International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 06, 2020
ISSN: 1475-7192

MOBILE APP CONTROLLED AUTOMATION WITH ADMIN WEBSERVER LIVE MONITORING SYSTEM

[1]Jeevitha SK, [2]Dr.Arasu Sivagami

***ABSTRACT**--Smart IoT systems have been in interest to researches over years because of its capability, ease of use and flexibility to build systems like automation systems. Automation systems are those that work when certain set of tasks are assigned to work on its own and avoid any human intervention. In this project, architecture of a mobile app controlled automation system with admin web server live monitoring system is proposed. This system uses raspberry pi 3b+ as a server, Arduino mega 2560 as a microprocessor and a Bluetooth module which are controlled using a mobile app and a web application. This project can be capably organised to make it intense, harmless and machine-driven. Also, it can send alerts to the owner by using internet in case of any trespass and raises an alarm optionally. The strategic advantage obtained by choosing this system over the same kinds of existing systems is that the live status of the devices can be communicated to the user via the mobile application without having to refresh the system.*

***KEYWORDS**-- Internet of things, Automation systems, Wireless networks, Arduino, Raspberry pi*

I. INTRODUCTION

Internet of things (IoT) is one of the most trending technologies which is widely used for managing and controlling various devices through internet. IoT has various applications of automation where tasks assigned to run automatically without the intervention of the human. Automation devices are of various types namely home automation, industrial automation system etc., With the usage of internet is becoming high there are many ways in which IoT influences in creating automation system that is high secure, flexible and easy to use.

In this paper, an automation system is created in such a way that it is flexible enough to use it in any type of automation system and in order to explain its functionality two loads light, motor by implementing using Raspberry pi 3b+, Arduino mega 2560, Bluetooth module Hc05, SPDT relay that effectively works with programming a web application that is responsible for showing live status of the devices and also controlling the devices through Arduino AT mega 2560 which is programmed to detect the device id and control its functionality.

[1] *Dept: Electronics and communication engineering, Saveetha school of engineering, Saveetha institute of medical and technical sciences, showmya2talk@gmail.com*

[2] *Dept: Electronics and communication engineering, Saveetha school of engineering, Saveetha institute of medical and technical sciences, arasusivagami19@gmail.com*

Received: 02 Jan 2020 | Revised: 12 Feb 2020 | Accepted: 17 Mar 2020

II. EXISTING METHOD AND ITS LIMITATIONS

Based on the researches that have been done, one of the main issues of the existing automation system is their implementation cost are expensive. Furthermore, the status of the devices in the automation system is possible after refreshing the web application only. Therefore, it consumes more data and in case of failure of any system cannot be identified unless refreshing the system. In addition to this, automation systems are specifically designed to its decided area and it is not flexible enough to use it for other area automation system. For example, home automation system can only be used effectively for home appliances because it communicates at a very short range. Also, the existing system uses microcontroller and does not have an operating system a common block diagram of an IoT based automation system is shown in Fig 1.

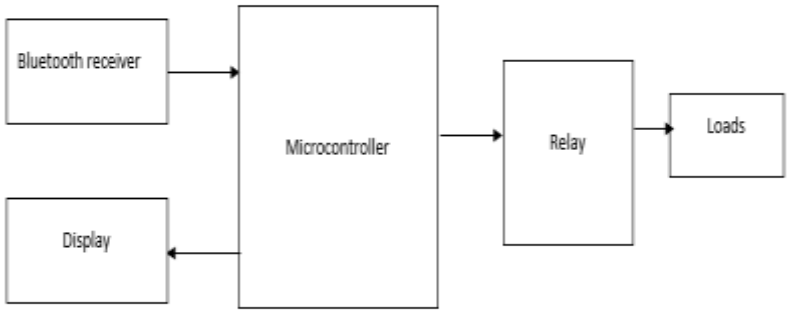

Figure 1: Common block diagram of an IoT based automation system

Therefore, in this paper a new system is created to overcome the limitations of the existing system This can be achieved by designing a low-cost system that is capable of live monitoring the devices in the automation system and by creating a system that is mobile app based which makes it easy to use along with the added advantage of implementation of this prototype to any area automation system.

III. METHODOLOGY AND MATERIALS:

A. Implementation and working:

The implementation and working of the project in shown below in Fig 2.

- The mobile app pairs up with the HC-05 Module through Serial Bluetooth Communication Protocol.
- The HC05 has Tx and Rx pin which is connected to Rx and Tx of Arduino Mega2560 respectively. This helps in sending Byte commands. Each Byte commands triggers one NPN transistor which switches on a relay.
- The Arduino 2560 is connected serially with USB with Raspberry Pi 3 B plus where the server with MySql Database is running on Linux Debian based Rasbian OS. Every time a signal is sent it changes the status of that load either to ON state or to OFF state.
- This can be monitored by the web app or mobile app using WiFi or Internet (if static IP is assigned and NAT is implemented).

