Energy Management System using IOT

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Abstract*— Nowadays the energy consumption of all our appliances are huge in level. Therefore energy consumption can be done by energy management system to reduce the energy consumption. This paper use a smart technology to control and monitoring the home appliances. This paper proposed to manage effectively household goods using IoT technology with the help of microcontroller. Further , implementation of this system to operate various household appliances through IoT interfacing with laptop by sending acknowledgement.

Keywords— ***Energy Management System(EMS), Internet of Things(IoT), Internet Protocol (IP), Passive Infra Red(PIR), Light Dependent Resistor(LDR).***

1. INTRODUCTION

It may be impossible to control the home appliances outside the home. A user need not switch ON and OFF home appliances manually. Our system allows user to operate through smart home energy management system. The energy consumed by the electrical appliances can be saved by at least 15% with the implementation of microcontroller. The existing system is controlled by IR technology. But it has some demerits such as IR receive only 180 degree radiations . Though it transmit and receives signals but it does not support network. By over come this demerits the IoT based smart controlling technology is developed. Microcontroller processor is only applicable for proposed system. It can be control via internet. The proposed system have some advantages such as , any where it can be controlled , it is an low power consumption because microcontroller power supply is only 500mA.

2. PROJECT DESCRIPTION

2.1 ARDUINO:

Arduino is the heart of our project. It is used to implement both hardware and software. It senses and control the object. Arduino programs can be written in any languages. In this proposal ardiuno ATmega328 is used.[3]

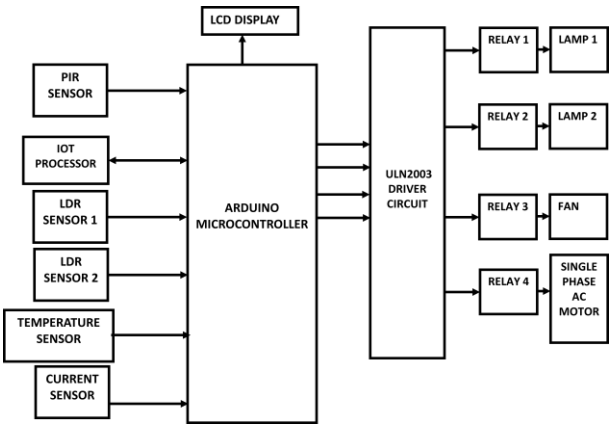

fig:1 block diagram of energy management system

2.2 IoT PROCESSOR:

IoT is the technology that connects to network . Each physical things is connected by giving a unique IP address.[2]

2.3 PIR SENSOR

PIR sensor is used to detect the movement of the object. Here it is used to senses the movement

of the fan.[1] LDR sensor is used to detect whether the lamp is ON or OFF and sends the signal to arduino. It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor , then the resistance changes. It is required to sense the presence of light.

2.5 TEMPERATURE SENSOR:

The most commonly used type of all the sensors are those which detect temperature or heat. These types of temperature sensor vary from simple ON/OFF thermostatic devices which control a domestic hot water heating system to highly sensitive semiconductor types that can control complete process control furnace plants.

Temperature sensor measure the amount of heat energy or even coldness that is generated by an object or system, allowing us to "sense" or detect any physical change to that temperature producing either an analogue or digital output.

2.6 CURRENT SENSOR:

In this proposal ACS712 is used as a current sensor. It senses the flow of the current in motor.[1] ACS712 is used as a current sensor. It senses the flow of the current in motor. The internal resistance of this conductivity path is 1.2mΩ typical, providing low power loss. This 5V DC operated little module accepts a bidirectional current input, and outputs an analog voltage

2.7 DRIVER CIRCUIT:

ULN2003 driver circuit is used. It is usually used to regulate current flowing through a circuit. It controls some devices in the circuit.[1] The circuit consists of IC ULN2003 based relay driver and 12v relay. The microcontroller gives input to the relay driver circuit and on/off relay setup . The relay contact connect andd disconnect the power supply for motor control circuit

2.8 RELAY:

Relay is an electrically operated switch. It prevents the circuit under over current and over loads.[1]

2.9 LOADS:

In this proposal two lamps, fan and motor are used as load.[1]

2. 10 LCD DISPLAY:

16*2 display is used. It displays the status of the loads.[1] LCD's have become very popular over recent years for information display in many 'smart' appliances. They are usually controlled by microcontrollers. They make complicated equipment easier to operate. LCD's come in many shapes and sizes but the most common is the 16 character × 2 line display with no backlight. It requires only 11 connections -eight bits for data (which only used two here) . It runs off a 5V DC supply and only needs about 1mA of current. The display contrast can be varied by changing the voltage into pin 3 of the display, usually with a trim pot.

2.11 WORKING:

In this project laptop is used as an input device. when input is given the IoT processor senses and sends the signal to arduino. According to the signal arduino execute the program and sends the output to the driver circuit. Then driver circuit energies the respective relay. The relay gets open and the load turns ON. Now, the sensors senses whether the load is ON or OFF and sends the status of the load to arduino. Finally, the LCD display the status of the load with the help of arduino.[2]

3. APPLICATIONS:

The smart energy management system can also be implement in following places

1. Industry - cost saving , sustainability , and climate change target during production.
2. Hospitals- lighting and power distribution.
3. Army - indication of weather conditions.

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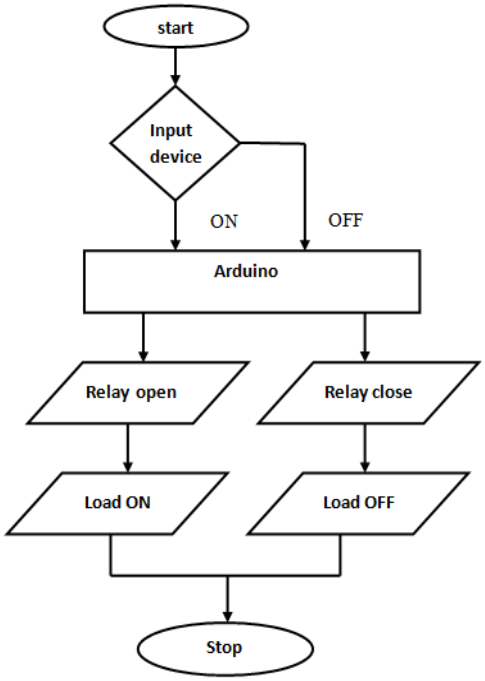
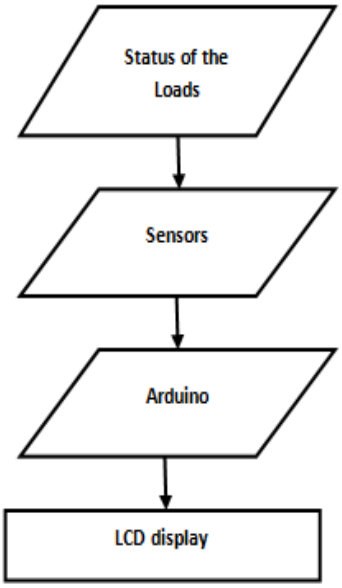
4. FLOWCHART

4.1 Flowchart for EMS



4.2 Flowchart for display unit



5. CONCLUSION:

As the need for an active and systematic building energy management system a smart home energy management system model using IoT was constructed as a way to reduce energy consumption in houses. Nowadays in busy schedule this system can be used in home , hospitals and also in some public places like complex , showrooms etc., "IF WE IMPLEMENT THIS, WE CAN CREATE A SMART HOME"

6. REFERENCE:

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