



## HOME ELECTRICAL DEVICE MONITORING AND CONTROL SYSTEM USING IOT

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### ABSTRACT:

with every enhancement in Internet in terms of speed and bandwidth, IOT (Internet Of things) is taking the market on a new node and knocking the door with new opportunities of inventions. This paper talks about an energy saving electrical device Surveillance and Control system based on IOT. A large amount of energy is consumed by lighting appliances, so making improved efficiency and quick fault detection is a significant challenge. In this work, two different model approaches is followed depending on the nature of application. For small areas or confined premises IEEE 802.11 wireless technology is used where all the appliances is connected to a common Wi-Fi network. In the second model like street lamp pole where number of appliances grows only in one direction, wired configuration is used to avoid range issue. IoT is game plan of related sensors, enlisting and automated devices spread over the globe over the web which can pass on among them to share and move information using noteworthy id which is apportioned to each and every device, as UIDs (Unique Identifiers). With the creating of different business premises and social requests, the focus to robotize these premises have extended profoundly. In like manner the creating traffic mess in the urban networks has pushed everyone towards a



prevalent and dynamically reliable electrical control structure. A straightforward web application and convenient based observation and control structure related with IoT cloud server is used here for greater imperatives protection and early objectives if there ought to emerge an event of any issue area. In this new creating period where sagacious urban territories are taking into shape, the effort for perfect essentials-based traffic sign and light control system has gotten pace. So, effort has been taken to give a trustworthy and straightforward application for easy to use and screen the electrical contraptions.

*Keywords: IOT data, Energy meter, units, cost, wifi network.*

## 1. INTRODUCTION

A home application control system (HACS) is a system which is controlled by a remote system. In order to activate home appliances and to allow for different ways of cooking, the home appliances control system needs mechanism for communication between the different devices in the system, and for coordination among the various processes running on such devices. Microwave, Oven, TV, and garage door etc. these home appliances are operating by remotely. These home appliances are controlled by remote

devices such as mobile phone, Desktop, and palm-top. They are connected through wireless application control protocol. The home appliance control system receives command and this command is manipulated by user. At that time system dispatch commands to respective appliances that will perform action. This home appliance helpful for human need, when the user is very hungry, then microwave oven may need to respond to the user's request that it operate maximally to cook the food as it can for example if the user is tired, may come home late, hungry then the



system may be asked to full cook or not and periodic warming up every 10 minutes afterward. The home appliance control system also is safe. When the microwave oven should now too hot or blow up then user can automatically off that system. From anywhere we can control the system. It protects home from the home the outsider's. We are living in the world of automation where most of the system is getting automated, such as industrial automation, homes and other business sectors. Home automation system involves automatic controlling of home appliances using different technology and controllers over smart phone or tablets. It saves energy and makes the operation of various home appliances more convenient. It involve automatic controlling of electrical devices in homes or even remotely through wireless communication. All equipment like audio and video

system, security system, and kitchen appliances used in home system is possible with this system.

The essential intention in the origin of the possibility of an IOT based reconnaissance framework was to take care of the issue of theft and interruptions and to render a place protected and secure. This undertaking depends on a discourse acknowledgment programming that has been designed to control general electrical and gadgets apparatuses as home robotization highlights. These home apparatuses can be directed and controlled by an arrangement of voice orders which have been reintroduced likewise. Alongside the home computerization highlight, a face acknowledgment programming has been used for giving home security to examine the nearness of an interloper and snap their photographs to be communicated to approve staff telephone.



