International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 01 | Jan -2017 www.irjet.net p-ISSN: 2395-0072

IOT BASED HOME AUTOMATION SYSTEM USING ARDUINO BOARD

Harsh Mehta[1],Kunal Jadhav[2],Avinash Mishra[3],Prof. Anushree Deshmukh[4]

[1]*Student, IT, Rajiv Gandhi institute Of Technology, Maharashtra, India*
[2]*Student, IT, Rajiv Gandhi institute Of Technology, Maharashtra, India*
[3]*Student, IT, Rajiv Gandhi institute Of Technology, Maharashtra, India*
[4]*Professor, IT, Rajiv Gandhi institute Of Technology, Maharashtra, India*

ABSTRACT - *In this project smart environment condition monitoring by various sensors(Temperature and Light level) for providing necessary data to annually adjust the comfort level in home by optimizing use of energy is developed. In this project we are also using Arduino board and Arduino Wi-Fi shield. Temperature sensors will also detect the high and low temperatures which will identify the temperature and will notify it on device. The android application developed will allow user to manually switch ON and off the lights. This gives a huge advantage on the smart home system using IoT.*

***KEY WORD*: Home Automation System, Android, Arduino, Arduino Wifi Shield, Sensors.**

1.INTRODUCTION

Home automation has been a feature of science fiction writing for many years, but has only become practical since the early 20th Century following the widespread introduction of electricity into the home, and the rapid advancement of information technology. Home automation refers to the application of computer and information technology for control of home appliances easily. It is a automation of the home, housework or household activity. Home automation may include centralized control of Light, Appliances, Temperature and other systems, to provide improved convenience. Comfort, energy efficiency and security. Home automation for the elderly and disabled can provide increased quality of life for persons who might otherwise require caregivers or institutional care. The popularity of home automation has been increasing greatly in recent years due to much higher affordability and simplicity through Smartphone and tablet connectivity. The concept of the "Internet of Things" has tied in closely with the popularization of home automation. Through the integration of information technologies with the home environment, systems and appliances are able to communicate in an integrated manner which results in convenience, energy efficiency, and safety benefits. As we are using **Arduino Uno.** It is a popular open-source single-board microcontroller, 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.

2. LITERATURE SURVEY

In this paper S.Anusha , M.Madhavi , R.Hemalatha have developed an IoT based home automation system which makes use of a micro-controller and a java based android application. The micro-controller used is ATmega328. They have also made use of a GSM module which helps the system to be used remotely [1].
In this paper Rajeev Piyare presents a low cost and flexible home control and monitoring system using an embedded micro-web server, with IP connectivity for accessing and controlling devices and appliances remotely using Android based Smart phone app. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor and control the home environment with more than just the switching functionality. To demonstrate the feasibility and effectiveness of this system, devices such as light switches, power plug, temperature sensor and current sensor have been integrated with the proposed home control system [2].

In this paper Ahmed ElShafee, Karim AlaaHamed presents a design and prototype implementation of new home automation system that uses WiFi technology as a network infrastructure connecting its parts. Their system consists of two main components; the first part is the server (web server), which presents system core that manages, controls, and monitors users' home. Users and system administrator can locally (LAN) or remotely (internets) manage and control system code. Second part is hardware interface module, which provides appropriate interface to sensors and actuator of home automation system. Unlike most of available home automation system in the market the proposed system is scalable that one server can manage many hardware interface modules as long as it exists on Wi-Fi network coverage. System supports a wide range of home automation devices like power management components, and security components. The proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems [3].

3. PROPOSED SYSTEM

The system has two parts, namely; hardware and software. The hardware system consists of arduino uno board, arduino wi-fi shield, sensors and home appliances. The software system consists of a java based android application also arduino language is used to configure the arduino uno board and the sensors. In this system, the components used are arduino uno board, arduino wi-fi shield, sensors(lm35 , LDR).[3] These hardware components are used in order to control the home appliances. Arduino uno board will help to develop an interface between the hardware and the software application. This system also consists of a software application which is developed using android. The arduino wi-fi shield will help in transmitting and receiving the input given by the user [2].

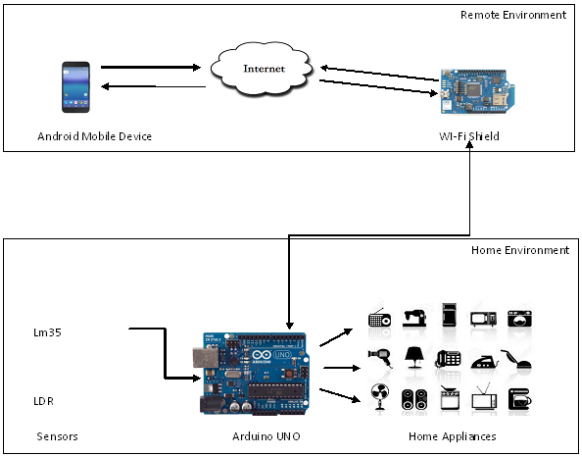

Fig -1: PROPOSED SYSTEM

Part1- The main path of appliance is controlling basic power using are android application which is made by us. The main part of Arduino is that it act as interface between hardware component and software (application).

Part 2-After successfully implements of path 1 we can introduce one of important aspect of project ARDUINO TEMPERATURE SENSOR LM35 which will check the room temperature and it is able adjust room temperature using the application. Plus light detection would play is role by adjusting light accordingly.
Part 3-Study of Light detection and temperature detection is carried out.
Part 4- Finally, Project will be compiled. Compilation of all the modules will be done. The whole system will be executed and will be able to run perfectly.

