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RESEARCH ARTICLE

ELECTRICITY CONSUMPTION ALERT SYSTEM

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ABSTRACT

This is a web based application users can get instant electricity bill and pay them online. The system developed to automate the electricity bill calculation and payment for user convenience. Calculates the electricity bill for every user and updates the information to their account every month. User view their electricity bill and users get the information like how voltages are used in individual home appliances. Used to calculate the voltage level of particular home appliance. Cost is used in particular appliance and also individually pay on the spot before month end. Users incapable of paying the bill before month end, it then calculates fine for each day.

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INTRODUCTION

Electricity use has dramatically changed daily life. We all know that the electricity is one of the largest expenses regularly incurred by the daily utility. It is important to understand how your electric utility calculates your electricity bill. We are often in chaos of how this electricity bill is charged. Therefore, our project aims to tackle this problem by demonstrating the details of each appliance utilities.

EXISTING SYSTEM

Existing Electricity billing System is implied by offline electricity reading as a EB reader is required to go to every house for once in every two months and calculate the amount , and then the users have to pay it .

Related Works:

Energy Monitoring using IOT: We have proposed a low-cost energy monitoring system, which is used for saving a significant amount of energy by identifying the devices that are consuming excessive power and the devices can be turned off

An Algorithm for Intelligent Home Energy Management and Demand Response Analysis

A home energy management (HEM) system is an integral part of a smart grid that can potentially enable demand response applications for residential customers. This paper presents an intelligent HEM algorithm for managing high power consumption household appliances with simulation for demand response (DR) analysis.

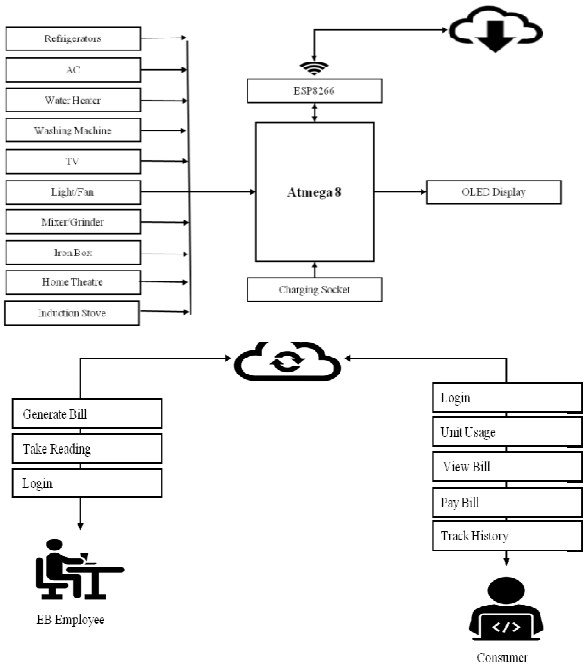
Home energy management systems: A review of modelling and complexity –https://www.sciencedirect.com/ science/article/abs/pii/S1364032115000568. The existing literature has presented several methods, such as mathematical optimization, model predictive control, and heuristic control, for creating efficient operation schedules and for making good consumption and production decisions. However, the effectiveness of the methods in the existing literature can be difficult to compare due to diversity in modelling parameters, such as appliance models, timing parameters, and objectives. IOT based smart energy monitoring system. The purpose of this method is to monitor energy. Continued use of loads should also be noted for the energy consumption of affected people with the ESP8266 microcontroller and data connection

PROPOSED SYSTEM

Reduction in the number of staffs to be employed by the company. Speed and performance is faster with high performance and saves time. Monitor the electricity usage of home is easily and also monitor the usage of units and amount at the particular home appliances. Our proposed system uses the Arduino UNO board, Wi-Fi module and a OLED display. The Wi-Fi module is the main component in the IOT operation . Amount of electricity usage by that month is previously fixed at admin. The intimation status has been sent to the user once they reaches the limited level. The Arduino UNO board is connected to a sensor which will sense the meter readings and the readings are then processed and are updated over the Wi-Fi through the Wi-Fi module. Embedded sensors, meters, and other IoT devices can monitor the energy utilized by each equipment.

SI.No	Parameter	Proposed System	Existing System
1.	System Design	Simple	Complex
2.	Implementation Cost	Economical	Expensive
3.	Maintenance of the System	Simple	Difficult
4.	Efficiency	High	Low
5.	Controlling the Load	Possible	Not Possible

System Architecture



MODULES

SOFTWARE DESCRIPTION:

EC Forecaster Web App

- Forecaster Web App contains the overall systems that measure, collect and analyse electricity usage.
- FWA system uses Advanced Meter Reading (AMR) Technology by allowing two-way communication between the utility provider's system and the meter.
- This enables demand-response actions or remote service barring or disconnects.

Appliance Tracker: Provides a list of appliances with their estimated watts and their energy use.

Automatic Meter reading: Data collecting from the meter and processing the collected data for billing and other decision purposes.