## 2. RELATED STUDY

This element when detects the nearness of a break in, on perceiving a face, the Pi Cam clicks a photograph of the trespasser and sends the photograph to our approved gadget or handset. As an additional element of our home computerization venture, a simple access mechanized door has likewise been accommodated a keyless programmed section. An IOT based home observation has been so composed as to modernize a family unit as per the innovation age to keep in pace with security alterations being executed in the west. Ideally this framework will be executed monetarily when mass delivered, considering it fit and possible for business use. Over the world, IOT (Web of Things) and M2M (Machine Relational Correspondence) advances which were produced for brilliant home framework are ending up

understood. The framework is produced by utilizing Bolstered Versatile Correspondence and Wellbeing Controlled Multifunctional Savvy Entryway Framework. The proposed framework will permit to impart amongst guests and proprietors of the house. Camcorder framework (the photograph of guests will be sent to the proprietor of the house), text warning, SMS/MMS notice and double sound/single sided process will be furnished with videophone. Also, distributed storage of picture information with a high determination will be furnished utilizing the framework with expanding wellbeing and security issues, the utilization of keen entryway framework expanded reliably with the appearance of security related hardware, for example, computerized entryway locks, propelled video discussion gadgets, and wire-less home security systems.

**EXISTING SYSTEM:**

In the existing system, the studies on Home Automation System focuses on addressing the problems or power consumption range of operation and cost of the whole system. To automate the appliances, various methods are used like SMS and Email. The work presented here is focused on fast and easily accessible of a wireless smart home automation system to reduce the manual work and everyone accesses this system. It is having low cost, secure, and quick access model design as compared to the previous systems and it has an additional advantage i.e. Security system. In the existing system, the studies on Home Automation System focuses on addressing the problems or power consumption range of operation and cost of the whole system. To automate the appliances, various methods are used like SMS and Email. The work presented here

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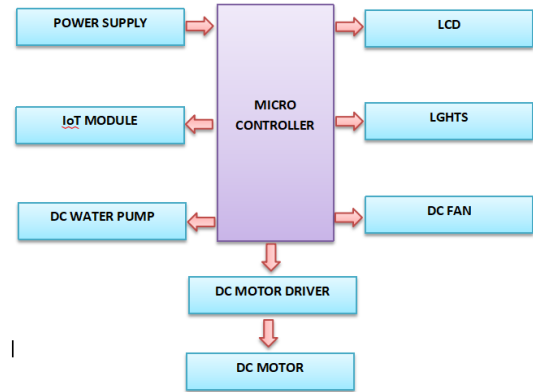
### 3. AN OVERVIEW OF PROPOSED SYSTEM

The Smart Home Automation System is an integrated framework to facilitate people with an easy to use home automation system that can be fully operated based on voice/ speech commands and through web page. The system is constructed in a way that it is easy to install, configure, run and maintain by any type of people. The system is operated as the voice command is given through a microphone so that the raspberry pi is performing an action on the basis of voice commands. The speech is



mapped through commands by using the Jasper Jasper enables outsiders to add intelligent voice control to any associated product that has a microphone and speaker. Users can ask jasper to play answer questions, get news and more on voice enabled product like the home intercom.

The proposed design contains Raspberry Pi at the center which receives all the commands. It is connected to internet for IOT services and sending email to the authorized in case it has detected face in its operating area. Pi is connected with the appliances through the relay module which will control the same through voice or through web page. Microphone and speaker is also used for taking voice input and output respectively.



**Fig.3.1. Proposed system.**

## RELAY:

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. Relays were first used in long-distance telegraph circuits as signal

repeaters: they refresh the signal coming in from one circuit by transmitting it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations. The traditional form of a relay uses an electromagnet to close or open the contacts, but other operating principles have been invented, such as in solid-state relays which

use semiconductor properties for control without relying on moving parts. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called *protective relays*. Latching relays require only a single pulse of control power to operate the switch persistently.

Another pulse applied to a second set of control terminals, or a pulse with opposite polarity, resets the switch, while repeated pulses of the same kind have no effects. Magnetic latching relays are useful in applications when interrupted power should not affect the circuits that the relay is controlling.