3.1 ANDROID

Android is a mobile operating system that is based on a modified version of Linux. It was originally developed by a start-up of the same name, Android, Inc. In 2005, as part of its strategy to enter the mobile space, Google purchased Android and took over its development work as well as its development team).Google wanted Android to be open and free; hence, most of the Android code was released under the open source Apache License, which means that anyone who wants to use Android can do so by downloading the full Android source code.

3.2. ANDROID APPLICATION

Android is a software stack for mobile devices that include operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. By providing an open development framework, Android offers developers the ability to build extremely rich and innovative applications. Developers have full access to the same framework APIs used by the core applications. Android includes a set of C/C++ libraries used by various components of the Android system. They include System C library, Media library, Surface Manager, LibWebCore, SGL, SQLite, FreeType and3D libraries [2].

3.3. ARDUINO UNO BOARD

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again [2].
"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

Fig -2: ARDUINO UNO BOARD

3.4.ARDUINO WI-FI SHIELD

The Arduino WiFi Shield allows an Arduino board to connect to the internet using the 802.11 wireless specification (WiFi). It is based on the HDG204 Wireless LAN 802.11b/g System in-Package. There is an onboard micro-SD card slot, which can be used to store files for serving over the network. It is compatible with the Arduino Uno and Mega. The onboard microSD card reader is accessible through the SD Library. When working with this library, SS is on Pin 4.Arduino communicates with both the Wifi shield's processor and SD card using the SPI bus (through the ICSP header). This is on digital pins 11, 12, and 13 on the Uno and pins 50, 51, and 52 on the Mega. On both boards, pin 10 is used to select the HDG204 and pin 4 for the SD card. These pins cannot be used for general I/O. Digital pin 7 is used as a handshake pin between the WiFi shield and the Arduino, and should not be used [4].

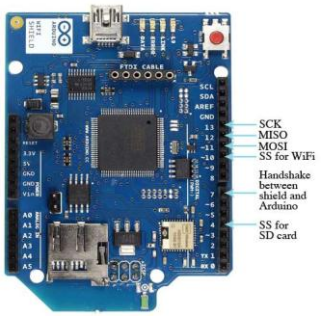

Fig -4: ARDUINO WI-FI SHIELD

3.5. SENSORS

In the broadest definition, a sensor is an object whose purpose is to detect events or changes in its environment, and then provide a corresponding output. A sensor is a type of transducer; sensors may provide various types of output, but typically use electrical or optical signals. For example, a thermocouple generates a known voltage (the output) in response to its temperature (the environment). A mercury-in-glass thermometer, similarly, converts measured temperature into expansion and contraction of a liquid, which can be read on a calibrated glass tube.
The types of sensors used in this system are lm35 i.e temperature sensor and LDR i.e light detection sensor. Both of these sensors will be connected to arduino uno board and will be configured accordingly. These sensors will sense the light and temperature in the

room and will allow user to manually switch ON and OFF the lights. Lm35 sensor will help the user to know the room temperature and the LDR sensor will help the user to have control over the light remotely.

4. WHY ARDUINO?

- Arduino is open source prototyping platform.
- Arduino based language is available for developing inputs and interacting with other softwares.
- Supported in all operating systems.
- Main aspect of it is less expensive than other prototyping systems available.
- You can get Arduino board with LOTS of different I/O and other interface configurations.
- The Pi is pretty much what it is and has a lot less time in the field.
- Pi - for $35 you get video, audio, Ethernet , and USB.
- That will cost you 2X that to get the same on top of an Arduino UNO.
- The Arduino UNO runs comfortably on just a few milliamps
- The Pi needs more like 700mA whereas aurdino requires less power.

ARDUINO VS RASPBERRY PI

PROCESSOR	ARDUINO UNO AVR ATmega328p	RASPBERRY PI BROADCOM ARM1176JZF-S
CLOCK SPEED	16MHZ	700MHZ
REGISTER WIDTH	8-bit	32-bit
RAM	2k	512MB
GPIO	20	8
I/O CURRENT MAX	40mA	5-10mA
POWER	175mW	700mW
OPERATING SYSTEM	None	Linux and others

5. CONCLUSIONS

A Smart Home system integrates electrical devices in a house with each other. The techniques which are going to use in home automation include those in building automation as well as the control of domestic activities, such as TV, fan, electric tubes, refrigerator and washing machine. After studying and understanding literature survey and other existing works, we proposed a Novel technique that will gives us better understanding of the Environmental conditions in home. Our system not only just monitors environmental conditions but it acts according to inhabitant requirement. In this paper we are planning to eliminate most of the human interaction by providing intelligent system. Development of such Smart Home achieve by using Internet of Things technologies. By using these system we can actually manage to make low cost, flexible smart homes to adjust its environmental conditions and resolve its errors with energy saving.

REFERENCES

[1]HOME AUTOMATION USING ATmega328 MICROCONTROLLER AND ANDROID APPLICATION, S.Anusha1, M.Madhavi2, R.Hemalatha3. International Research Journal of Engineering and Technology (IRJET) , Volume: 02 Issue: 06 | Sep-2015 www.irjet.net

[2]Internet of Things: Ubiquitous Home Control and Monitoring System using Android based Smart Phone, Rajeev Piyare. International Journal of Internet of Things 2013, 2(1): 5-11 DOI: 10.5923/j.ijit.20130201.02

[3]Design and Implementation of a WiFi Based Home Automation System, Ahmed ElShafee, Karim AlaaHamed. World Academy of Science, Engineering and Technology International Journal of Computer, Electrical, Automation, Control and Information Engineering Vol:6, No:8,2012.