

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 6, Special Issue 11, May 2017

Smart Home Automation System Using Arduino for Real Time Application

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ABSTRACT: An effective and flexible home control and monitoring system with the aid of an integrated micro web server with IP connectivity for access to and control of equipment and devices remotely app. The proposed system does not require a dedicated server PC with respect to similar systems and offers a new communication protocol for monitoring and controlling the home environment with more than just switching functionality. Smart home interfaces and device definitions to ensure interoperability between ZigBee devices from various manufacturers of electrical equipment, meters and Smart Energy enables products to allow manufactured. We introduced the proposed home energy control systems design intelligent services for users.

I. INTRODUCTION

Intelligent management of the power system, facilitate the joint use the current and minimizes power loss during transmission and power consumption is highlighted by the global community, academic institutions, and State administration. To gain full utility and customer protection dimensions, the idea of a smart grid enabling technologies used in In recent years, attracting a great deal of attention in the energy industry and academia Such studies. With continued growth in popularity and functionality of mobile devices, demand advanced mobile applications widespread human life continue to grow. The use of Web Services is an open and interposable method for providing remote access service or applications can communicate with each other an attractive market for home. Automation and network of busy families and individuals will be physical Limitations. BOARD is Ethernet Shield, and it was the smart Home micro web server. Arduino open source electronics prototyping platform based on Flexible, easy to use hardware and software. The Arduino BOARD Microcontroller Board of Based on the UNO BOARD with digital input / output pins. The Ethernet interface is Arduino via the SPI pins. Low voltage switching relays were used to integrate Devices with Arduino is to show switching functionality. The Sensor is used to control a smart home environment. A supervisory control system Intranet, low cost and high performance can react The ZigBee technology. An end node, the node sends data to the coordinator, and the coordinator Hub sends the data back to the terminal end of the loop. Since all devices have their own IP Address based on IPv6, they can be directly connected to an external network. So, all smart devices It can not only through the handheld remote control device to the central and local home, but can also be controlled remote computer control through the introduction of home Internet Gate way machine.

II. PROPOSED SYSTEM

In this section, we present the theory on real Application for Smart Home Automation System Using Arduino in IoT environment. The overall block diagram of the proposed method is explained. Each and every block of the system is explained in detail. The general objective of this project is to design controlling home and industrial appliances using internet from long distance. In figure, A central controller (our Arduino board) receives user commands to execute. It has Internet connectivity through WEMOS ESP8266 which is connected to internet through wifi and Wemos is interfaceto Arduino to control wirelessly home devices. On the user side, a mobile device provides interface with the system as a whole through a user friendly application.

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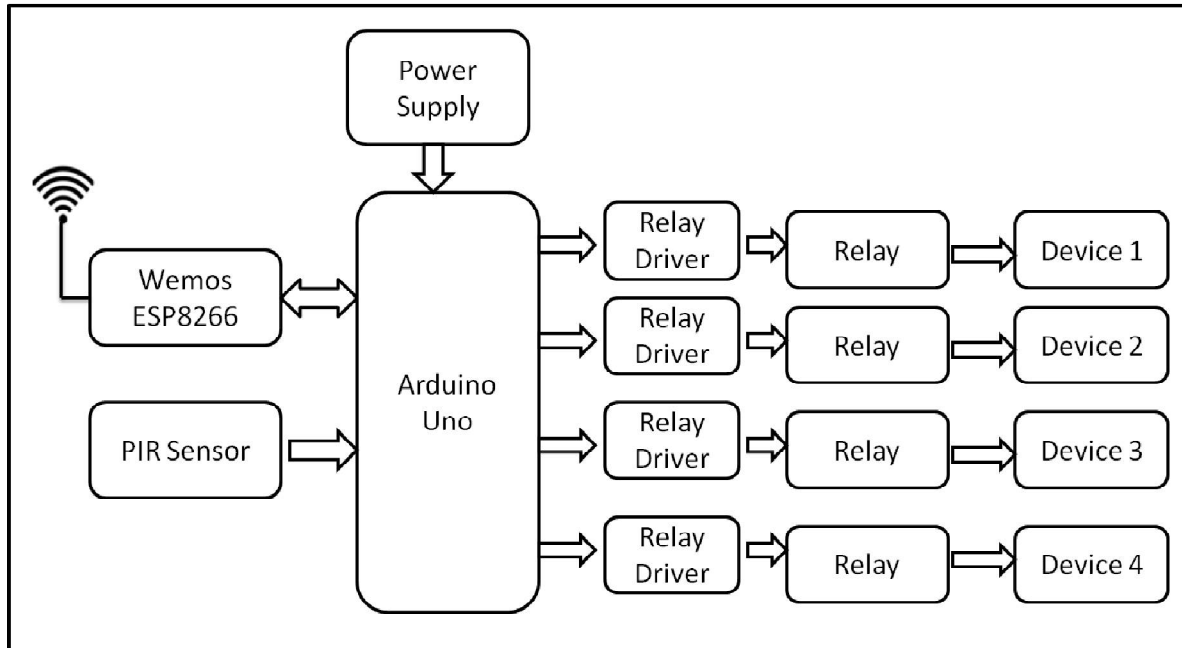


Figure:Block Diagram of Control System

In block diagram shows PIR sensor to detect person for wireless Security purpose. After detection, PIR sensor gives input to microcontroller and it send Alert Email using Internet.