End User Module

-EB Admin
-Consumer

HARDWARE DESCRIPTION:

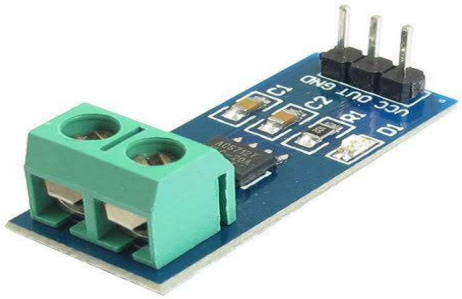
Power Supply: To run the projects we need supply of 5V DC. We have available power of 230V and we need to convert it into 5V DC.

Arduino Uno: Arduino Uno is a microcontroller board based on ATmega328P microcontroller. ¬Along with ATmega328P, it consists other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller.

ESP8266: The ESP8266 is a low-cost Wi-Fi microchip, with built-in TCP/IP networking software, and microcontroller capability. This small module allows microcontrollers to connect to a WiFi network and make simple. TCP/IP connections. A cost-effective and highly integrated Wi-Fi MCU for IoT applications. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor. We are using Wi-Fi which acts as a heart for IoT. Through WiFi the consumer can set changes in threshold value, it can ON and OFF the energy meter.

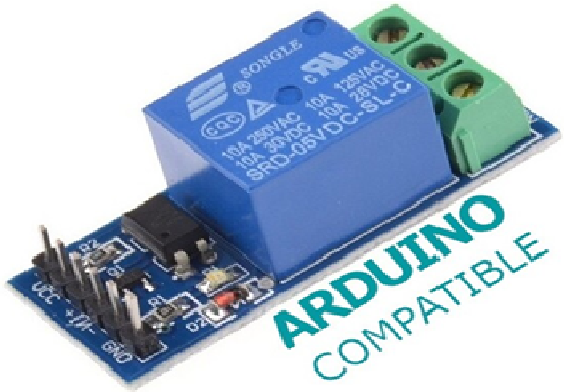
Current Sensor: The invention of electricity has led to a revolutionary change in the life of humans. We invented many innovative applications of electricity to make our daily life easier. Today almost all of our equipment runs on electricity. The flow of charge is known as Current. Different devices need a different amount of current based on their functional requirements.

So, to save such a situation and monitor the amount of current required or being used in an application, measurement of current necessary. This is where the Current Sensor comes into play. One such sensor is the ACS712 Current Sensor.



OLED Display Module: OLED (Organic Light-Emitting Diode) is a self light-emitting technology composed of a thin, multi-layered organic film placed between an anode and cathode. In contrast to LCD technology, OLED does not require a backlight. OLED possesses high application potential for virtually all types of displays and is regarded as the ultimate technology for the next generation of flat-panel displays.

Relay Board: Board For remote connection, disconnection and protection purpose we need to dissconnect the power from grid, for this we are using relay board.



IMPLEMENTATION

Hardware & Software Requirements

Software

- Server Side : PHP .
- Client Side : HTML, CSS .
- IDE : Flask .
- Back end : MySQL .
- Server :Wampserver .

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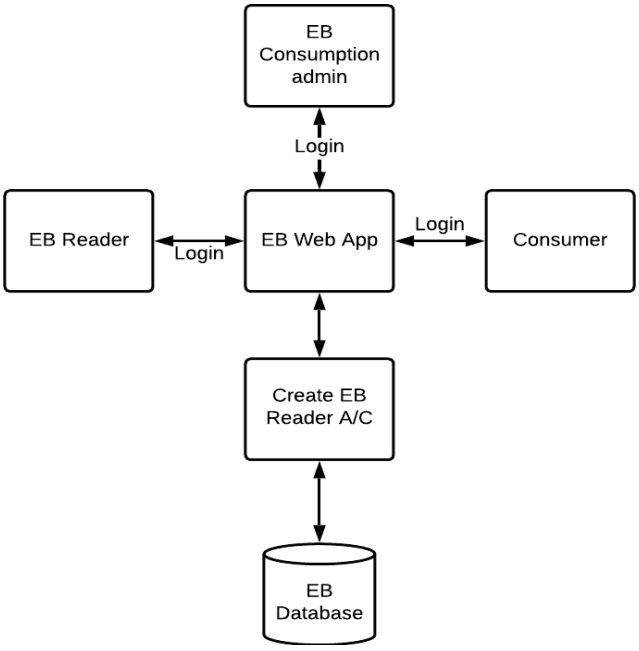
Hardware

- OS : Windows 10 - 64 –bit
- Processor : Intel core i5
- RAM : 4 GB +

Data Flow Diagram



Conclusion

As a result, an accurate electric load forecasting is implemented and helps to effectively manage, plan, and schedule appropriate low cost electricity generation units to decrease per unit cost and provision of on-time energy for maximum financial benefits.

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