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Power Consumption Monitoring and Home Automation using iot

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Abstract: *The idea of smart power monitoring using IoT and Arduino have been introduced. We are using Arduino because it is energy efficient i.e. it consume less power, it is fastest and has two UARTS. IOT based power saving and consumption using wifi module is a network path in order to communicate, exchange data or control each other.Monitoring and keeping tracking of your electricity consumption for verification is a tedious task today since you need to go to meter reading room and take down readings.AIM for the planning of a system which will minimize energy waste in home environments with efficiency managing devices operation modes. The use of Wi-Fi module provides a feature of notification through internet. One can easily access the monitoring through web page that we designed. Current reading can be seen on web. Automatic ON & OFF of appliances is possible. Threshold value setting and sending of notification is the additional task.*

Key Words: *Home Automation, IOT, Power monitoring, Webpage, Wi-Fi*

I. Introduction

The paper mainly deals with smart power meter, which utilizes the features of embedded systems i.e. combination of hardware and software in order to implement desired functionality. The paper discusses comparison of Arduino and other controllers, and the application of Wi-Fi modems to introduce 'Smart' concept. With the use of Wi-fi modem the consumer as well as service provider will get the used energy reading with the respective amount, Consumers will even get notification in the form text through internet when they are about to reach their threshold value, that they have set. Also with the help of Wi-Fi modem the consumer can monitor his consumed reading and can set the threshold value through webpage. This system also can be used to disconnect the power supply of the house when needed.

Power saving and consumption using IOT is building automation for a home called smart home which involves the control, consumption and automation of home appliances using Internet of thing. The main aim of the project is to provide the consumer with a system which will provide the complete power consumption of the appliances used. The system will also implement home automation applications. Whenever there is an increase in the consumption of power by any of the home appliance, the system will keep a check of it. The advantage of the project is it will provide the user a complete overview of his power consumption. The present project "Power Consumption Monitoring And Home Automation Using IOT" addresses the problems faced by both the consumers and the distribution companies.

II. Literature Review

In recent year, there are many implementation is going for the smart home system for residential building to make it more efficient day by day. But now a day's mostly VB (visual basic) and PLCC is being used. Practically we can implement the smart home by many researchers to optimize the better result and to improve the technology for the less consumption of electricity. It is the monitoring of the energy consumption and the Controlling the environment in buildings, schools, offices and museums by using different types of sensors and actuators that control lights, temperature, and humidity[8]. If the consumer is not aware with the threshold notification, then the meter will automatically get off. Then the consumer has to visit the webpage again and increment the threshold value [4].

III. Materials and Methodology

IOT based power saving and consumption using wifi module is a network path in order to communicate, exchange data or control each other. Monitoring and keeping tracking of your electricity consumption for verification is a tedious task today since you need to go to meter reading room and take down readings. Well it is important to know if you are charged accordingly so the need is quite certain. Well we

automate the system by allowing users to monitor energy meter readings over the internet. Our proposed system uses wifi module system to monitor energy usage using arduino.

This project proposes a low cost, secure, ubiquitously accessible, remotely controlled solution for home automation. Looking at the current scenario we have chosen Android platform so that most of the people can get the benefit. The technology is easy to use and targeted for people without technical background.

3.1 ARDUINO UNO:

Arduino board is the heart of our system. Entire functioning of system depends on this board. Arduino reacts to the 5v supply given by opto-coupler and keeps on counting the supply and then calculates the power consumed and also the cost. This data, it continuously stores on webpage, so that users can visit any time and check their consumption. It even reacts accordingly as per programmed, to the situations like message sending during threshold value etc.

3.2 Node MCU:

Node MCU is one of the type of arduino.It consist of ESP8266 Wifi module ,and hardware which is based on the ESP-12 module.[6][7] The term "Node MCU" is the core of this project .It is the intermediate between the user and the home appliances to be controlled.The main function of the node MCU is to create a web link through which the appliances can be controlled.The programming part is fed to the node MCU and is stored in its memory for further use .This arduino is cheap and very user friendly.

3.3 WEBPAGE (HTML):

HTML is the acronym used for hypertext Markup language .It is one of the easiest coding languages to create a webpage .It is a standard language to create web pages .We use html to create different switches for each appliances in our home automation project .These switches can be controlled by generating an IP address which is fed to the node MCU wifi module .The user can easily control the home appliances on the given html page once he gets connected to the internet .Thus html webpage provide a better platform for a user to easily control and monitor the home automation system.

