

# “Home automation and power management on smart home using cloud server”.

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## **ABSTRACT**

The main aim of this paper is to reduce the power by using the concept of home automation and power management system. Home automation is a term which is used to describe the use of specific automation techniques in homes for enhanced comfort, convenience. Power management can be done by taking examples of two odes. Main input power can be taken from KPTCL that will be recorded in the cloud.

**KEYWORD: Karnataka Power Transmission Corporation Limited.**

## **I. INTRODUCTION**

Home automation is an umbrella term which is used to describe the use of specific automation techniques in private homes for enhanced convenience, comfort and security of the residents. Some prevalent technique used in home automation include control of light ,heating, ventilation, air condition, .Home automation using cloud networking can simplify this scenario by connecting each sub system of a home automation system directly to the cloud and this not only reduce setup time and maintenance cost by eliminating the need of specialized gateway and web server in each household but also enable home automation service provider to deliver advanced auto services to the system .Multi-user system must be necessarily based on the standard cloud computing model in which services are made available to the general public over the internet as long as they use the specified web application programming interface .

Cloud networking and data infrastructure allow the individuals to monitor, manage and control their personal data points through the internet. It is a real time data infrastructure allowing the management of millions of data points from thousands of individual’s organizations and companies. Considering our living environment almost all places are designed with computers, air-conditioned and other high power consumption devices. People usually forgot to turn off the power devices after they are not in use .so how to make efficient use of limited energy become a major problem to conquered .Recently central power management system is proposed ,in this system it just performs on and off operation on the power switch in a room space .Control of appliances on single or individual is very hard to attain.

## **II. RELATED WORK AND CONTRIBUTIONS**

Chai-Hung Lien et al. [1] describes the wireless power controlled outlet module with some scalable mechanisms; this scalable mechanism is needed for the home power management.

Borse Bhagyashree et al. [2] proposed a technology that can perform some remote control monitoring of electrical appliances on internet. The result obtained in this system eliminates the waiting time of typical of typical automatic power cutoff outlet.

Dong Zibo [3] proposed the implementation of a smart power metering system this system improves the accuracy of the non-linear power consumption calculation and provides user’s solution of optimized power consumption plan which is based on the hourly time varying tariff. In the proposed system the electricity cost of a home can reduce up to 12% from the simulation of four re-schedulable home applications.

Jinsoo Han et al. [4] proposed a very efficient home energy management system to reduce power consumption in the home area. In the home area especially considering in the room it can be easily considering in the room it can be easily controllable with an IR remote control of a home device.

Jin Xiao [5] proposed smart home system in Korea. Author showed that the proposed system is open, extensible, integrated, and intelligent. Also they detail the challenges and key design requirements for the smart home systems based on past experiences, & they show how convergence system design is a capable methodology for enabling an integrated and multi faceted home management system that encompasses energy management, home appliance control, environment management & living support functionalities under a single unified design.

Jaypal Baviskar et al. [6] this paper proposed about a wireless sensor network based on the embedded system and this system deals with the implementation of a zigbee network for the remote controlling of the green house parameters.

Mingfu li et al [7] The main goal of the proposed system is to reduce the impact of wireless interference on a smart home control network and unnecessary energy consumption of a smart home .the result obtained from the system has a lot of energy savings.

Mihai T. Lazarescu [8] proposed internet of things which provides a virtual view via internet protocol, to a huge variety of real life objects, ranging from a car, to a tea cup, to a building, to trees in a forest. Wireless switching networks are well suited for long term environmental data acquisition for internet of things representation. The proposed systems presents the functional design and implementation of a complete wireless sensor network platform that can be used for a range of long term environmental internet of things application.

Lih-Jen Kau proposed a smart home energy management system. In this smart home energy management system power can be saved .Model contain cloud as a server which receives input data from the server which contains GUI that data pass to the microcontroller ,and then the drivers .Some sensors must also be connected in order to detect the fault.

### III. PROPOSED SYSTEM

The proposed system describes about home automation and power mangement system. Home automation is a term which is used to describe the use of specific automation technique in private homes for enhanced convenience, comfort and security of the residents. In this proposed system home automation will come to picture in case only when persons are inside the home, then only the power supply will be utilized otherwise the power supply will be off automatically.

Power management can be explained by taking two nodes as example . Node-1 and Node-2 are designed in the same way. If the total power given is 100KW then both node-1 and node-2 will equally share power. Then suppose if node-1 uses 20KW in 2days and node-2 uses 50KW in 2days. The total amount of power is all used by the node-2, then alarm will be activated by sending signal to the node-2 that all power is utilized then the power will be taken from the node-1 like this power management is done in the system.