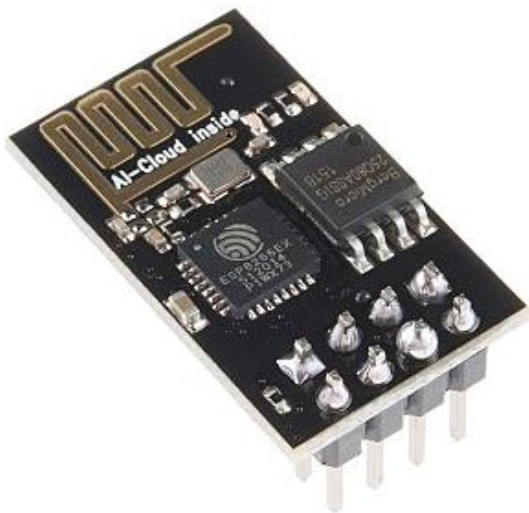


Fig.3.3. Module

### ESP8266:

Modules made with the ESP8266 by the third-party manufacturer Ai-Thinker and remains the most widely available. They are collectively referred to as "ESP-xx modules". To form a workable development system they require additional components, especially a serial TTL-to-USB adapter (sometimes called a USB-to-

UART bridge) and an external 3.3 volt power supply. Novice ESP8266 developers are encouraged to consider larger ESP8266 Wi-Fi development boards like the NodeMCU which includes the USB-to-UART Bridge and a Micro-USB connector coupled with a 3.3 volt power regulator already built into the board. When project development is complete, those components are not needed and these cheaper ESP-xx modules are a lower power, smaller footprint option for production runs.



**Fig.3.4. ESP8266 module.**

#### **OPERATION:**

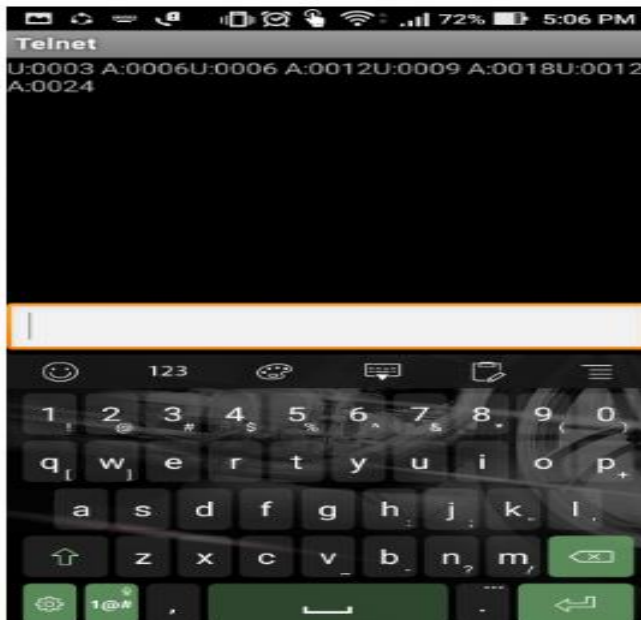
Smart meters are electronic measurement devices used by utilities to communicate information for billing customers, track and record customers' electric use and operating their electric systems. With smart meters, sending data to the electricity supplier automatically, there would not be the need to have the meter mounted outside the customer premises. Placing the meters inside a garage or other room would provide a much more protected location and aid in the security of the smart grid. This would require moving or extending the power line terminus from their normal location to the interior which would add considerable expense, and most likely be prohibitive for any extensive smart grid projects. As a matter of fact, for any new homes built in areas with existing smart meters infrastructure, this may be a useful option. Data can be sent wirelessly to an access point at the



power pole or via communication over the low voltage power lines.



**Fig.3.1. Working model.**



**Fig.3.3. Output results across by using  
TELNET application.**

#### 4. CONCLUSION

In this project Wireless Sensor Home Area Network (WSHAN) with IOT interfaced smart meter was designed, implemented and tested. Our system measures energy usage logs data real time and controls any device connected to power outputs. The power usage was measured by the smart meter prototype and the calculated data was transmitted through wifi communication to PC (Personal Computer). With the PC software, scheduling with TOU pricing showed that it creates an economic expenditure for consumer and it's all the same for the utility side. Our contribution is a smart meter system with consumer control in energy saving events corresponding to smart grid concept.

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