ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Controlling and Monitoring of Electrical Appliances Based on IOT

M.Lokesh
P.G Scholar,
Department of ECE
Priyadarshini Institute of Technology,
Tirupati, A.P., India.

Mr. Y.Balagangadhar Reddy, M.Tech
Assistant Professor,
Department of ECE
Priyadarshini Institute of Technology,
Tirupati, A.P., India.

Abstract:
Due to the drastic changes in technology in the last decade, so many advancements were introduced in electricity departments. With the proliferation of Internet ofThings (IoT) devices such as smartphones, sensors. It is possible to collect massive amount of data for localization and controlling of electrical devices in commercial buildings. These are extensive opportunities for improving the energy consumption of buildings via smart HVAC control. In this respect the major challenges we envision are to achieve occupancy monitoring in a minimally intrusive way, e.g. using the existing infrastructure in the smart buildings and not requiring installation of any applications in the users smart devices. This paper surveys the existing works on occupancy monitoring and multi-modal data collection techniques for smart commercial buildings. The goal is to lay down a framework for future research to exploit the spatiotemporal data obtained from one or more various of IOT devices.

Index Terms: ***Energyefficiency, hidden Markov model (HMM), HVAC, localization, occupancy monitoring, positioning, position estimation, WLAN, WiFi, wireless location estimation.***

I. INTRODUCTION

Smart buildings are becoming a really with the integration of Building Management Systems (BMS) with an underlying monitoring and communication infrastructure that consists of smart devices along with the communication
Infrastructure, are referred to as Internet of Things (IOT). The BMS manage various crucial components of the buildings such as heating, ventilating and air conditioning (HVAC) gas, lighting, security system and fire system and it can communicating with the IOT devices.

With the availability of IOT in commercial buildings, building occupants and environment can be monitored in real time. In this way, we can have real-time access to occupancy counts in different zones of the building and even locate most of the users carrying a wireless device. This real-time occupancy status information can be used in a variety of applications controlled by the BMS. For example, the smart buildings systems of the future can adjust their energy consumption by intelligently controlling the HVAC, and respond promptly to any potential issued that can put the building off its track to carbon neutrality.

In addition to energy issues, real-time occupancy tracking may also help rescuing survivors in case of emergency response applications. The security or fire system can be benefit from this information throughout the BMS. Finally, this information may also be used to improve building surveillance and security, and help in better deploying the wireless communication infrastructure for fulfilling ubiquitous throughout the buildings.

Due to such advantages of occupancy controlling/monitoring many approaches have been proposed in the literature by considering the use of different devices, assumptions, and goals. The approaches have certain drawbacks with respect to accuracy, cost, intrusiveness and privacy.
The main aim of the project is to reduce costs it to rely on the existing infrastructure as much as possible. This automatically addresses the intrusiveness issue since there will be no need to deploy additional devices inside the rooms, and additional applications on the users devices. Nonetheless, this raises the question of accuracy which may be severely affected.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

In an analysis of the existing approaches and heap address the aforementioned issue by promoting the use of multi model data fusion that will be collected from the existing the IOT network. A data fusion process could improve the accuracy of controlling and monitoring of occupancy detection while maintaining a low intrusiveness. By exploiting the synergy among the available data, information fusion techniques can filter noisy measurements coming from IOT devices, and make predictions and inferences about occupancy status. Specifically, we first analyze the variations of the problem and the available IOT devices and then survey the existing works with respect to these assumptions. We analyze their abilities to address the issues of accuracy, cost intrusiveness and privacy. We finally consider data fusion approaches and investigate how these techniques can be exploited to come up with more advanced occupancy controlling and monitoring techniques that can significantly reduce the energy consumption of the commercial building in home automation system using HVAC systems.

