HOME AUTOMATION USING ARDUINO AND IoT

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Abstract - *This paper presents a low cost flexible and reliable home automation system with additional security using Arduino microcontroller, with IP connectivity through local Wi-Fi for accessing and controlling devices by authorized user remotely using Smart phone application. The proposed system is server independent and uses Internet of things to control human desired appliances starting from industrial machine to consumer goods.The user can also use different devices for controlling by the help of web-browser, smart phone or IR remote module.To demonstrate the effectiveness and feasibility of this system, in this paper we present a home automation system using Arduino UNO microcontroller and the IC ATmega328 as a connectivity module. It helps the user to control various appliances such as light, fan, TV and can take decision based on the feedback of sensors remotely. We have tested our system through conducted experiment on various environmental conditions.*

Key Words: **Arduino Uno Controller IC AT mega 328; Wi-Fi network module ESP8266; .IoT,Internet Of things.**

1. INTRODUCTION

IOT or internet of things is an upcoming technology that allows us to control hardware devices through the internet. Here we propose to use IOT in order to control home appliances, thus automating modern homes through the internet. This system uses four loads to demonstrate as house lighting. Our user friendly interface allows a user to easily control these home appliances through the internet. For this system we use an Arduino board.Arduino is interfaced with a WIFI module to get user commands over the internet. Also we have an LCD display to display system status. Relays are used to switch loads. After receiving user commands over the internet, microcontroller processes these instructions to operate these loads accordingly and display the system status on an LCD display. Thus this system allows for efficient home automation over the internet.

2. DISCRIPTION

As we are using Arduino Uno. It is a popular open source single-board micro -controller, descendant of the open-source Wiring platform, designed to make the process of using electronics in multidisciplinary projects more accessible. The hardware consists of a simple open hardware design for the Arduino board with an Atmel AVR processor and on-board input/output support. The software consists of a standard programming language compiler and the boot loader that runs on the board. Arduino hardware is programmed using a Wiring-based language (syntax and libraries), similar to C++ with some slight simplifications and modifications, and a Processing-based integrated development environment.

3. BLOCK DIAGRAM
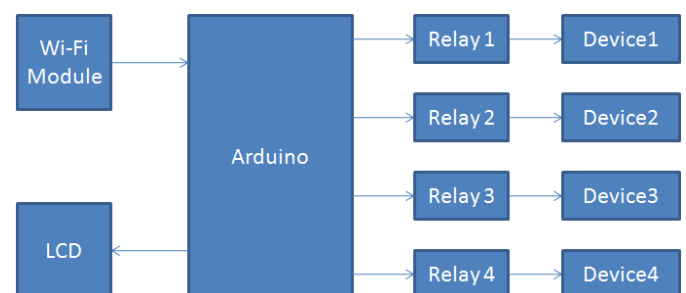
4. ARDUINO UNO

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-

yourself (DIY) kits. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or Breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

Summary

Microcontroller- ATmega328
Operating Voltage- 5V
Input Voltage (recommended)- 7-12V
Input Voltage (limits)- 6-20V
Digital I/O Pins - 14
Analog Input Pins - 6
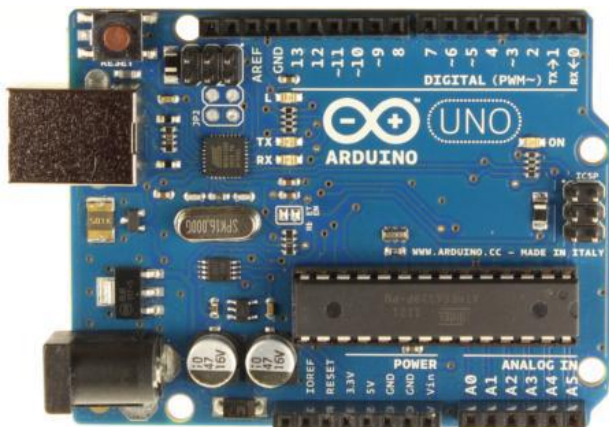DC Current per I/O Pin - 40 mA
DC Current for 3.3V Pin - 50 mA
Flash Memory 32 KB (ATmega328)
SRAM - 2 KB (ATmega328)
EEPROM - 1 KB (ATmega328)
Clock Speed 16 MHz

5.PROPOSED SYSTEM

IOT or internet of things is an upcoming technology that allows us to control hardware devices through the internet. Here we propose to use IOT in order to control home appliances, thus automating modern homes through the internet.The system consists of Arduino uno board, relays, wifi module esp 8266, loads,lcd display.This system uses four loads to demonstrate as house lighting.We are used Ubidots as iot platform. We can add switches there one for each load.The Arduino reads the status of the switches on the Ubidots dashboard consistently over the internet through wifi module. According to the status of the switches Arduino turn on or off the loads. Also it will display the status of the loads on the lcd. In this way, the loads in the home can be operated from anywhere in the world using iot technology over the internet.

6.EXPERIMENTAL RESULTS

The IOT system we have developed is tested in different load conditions for few houses . After installing the experimental setup, the user needs to install the software to his/her laptop or android phone. After proper installation of the provided software the16X2 LCD display will show the IP address. After IP address and port address are obtained user can login from the android application.As soon as the setup is completed, a home page will appear, from which the user could keep a track of all the electronic and electrical devices which are connected with the server.

7. CONCLUSION AND FUTURE SCOPE

In this paper we focused on different process of operating or controlling electrical and electronic appliances remotely with the help of Arduino. This method of controlling such applications is referred to as automation. The experimental setup which we designed has its focal point on controlling different home appliances providing 100% efficiency. Due to advancement in technology, Wi-Fi network is easily available in all places like home,Office Building and Industrial Building so proposed wireless network easily controlled using any Wi-Fi network. The wiring cost is reduced. Since less wiring is required for the switches. This also eliminates power consumption inside the building when the loads were in off conditions. This system is also platform independent allowing any web browser in any platform to connect ESP8266-01.The system is fully functional through android application known as "ESP8266 Wifi control". The delay to turn ON is 3 sec and turn OFF is 2 sec for any load. For future use, the researchers would recommend as : (i)Reducing the time delay to turn on and off of an appliance (ii) Adding speech recognition to the system (iii)using automatic smart phone detection through Wi-fi such that it will operate the loads automatically when it is in range.(iv) Expansion of range of Wi-Fi such that one can operate in permissible long distance through smart phone.

7.REFERENCES

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