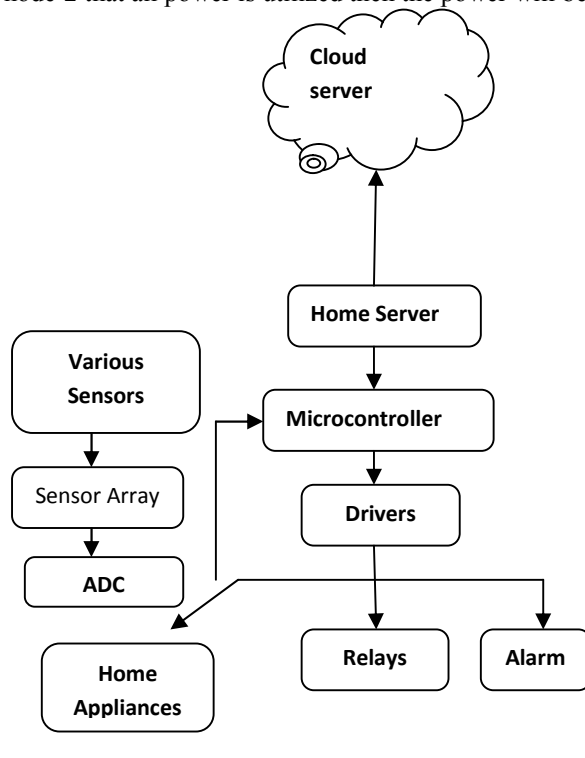


Fig. 3.1 Block Diagram of home automation.

The block diagram of the home automation is shown in figure 3.1. The system consists of various sensors like LDR, Temperature sensor, PIR.

## LDR

LDR is a component that has resistances those changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits. The most common type of LDR has a resistance that falls with an increase in light intensity falling upon the device. A light dependent resistor housed in a sealed epoxy case with clear lens window .Resistance decreases as light falling on the device decreases.

## ARM\_7

ARM-7 is a group of older 32 bit ARM processor cores licensed by Arm holdings 8 to 40KB of on chip static Ram 32 to 512 KB on chip flash program memory .low power real time clock with independent power and dedicated 3.2KHZ clock input. It works on 3.3V.

## Relay

A relay is an electrically operated switch made up of an electromagnet and set of contacts. Single pole double throw switch is used designed for 1.65V to 5.5V operation. SN74LVC1G3157-Q1 version is used.

## PIR Sensor

Two types of IR sensors are their active and passive. Passive sensors are used. A passive infrared sensor is an electronic sensor that measures infrared light radiating from objects in its field of view.PIR sensors are approximately ¼ inch square and take the form of thin film. Materials include gallium nitride, calcium nitride, and polyvinyl fluorides. It has single bit output, small size makes it easy to conceal. 3.3V to 5V operation with 100ma current drawn. Passive #555 -28027 is used.

## Temperature sensor

LM35 temperature sensor is used which is a precision IC temperature sensor with its output proportional to the temperature. It operates from 4 to 30V.

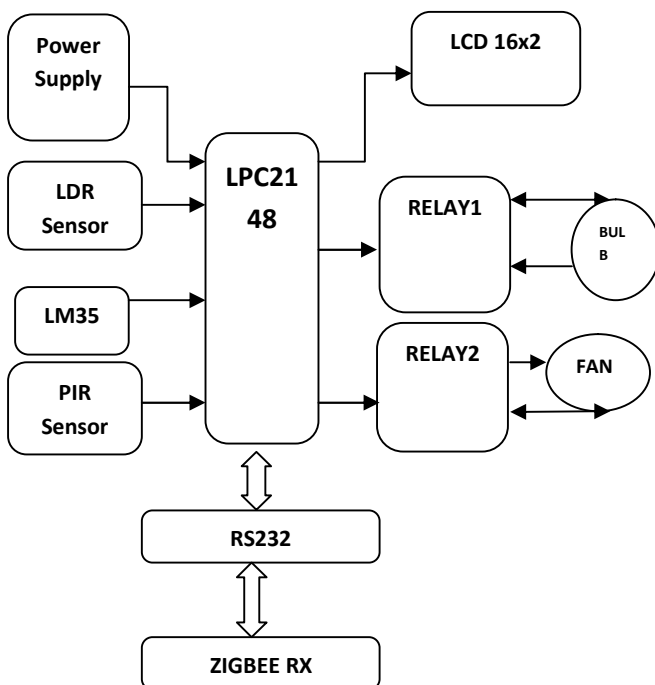


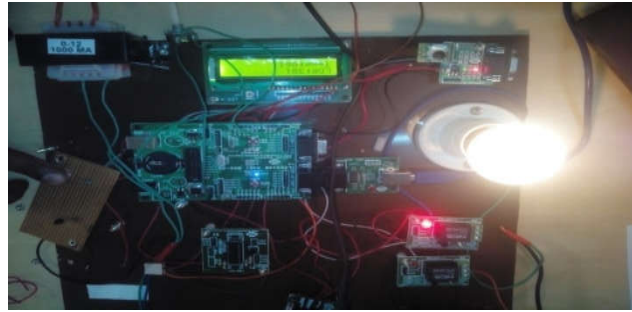
Fig.3.2 Node1

The system consists of various sensors like LDR, temperature sensor, PIR as shown in above figure3.2 which is taken as input that input is will be in the form of analog and it is converted into digital with the help of ADC. Converted digital input is connected to microcontroller which is ARM-7, LPC 2148 on the other side controller is connected to relay. In the proposed system LDR, temperature sensor is implemented, so two relays are used. LCD is used to display readings. LPC2148 is connected to the zigbee by using RS232. Zigbee is used to transmitting and receiving purpose. Exactly like this node -2 will be designed. Power management can be done with the help of both node-1 and node-2.