II.LITERATURE REVIEW
EXISTING METHOD

In home automation system has mainly four drawbacks are there, one is inflexibility, second one is manual operations, tariff is very high and remote controlling and remote monitoring is not possible in achieving security. The main objectives of this research is can be able to design and to implement a home automation system using IOT that is due to the capable of controlling and monitoring the electrical appliances through an easy manageable web interface. The proposed system has a great flexibility and good manageability by using Wi-Fi technology can be used to implement and to interconnect its distributed sensors to home automation server. This will decrease the deployment cost and it will be increases the ability of upgrading and system reconfiguration.

PROBLEM DEFINITION

There are a number of variations when we refer to occupancy of controlling and monitoring problem. These are interrelated but depending on the goal of the application, in the past, various forms of the problem are studied. We show them in the form of subset/superset relationships in the following fig.

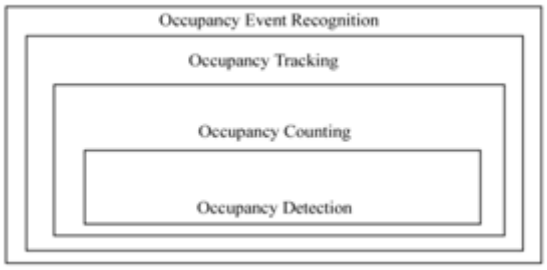

Fig 1: Occupancy monitoring problems

Occupancy Detection:

This problem studies whether a space is occupied or not at a given time. This is typically in the form of binary answers which doesn't tell how many people exists if the space is occupied. The spaces considered here are typically offices are private spaces. Occupancy detection of public spaces (e.g., meeting rooms, aisles, cafeterias), on the other hand, is more challenging. Typically, these public spaces can either be controlled or monitored by default consider occupied for HVAC applications.

Occupancy Counting:

The goal of this problem is to determine the total number of people in a building at a given time. There are two versions of this problem: first, counting all the people in the whole building. Second, counting people based on some predefined zones. The zones can be defined, for example, using HVAC zones, offices, etc.,

Occupancy Tracking:

This problem can be considered as the super set of the all of above problems. It is not only detects people, but also controlling and monitoring of electrical appliances in commercial buildings in home automation system.

Occupancy Event Recognition:

This problem is mostly related with the activities of the users once they are monitoring at certain locations. The activities can be individual or collective. Through occupancy event recognition, the behavior analysis of the individuals can be done and used for intelligent HVAC control.

When investigating these problems, researches relied on several network and IOT devices. These can also be

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

classified into the following categories in order to assess the cost and intrusiveness of the approaches.

Step 1: Approaches which rely on the existing Wi-Fi infrastructure without any addition of hardware or software
Step 2: Approaches which additionally require new software to be installed on APs or client devices.
Step 3: Approaches which requires new hardware or software deployment. This category can either aggregate several IoT devices.

In this project, we survey the existing occupancy controlling and monitoring approaches based on steps above. Specifically step 1 and step 2 are considered under Wi-Fi based occupancy monitoring system. When coming to step 3 the approaches that fused data from several IOTs will also be reviewed under data fusion.

DISADVANTAGES:

1.By using this different industrial parameters are very difficult send to remote areas through Web Server.
2.By seeing the monitored values we cannot control the devices easily from remote areas through Web Server.

III.PROPOSED SYSTEM

The proposed system consist a prototype low cost wireless embedded gateway for an controlling and monitoring of electrical appliances or home appliances through an internet. The proposed prototype is focused mainly at the low cost solution for legacy appliances. The main goal of this proposed system is to reduce the delay and the electric bill for home automation system in commercial buildings. In this system to improve the energy consumption in buildings via HVAC(Heating Ventilation and Air Conditioning) control. The embedded gateway is can be used to communication with one end device as user and to internet. Any smart phone with an internet connection can access the home environment through the gateway. In the proposed system the gateway can provides the data is transfer between user and multiple home appliances through the internet.