Also, for live monitoring, AJAX JQuery is used in order to fetch data without refreshing. To control the devices Arduino IDE is used to program by connecting to the Bluetooth device and thereby switch the device ON/OFF. The web server is designed by using LAMP Linux, Short for Linux, Apache, MySQL, and PHP, an

open-source Web development platform, also called a Web stack, that uses Linux as the operating system, Apache as the Web server, MySQL as the RDBMS and PHP as the object-oriented scripting language. Perl or Python is often substituted for PHP. Android mobile application is programmed by using android studio having all the loads which is capable of pairing with the Bluetooth and the control the function.

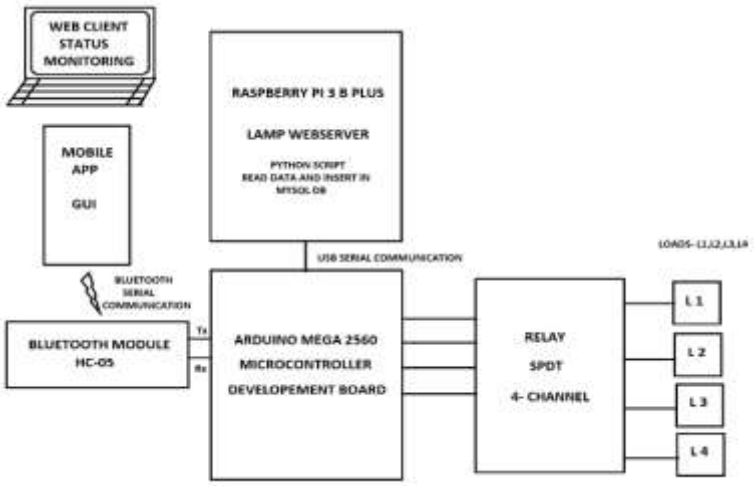

Figure 2: Block diagram

B. Main components:

1. ARDUINO ATMEGA 2560

This board as shown in Fig 3. Serves the purpose of a controller as it can be used as a platform to incorporate relays, motors, sensors etc. or any load depending on the area of automation system. In this project the two loads are used namely bulb and motor. This acts as an interface between the loads and controls them according to the code that is being written. The function of the Arduino board is to read the input and output, send and receive data, trigger an output according to the code written.

Figure 3: Arduino MEGA 2560

2. RASPBERRY PI 3 B+:

It is the latest update of Raspberry pi 3 having an update on 64-bit quad core processor which runs at 1.4Ghz with heat sink along with 4 to 5Ghz wireless LAN, Ethernet and PoE capability. This board is used because it serves as a local server to the entire IoT system. The code in this written using Raspbian. The functions of this board is to receive input from the web application and send commands to Arduino to reach the respective device using the device id.

Figure 4: Raspberry Pi 3b+

3. SPDT RELAY BOARD:

The single pole double throw relay is a high-quality relay that has common terminal, normally closed terminal and a normally open terminal. When there is no current flow then the common terminal and normally closed terminal have continuity and when the coil is energized, the common terminal and the normally open terminal have continuity. When the coil is energized there is a sound tick that ensures the working of the relay. The function of this to connect the loads to it and control it current according to the trigger send by the Arduino.

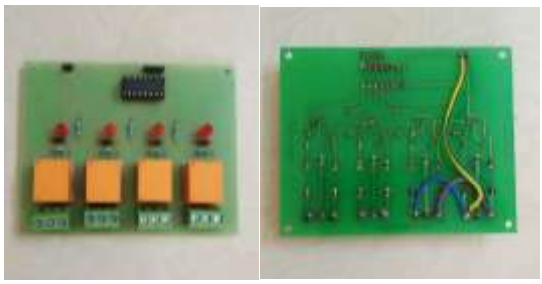

figure 5: Relay board fig 6. Soldered side of the relay board

4. BLUETOOTH HC05

It is a transparent wireless Bluetooth module that can wirelessly connect to devices which helps in controlling the device. It is a MASTER/SLAVE module, and these can be configured by AT commands where the slave mode can accept any connections and master mode can initiate a connection. This module connects the Arduino ATmega 2560 to the loads used.

Figure 7: Bluetooth HC 05

In addition to these two loads namely bulb and motor along with the 7-inch TFT touch screen in order to see the live monitor status. This paper ensure flexibility to any area of automation system namely hotel automation system, home automation system etc. and makes it possible to control and live monitor.

IV. RESULTS AND DISCUSSION

This section shows the mobile app-controlled automation system with admin webserver live monitor system that can be used for any area of automation system namely hotel automation system, industry automation system, home automation system etc. This paper was managing to accomplish a low cost, easily handle-able, highly secure, wireless and a live monitor automation system.