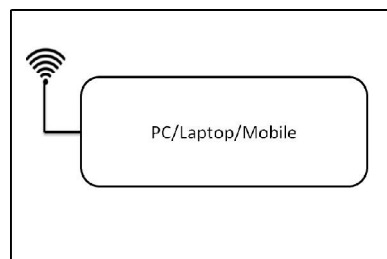


Figure: control unit

In figure shows control unit, for controlling home appliances we can use PC or Laptop or Mobile to control home appliances through internet for this we use IP address. The mobile device can be either wired to the central controller (through USB cable for instance), or communicates with it wirelessly. Within the scope of the home, wireless connectivity can be achieved using an Wi-Fi shield on the central controller. This way, we would be able to access the controller either locally or remotely through the Internet. Communication protocols between Home Automation devices Equations The control center of network is home gateway system, which is, from inside, to coordinate all household appliances, control their working condition and inquiry their current status, and, from outside, connect with Internet, receive remote users' instructions and transfer related information to business sites. If all appliances work properly, home gateway stores appliances status. If not, home gateway reports an error message to supplier. External Communication Home gateway interconnects Internet and the home network. It sends all devices information in home network to the portal server via TCP/IP socket. And also it can control and monitor the devices with date packet communication. Thus it enables users to control and monitor the home networks through Internet and even mobile phone since the portal server has the mobile interface.

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III. CIRCUIT DIAGRAM DESCRIPTION

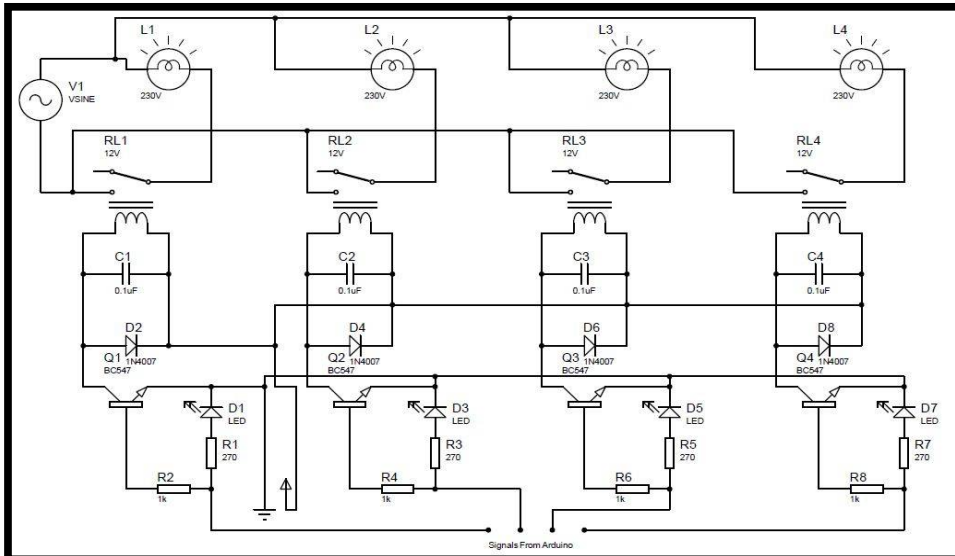


Figure: Circuit Diagram

In figure shows circuit diagram, In which four Relay used for Device on/off in home system or industrial automation system using Arduino and WEMOS ESP8266. Output pin of arduino is connected to the transistor BC547 npn. This is used as driver circuit for relay. Relay used as electronic switch to on/off device.

IV. PROJECT DESIGN

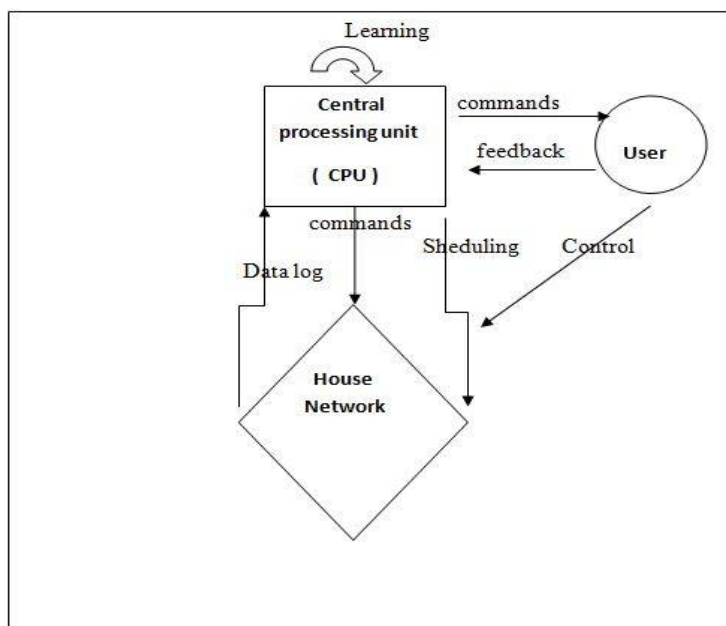


Figure: Project Flow

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V. RESULT ANALYSIS

Setup of project is shown below which allow us to take the final results for this research work.