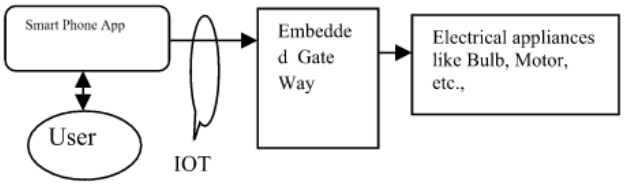

Fig 2: Architecture of Proposed System

The main features of proposed system are:
1.The expensive components are not required in embedded gateway.
2.It will completely based on open source solutions.
3.In automation system it will be increase the system mobility and scalability.
4.Remote monitoring and remote controlling can be done in proposed system.
5.Reduce the man power.
6.Automation can be done in proposed system.

BLOCK DIAGRAM

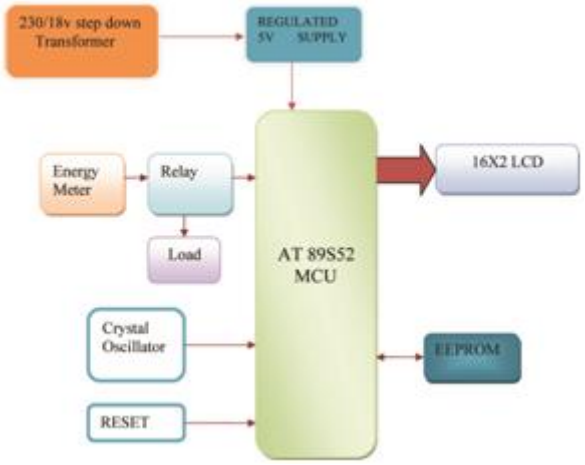

Fig 3:BLOCK DIAGRAM OF PRAPOSED SYSTEM

IV.HARDWARE DESCRIPTION
AT89S52 MICROCONTROLLER

Fig 4: AT89S52 Microcontroller

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Description:

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry- standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes.

The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

Features of AT89S52 Microcontroller:

1.Compatible with MCS-51® Products
2.8K Bytes of In-System Programmable (ISP) Flash Memory
3.Endurance: 1000 Write/Erase Cycles
4.4.0V to 5.5V Operating Range
5.Fully Static Operation: 0 Hz to 33 MHz
6.Three-level Program Memory Lock
7.256 x 8-bit Internal RAM
8.32 Programmable I/O Lines
9.Three 16-bit Timer/Counters
10.Eight Interrupt Sources
11.Full Duplex UART Serial Channel
12.Low-power Idle and Power-down Modes
13.Interrupt Recovery from Power-down Mode
14.Watchdog Timer
15.Dual Data Pointer
16.Power-off Flag

RELAYS

A relay is an electrically controllable switch widely used in industrial controls, automobiles and appliances.

The relay allows the isolation of two separate sections of a system with two different voltage sources i.e., a small amount of voltage/current on one side can handle a large amount of voltage/current on the other side but there is no chance that these two voltages mix up.

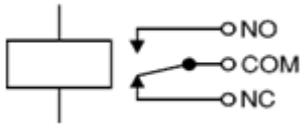

Fig 5: Circuit symbol of a relay

Operation:

When a current flow through the coil, a magnetic field is created around the coil i.e., the coil is energized. This causes the armature to be attracted to the coil. The armature's contact acts like a switch and closes or opens the circuit. When the coil is not energized, a spring pulls the armature to its normal state of open or closed. There are all types of relays for all kinds of applications.

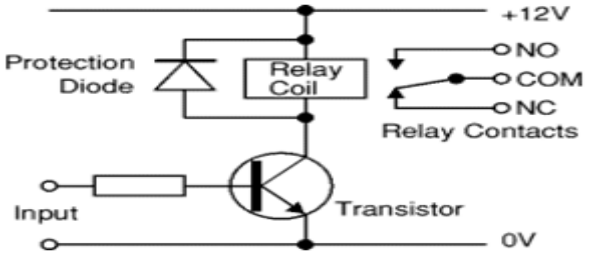

Fig 6: Relay Operation and use of protection diodes

Transistors and ICs must be protected from the brief high voltage 'spike' produced when the relay coil is switched off. The above diagram shows how a signal diode (eg 1N4148) is connected across the relay coil to provide this protection. The diode is connected 'backwards' so that it will normally not conduct. Conduction occurs only when the relay coil is switched off, at this moment the current tries to flow continuously through the coil and it is safely diverted

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

through the diode. Without the diode no current could flow and the coil would produce a damaging high voltage 'spike' in its attempt to keep the current flowing.

