG Sensor detects the leakage of LPG Gas in the kitchen

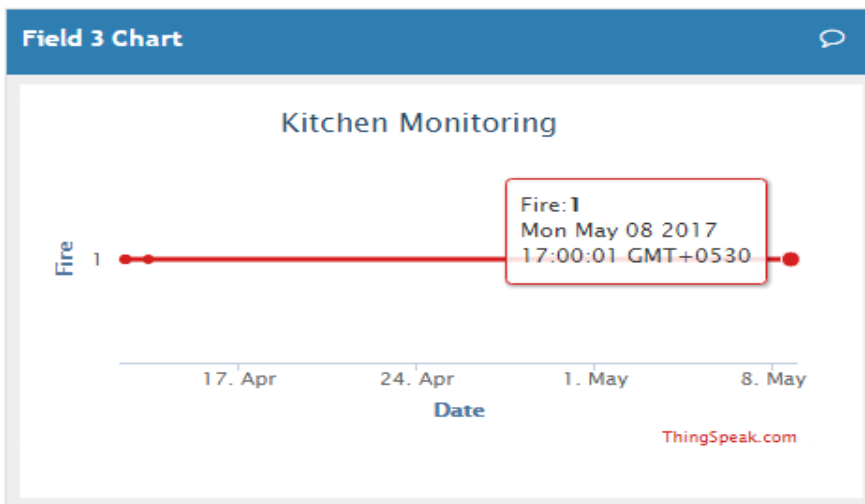
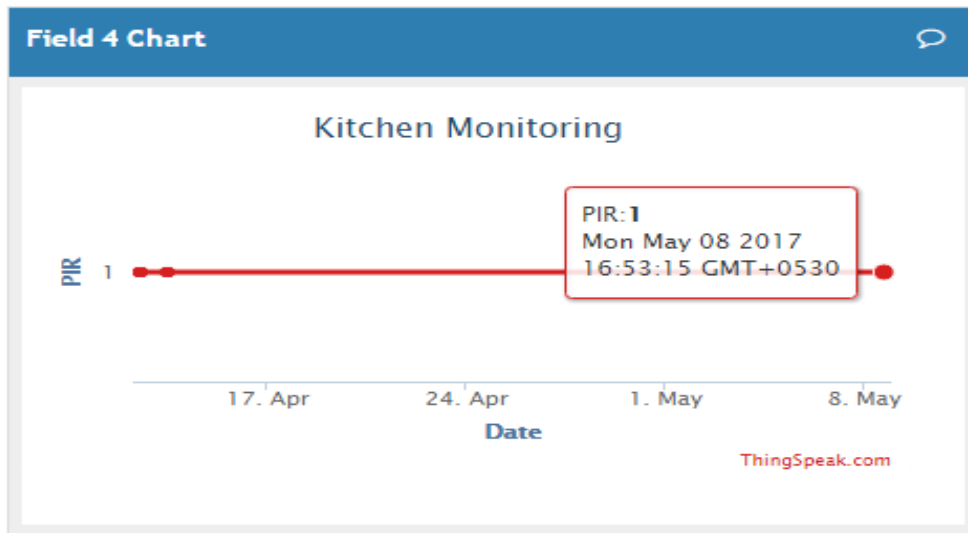
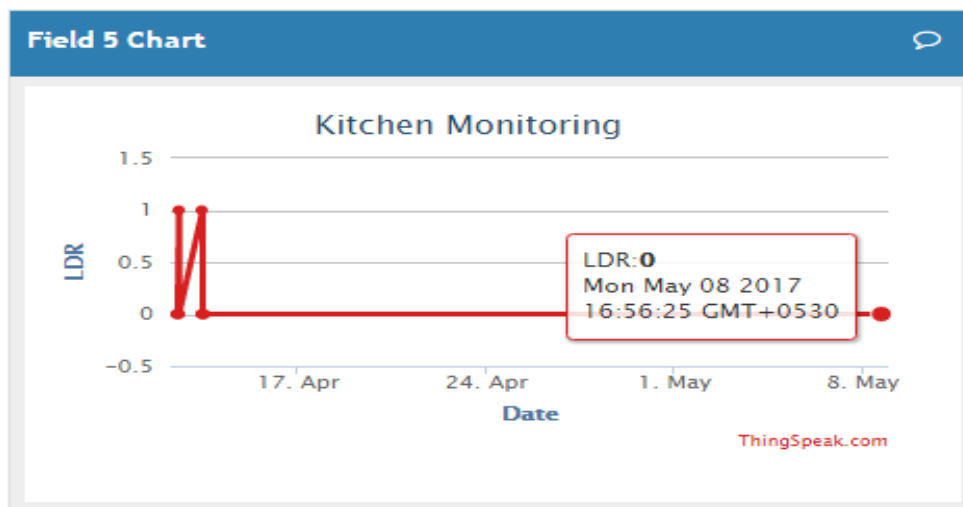


Fig3: Fire Sensor detects the fire in the kitchen**Fig4:** PIR Sensor detects the Human Body**Fig5:** LDR detects the light intensity in the kitchen

6. CONCLUSIONS:-

Kitchen monitoring is done using ARM7 in the stream of embedded systems using GSM and IoT. This project presents the design and execution of an interactive kitchen monitoring. Kitchen monitoring system with the control, communication and web based monitor and automatic control of equipment is forming a trend in automation field. Replacing PC with low-cost single chip processor can create administrators to get parameters of different remote sensor and send control information to field equipments at any time through Internet. The complete system is secured through a login and Webpage password based authentication. The design is completely wireless and integrated with the software to form a low cost, robust and easily operable system. communication makes the system easy to install. The Wi-Fi and Web based controlled duplex communication system provides a powerful decision making device concept for adaptation to several smart kitchen scenarios.

7. REFERENCES

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