3.4 SWITCHING DEVICE:

In our system we are using 4 channel 5v relay. This type of relay can be used for various purposes. They are easy to use and their applications are over a wide range .They can be used for controlling larger loads. The device consist of four different relay .Each relay is used for the controlling of the home appliances .The rating of the relay used is 10A/125VAC.The output of the relay can be easily recognized by the light emitting diode of the given switching device .The relay works as a key between the source and the load to be controlled .The different loads that can be controlled using the given relay are as follows AC or DC motor, lighting bulbs, electromagnets, electric fans, etc.

3.5 ACS 712 Current Sensor:

ACS712 is one of the type of current sensor .This is used to find the amount of current flowing through device .It is used for monitoring the current and provide it to the user on the given display .5V DC supply is given to the ACS712 sensor as a power source .The power monitoring part of the system is carried out by using this sensor .They are easily compatible with the given arduino board.

IV. Block Diagram

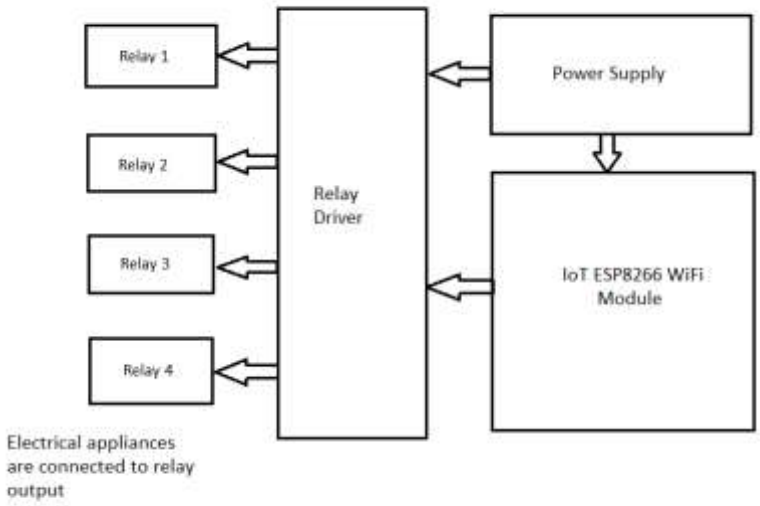

Figure 1: Home automation block diagram [7]

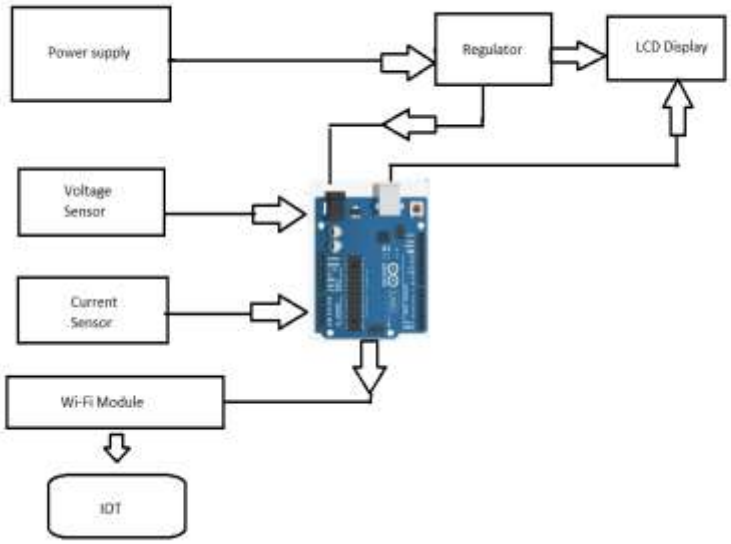

Figure 2: Power monitoring block diagram [8]

V. Future Scope

The project provides the entire energy readings at one's finger tips. The project can be further extended to detect the energy meter tampering. A smart app can be designed to provide various alerts based on the readings from the device. A unified can be provided to the customers for both viewing the energy usage and a platform to pay the bill online following the digital India initiative. In one case the service provider can evaluate the bills which are not paid and can disconnect the energy connection remotely.

VI. Conclusion

An attempt has been made to make a practical model of 'Power Consumption Monitoring And Home Automation Using IOT.' The propagated model is used to calculate the energy consumption of the household, and even make the energy unit reading to be handy. Hence it reduces the wastage of energy and bring awareness among all. Even it will deduct the manual interventionThis project proposes a low cost, secure, ubiquitously accessible, remotely controlled solution for home automation. Looking at the current scenario we have chosen Android platform so that most of the people can get the benefit. The technology is easy to use and targeted for

people without technical background.This technology also provides great assistance to handicapped and aged old people.

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