#### IV. SYSTEM IMPLEMENTATION AND RESULT

The proposed system is implemented in keil. First initiate the LCD and ADC, and then read the temperature data, that data will be display on LCD. Again LDR data is read and displayed on LCD, read PIR if temperature is not greater than 180 turn on bulb if so LDR is less than 10 then turn on fan if not PIR is equal to 255 turn on bulb. In this proposed system LDR and temperature sensor is implemented.

Suppose during the day time inside the room or any place in the home darkness and if person present means the bulb will glow as shown in below figure 4.1.



4.1 Fig showing LDR output.

When temperature inside room become more at that time fan will be on and the temperature readings on LCD is shown in fig. 4.2.

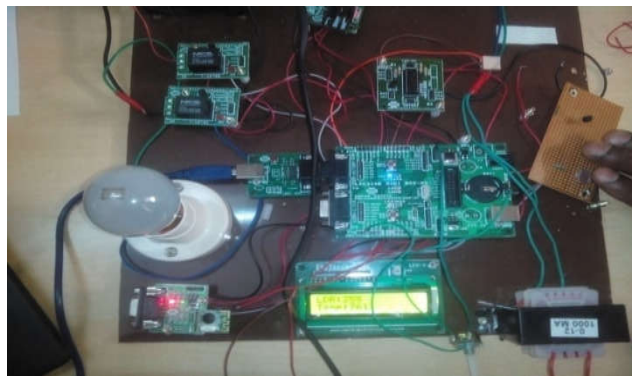


Fig. 4.2 showing the Temperature reading on LCD.

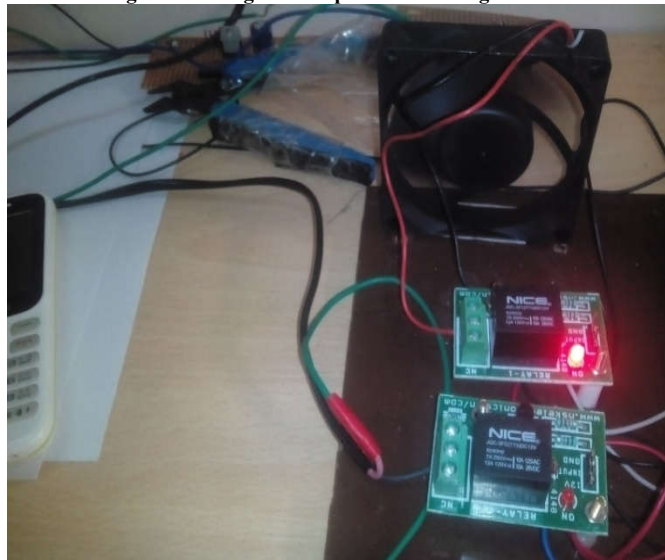
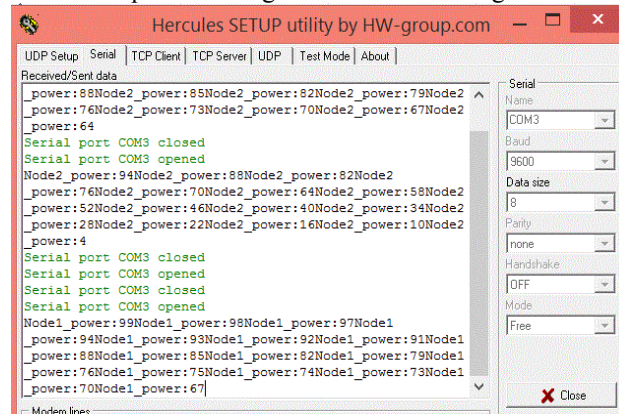


Fig. 4.3 showing temperature output.

The Above fig. 4.1, 4.2, 4.3 tells about home automation.  
 The power management is shown in fig. 4.4



**Fig. 4.4 Result Showing node1 and node2 power.**

When the node1 uses more power at that time node2 will transfer the power and transferred power is shown on LCD. Like this power management can be done and the result is shown below in fig.4.5



**Fig.4.5 Result showing when node2 transfers power.**

When the node2 uses more power at that time node1 will transfer the power and the transferred power is shown on LCD like this power management can be done and the result is shown in fig.4.6.



**Fig.4.6 Result showing when node1 transfers power.**

Here in this system the cloud is developed in the form of server and it is implemented in the GUI using mat lab.

## V. ADVANTAGES.

The main advantages of proposed system are

1. Power can be saved.
2. Cost Efficient.

## VI. APPLICATION.

1. Industrial application.
2. In homes.

## VII. CONCLUSION

Home automation and power management on smart building using cloud server is implemented and verified. Home automation is verified only in one condition when the person is present and in the darkness by glowing the bulb and also when the temperature inside the room or home is more . power management can be verified by transferring the power to the node which is having less power.

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