ENERGY METER

Energy Meter is an exclusive project that enables the user to consume the power in a more efficient way .when the user tries to consume the power i.e. when he switches on any of the electrical appliances in his house. When these electrical appliances are switched on, they consume more or less some power. In this project the energy meter we are using for taking the counts is the ADE 7757 IC.

ADE7757: Single Phase Energy Metering IC with Integrated Oscillator

The ADE7757 is an accurate electrical energy measurement integrated circuit. It is a pin reduction version of ADE7755 with an enhancement of a precise oscillator circuit that serves as a clock source to the chip. The ADE7757 eliminates the cost of an external crystal or resonator, thus reducing the overall cost of a meter built with this IC. The chip directly interfaces with shunt resistor.

The ADE7757 provides instantaneous and average real power based on line current and voltage. The part specifications surpass the accuracy requirements as quoted in the IEC1036 standard. The only analog circuitry used in the ADE7757 is in the ADCs and reference circuit. All other signal processing (e.g., multiplication and filtering) is carried out in the digital domain. This approach provides superior stability and accuracy over extremes in environmental conditions and over time.The small analog input full-scale allows the chip to interface to low value shunt resistances without losing dynamic range. The ADE7757 is available in 16-lead SOIC narrow-body package.

Fig 7: Energy Meter

V.SOFTWARE TOOLS

KEIL SOFTWARE

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

PROLOAD

Proload is a software which accepts only hex files. Once the machine code is converted into hex code, that hex code has to be dumped into the microcontroller placed in the programmer kit and this is done by the Proload. Programmer kit contains a microcontroller on it other than the one which is to be programmed. This microcontroller has a program in it written in such a way that it accepts the hex file from the keil compiler and dumps this hex file into the microcontroller which is to be programmed. As this programmer kit requires power supply to be operated, this power supply is given from the power supply circuit designed above. It should be noted that this programmer kit contains a power supply section in the board itself but in order to switch on that power supply, a source is required. Thus this is accomplished from the power supply board with an output of 12volts or from an adapter connected to 230 V AC.

APPLICATIONS:

1. Industries.
2. Home Appliances.

VI.EXPERIMENTAL RESULTS

Fig 8: Original Hardware Kit

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Fig 9 : Switch ON WI-FI And Select ESP-C8 Signal

When Wi-fi is ON search & to select ESP-C8 signal and then the password is open door.

Fig 11 : Switch ON Mobile Data And Portable Hotspot Settings

When the mobile data is ON then we go to the portable hotspot is also ON and to select the hotspot setting and to set the SSID is IOT and then the password is carving notions.

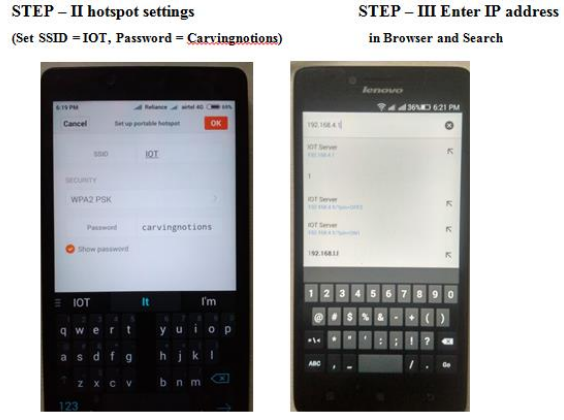

Fig 10 : Enter The Password And Search IP Address

Now we can open the browser and to enter the IP address is 192.168.4.1.

