HOME AUTOMATION AND ENERGY MANAGEMENT

Abstract:-

- Smart Home Automation system is a web based application that allows the user to monitor the home appliances using mobile devices.
- This project argues that home automation can make a difference regarding better energy management and usage of renewable energy sources.
- People are more sensible to the need of using energy and other resources more rationally but do very little to that end on their daily lives at home.
- The aim of our project is to monitor the home appliances and also measure the moisture content in the soil in the garden.
- Current Sensors have been used in this project to measure the power dissipation by the individual appliance.
- Moisture Sensors have been used in this project to measure the moisture content in the soil.

SPECIAL AREA OF INTEREST:

- The main motto of this project is energy conservation.
- The smart meter helps in operating appliances in a household using Wifi.
- The project involves
     Microcontrollers, sensors and actuators.
    Web development (we are using node red software)
    Connecting things to cloud
    Monitoring and analysing data.
- Integration of sensing and actuation systems, connected to the Internet, is likely to optimize energy consumption as a whole.
- The areas which this project deals with are
    1. Energy monitoring
    2. Energy conservation
    3. Data management
    4. IOT (Internet of things)
    5. Using moisture sensors (which "can" be developed in a large scale and will be useful in irrigation)
    6. Web development(Node red, MQTT, Java script)

Type of project:

Our project, smart home, is an Internet of Things based product. It is a market oriented product, and has domestic uses. It can be implemented in all types of homes and is advantageous as it helps in lower power consumption by constant monitoring of power usage. Hence this product will also have good demand among the general public.

Feasibility

The project was feasible in the given time constraint and with the given budget. By November, we had learnt how to use the Arduino microcontroller and learnt how to code on it. We also had a general idea of the hardware aspects of the project.]

In the meets that followed, we discussed about how to tackle the software parts of the project. It was finally decided that we could use Node red for wiring up the Internet of Things. So in December we were assigned to read more on PHP, MySQL and JavaScript to improve our programming skills so that we could work on Node Red with higher efficiency. After December, we began with wiring everything up. Thus I can confidently say that the given project was feasible in the given time period.

The resources and components used in the project were also easily available through online shopping. Arduino Uno board, ESP8266 Node MCU, current sensors Acs712, relays, humidity sensors , voltage sensors were all easily available and the budget given was sufficient to cover the expenses.

Budget
Rs.2500(Bills were submitted to treasurer)
Link: BillPdfLink

Team members

Mentors (3)
1. K.S.S.M.Kamal
2. Sripathi Muralitharan
3. M.Pavan
4. Rohan

Members (4)
1. J.Rohith
2. Kshama
3. Bhushan
4. S.J.D.V.S Shanmukha

BASIC APPROACH

- Our project basic aim is to Energy management and control over appliances in houses. So, we need to calculate the power consumed by each and every appliance in the house at a particular instant of time.
- To calculate the power consumed we need to measure the voltage and current drawn by the appliance.
- For measuring the current we are going to use ACS712 current sensor.
- For measuring the voltage we are going to use a step down transformer and convert it into AC signal in the range of 0 to 5v and measure it.
- Once we have the power Energy is just integration of the power values over a time and going to give the daily reports of the energy consumption through server.
- We are going to connect to server using the WiFi module Node MCU esp8266.
- The control of the appliances can be controlled by using Relays.
- We are going to use Existing technology NODERED (mqtt) as our server.
- We are going to create a Garden controller which is used to water the plants and control various valves and motors using Relays. For this we are going to use moisture, temperature and humidity sensors.

Timelines:

1. **September and October 2017**
   To learn about Arduino, different types of sensors, Relays and basic electronic components.

2. **December 2017(winter holidays)**
   To learn HTML, CSS and some basics of Web Development.

3. **January 2018**
   Checking and learning about all the components going to use in the project

4. **February 2018**
   Completion of the project and checking.