The figure 8 shown below shows a mobile app being given input to the loads and then the loads shows output by switching on/off. This is because the loads are being connected to the Arduino at mega 2560 via the Bluetooth module HC05 which is being programmed accordingly. The LCD screen shows the status of the entire automation system in the web application that is programmed using Linux, Apache, MySQL, PHP. This web application is capable of live monitoring without having to fetch data after refreshing because it is programmed using AJAX JQuery where the raspberry pi 3b+ acts as a local server for the entire system.

Figure 8: Showing mobile app-controlled automation with admin webserver live monitoring system

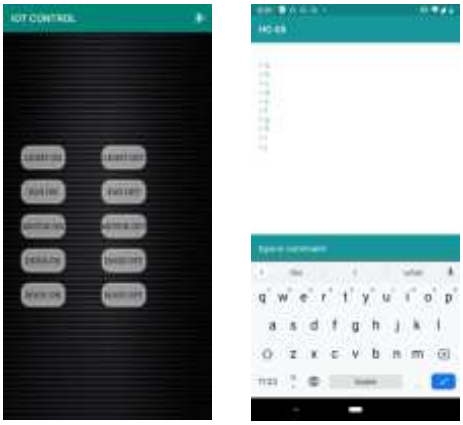

Figure 9: showing mobile application with output

Thus, the resultant project serves as an automation system with live monitoring with high security and one hand-held device to control the entire system at very low cost. Also, the main advantage of this project is that it can be implemented to n number of Arduino boards for a greater number of loads and thereby, ensuring high security because live monitoring status of the devices will be sent to the web application by the Raspberry pi 3b+.

V. CONCLUSION

This paper proposed, designed and accomplished a mobile app-controlled automation system that is capable of live monitoring which makes the entire system to be operated at greater distance as well as control any number of devices all inside an app. The advantages of this project can be used in industrial automation system where there are more devices to control and it can be done securely. Likewise, this project can be used in any area of automation.

REFERENCES

1. Ritvik Iyer, Antara Sharma “IoT based home automation system with pattern recognition” International Journal of Recent Technology and Engineering Volume-8 Issue-2, July 2019
2. Gunarathne, S. B. M. S. S., & Kalingamudali, S. R. D." Smart Automation System for Controlling Various Appliances using a Mobile Device" IEEE International Conference on Industrial Technology (ICIT) 2019
3. Jabbar, W. A., Alsibai, M. H., Amran, N. S. S., & Mahayadin, S. K. " Design and Implementation of IoT-Based Automation System for Smart Home" International Symposium on Networks, Computers and Communications 2018 (ISNCC). doi:10.1109/isncc.2018.8531006
4. Singh, H., Pallagani, V., Khandelwal, V., & Venkanna, U. " IoT based smart home automation system using sensor node." 4th International Conference on Recent Advances in Information Technology (RAIT). 2018
5. Dr.V.Ramya, G.Thirumalai Rajan, “Raspberry PiBased Energy Efficient Industrial Automation System”,IJIRCSE, Volume 2, Issue 1, January 2016..
6. Geetesh Chaudhari, Sudarshan Jadhav, Sandeep Batule, Sandeep Helkar, “Industrial Automation Using sensing-based application for Internet of Things”, IARJSET, Vol.3, Issue 3, March 2016.
7. Ashwini Deshpande, Prajakta Pitale, Sangita Sanap”, “Industrial Automation using Internet of Things(IOT)”,IJARCET, Volume 5, Issue 2, February 2016.
8. Gupta, Punit, and Jasmeet Chhabra. ”IoT based Smart Home design using power and security management.” In Innovation and Challenges in Cyber Security (ICICCS-INBUSH), 2016 International Conference on, pp. 6-10.IEEE, 2016.
9. Mandula, K., Parupalli, R., Murty, C. A. S., Magesh, E., & Lunagariya, R. "Mobile based home automation using Internet of Things (IoT)" International Conference on Control, Instrumentation, Communication and Computational Technologies 2015 (ICCICCT). doi:10.1109/iccicct.2015.7475301
10. Kodali, Ravi Kishore, Vishal Jain, Suvadeep Bose, and Lakshmi Boppana. ”IoT based smart security and home automation system.” In Computing, Communication and Automation (ICCCA), 2016 International Conference on, pp. 1286-1289. IEEE
11. Ali, M. F., Harum, N., Abu, N. N., Al-Mhiqani, M. N., Talib, M. S., & Mohammed, A. A. (2019). Protecting iot based transmitted data security using tokenized multiple layered encryption techniques. International Journal of Advanced Science and Technology, 28(8), 485-505. Retrieved from www.scopus.com

12. Kim, H. -., & Song, E. -. (2019). Behavior-based malware detection using deep learning for improve security of iot infrastructure. International Journal of Advanced Science and Technology, 28(5), 128-134. Retrieved from www.scopus.com
13. Sharma, V., & Bhatt, D. P. (2019). Design and analysis of IOT/WSN compatible low power symmetrical cryptography algorithm for data security. International Journal of Advanced Science and Technology, 27(1), 120-126. Retrieved from www.scopus.com