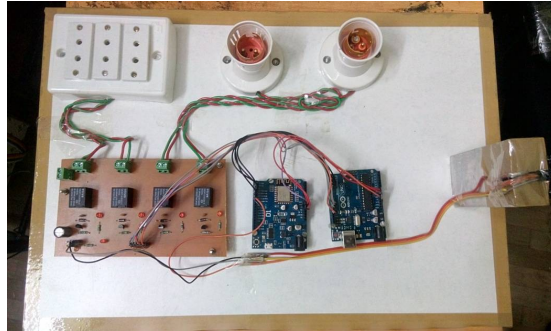


Figure: Project Setup

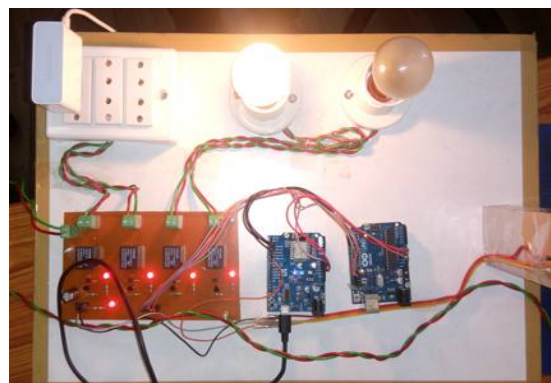


Figure: Output Result

This figure shows project setup and how to control device through IP address using mobile or PC/Laptop. In url, we have to enter IP address and control devices.

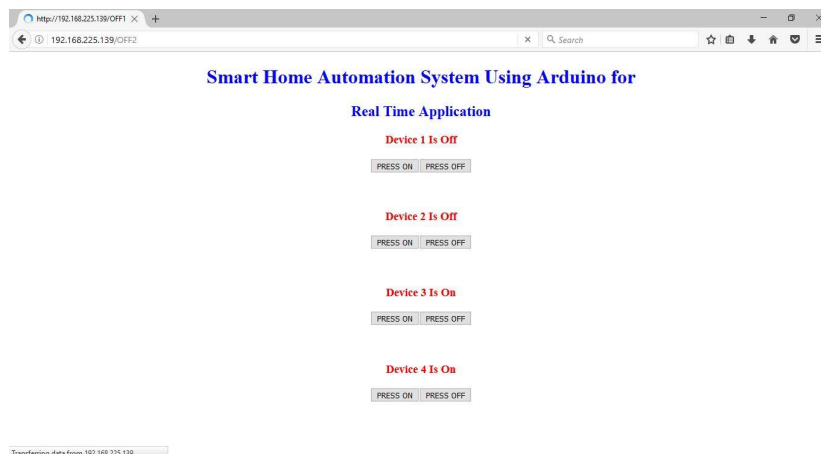


Figure: Controlling Through PC/Laptop

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In this, we use PIR Sensor in front of door, if person is detected Email is send to the owner using internet. Owner get a notification on Email can check on Mobile or PC/Laptop. Result shown in figure.

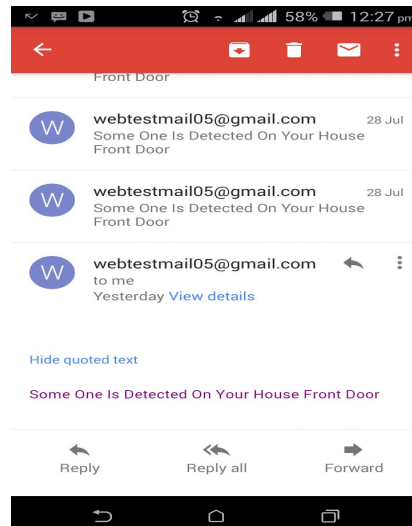


Figure: Notification on Mail mobile View

The results obtained are tested and calibrated successfully. The results are found to be convincing.

VI. CONCLUSIONS

We propose a new architecture for the monitoring and control system that uses a flexible home based IOT at a reasonable price and Arduino as well as using android app for system control configuration. The proposed architecture is used in a quiet based web services in an interoperable application layer for communication between the remote user and the home device. The Wi-Fi connection is the support built, the home access device to control. If the Internet is not possible, it can be access by used the 3G mobile phone system.

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