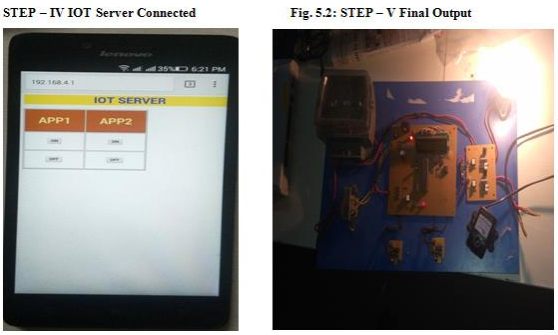

Fig 12: Expected Results of Hardware Kit

VII.CONCLUSION

In this project the existing efforts for the occupancy of controlling and monitoring of electrical appliances in commercial buildings. The existing approaches indicated a trend towards the use of existing IOTS that are available within the buildings. the current efforts where IOT comes into picture with the involvement of smart phones and Wi-Fi APs. the smart phones and Wi-Fi technology provides minimal hardware and software costs, the future commercial buildings have a great potential to save energy by employing smart controls strategies on HVAC through the help of data collected via IOT.

FUTURE SCOPE

Actually in this project controlling & monitoring of electrical appliances through the internet via IOT is implemented. So far better applications we can extant to with the help of sensors we can ON/OFF the electrical devices automatically.

REFERENCES

[1]. G. Levermore, Building Energy Management Systems: An Application to Heating, Natural Ventilation, Lighting and Occupant Satisfaction. Taylor & Francis, 2002. [Online]. Available: http://books.google.com/ books?id=hy-tFK4F9YQC

[2]. A. De Paola, M. Ortolani, G. Lo Re, G. Anastasi, and S. K. Das, “Intelligent management systems for energy efficiency in buildings: A survey,” ACM Computing Surveys, vol. 47, no. 1, May 2014.

[3] T. A. Nguyen and M. Aiello, “Energy intelligent buildings based on user activity: A survey,” Energy and buildings, vol. 56, pp. 244–257, 2013.

[4] K. Nyarko and C. Wright-Brown, "Cloud based passive building occupancy characterization for attack and disaster response," in Proc. IEEE Int. Conf. Technologies for Homeland Security (HST), 2013, pp. 748–753.

[5] R. Melfi, B. Rosenblum, B. Nordman, and K. Christensen, "Measuring building occupancy using existing network infrastructure," in Green Computing Conference and Workshops (IGCC), 2011 International, July 2011, pp. 1–8.

[6] V. L. Erickson, M. A. Carreira-Perpi ´ n˜an, and A. E. Cerpa, "Occupancy modeling and prediction for building energy management," ACM Transactions on Sensor Networks (TOSN), vol. 10, no. 3, p. 42, 2014.

[7] K. Chintalapudi, A. Padmanabha Iyer, and V. N. Padmanabhan, "Indoor localization without the pain," in Proceedings of the Sixteenth Annual International Conference on Mobile Computing and Networking, ser. MobiCom '10. New York, NY, USA: ACM, 2010, pp. 173–184. [Online]. Available: http://doi.acm.org/10.1145/1859995.1860016

[8] M. Youssef and A. Agrawala, "The Horus WLAN location determination system," in Proceedings of the 3rd International Conference on Mobile Systems, Applications, and Services, ser. MobiSys '05. New York, NY, USA: ACM, 2005, pp. 205–218. [Online]. Available:http://doi.acm.org/10.1145/1067170.1067193

[9] P. Bahl and V. Padmanabhan, "RADAR: an in-building RF-based user location and tracking system," in INFOCOM 2000. Nineteenth Annual Joint Conference of the IEEE Computer and Communications Societies. Proceedings. IEEE, vol. 2, 2000, pp. 775–784 vol.2.