

IOT BASED SMART BOARD USING CLOUD PLATFORM

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ABSTRACT

In this era of digitization and automation, the life of human beings is getting simpler as almost everything is automatic, replacing the old manual systems. Nowadays humans have made internet an integral part of their everyday life without which they are helpless. Internet of things (IoT) provides a platform that allows devices to connect sense and control remotely across a network infrastructure. In this project, we are making a Smart Board, which consists of plugs and switches. Tube lights, fans, power point devices etc. can be connected to it which can be controlled by a web application. The instructions will be first sent to the cloud and through the cloud they will further be sent to the smart board. Then the respective action will be performed.

Keywords: *IoT, Arduino, Wi-Fi, Android, Wireless connection.*

I.INTRODUCTION

In this world with fast implementation of internet in each and every daily appliance, we aim at increasing the ease of using these appliances. It becomes difficult for the handicapped people to operate these appliances, so we provide a solution by developing a Smart board which provides control over accessing all house hold appliances. In this smart board we can control fans, tube lights, etc., over mobile application or web application. IoT provides an easy way of implementing this smart board concept. Arduino sends signals on cloud and further these readings are used to monitor the usage of appliances. With the help of these monitored results, user can analyze power consumption by the appliances.

II.LITERATURE SURVEY

Many papers have been published about Home Automation using various technologies. Control home appliances using Bluetooth enabled devices. Arduino Uno and Diligent chip-KIT is used. By using Arduino, it becomes low cost as well as user friendly. It can have Bluetooth access for about 20-meter range [5]. The system proposed uses NFC (Near Field Communication) card which is swiped at the entrance door by the user. The NFC card is programmed to control the various appliances present in the house. It has secured framework. The NFC card is not affected by external environmental factors. The drawback of the system is that NFC card

has extremely low range and very low storage capacity [6]. A wireless router based on ZigBee networks for home automation systems applications, which is capable of smart devices monitoring and controlling. The data of the devices can be effectively centrally controlled [7]. Control home appliances using android application through cloud network. Integrate android devices and cloud network to control home appliances. Pachube is used as the cloud networking cloud here. X10 transmission method is used. The Arduino Duemilanove's flash drive does not operate well with the Arduino Ethernet Shield connected. Hence external Arduino flash drive is required. X10 transmission method is affordable but it has reliability issues in certain settings [8]. A way to control home appliances using android application over internet. Using mobile application control home appliances through Arduino. Approach to develop android application and interfacing between Arduino and android application. The system uses Arduino which is inexpensive. Android application increases accessibility [1]. Develop and design a prototype to control home appliances that can be controlled using android application through local area network or internet. Develop android application and create platform to control home appliances using Arduino. Radio frequency is used for plugging the appliances and hence it reduces the wiring required [2]. Design small smart home system and created by utilizing WLAN network based on Arduino micro- controller. This system is able to control and monitor home appliances. Interfacing between Arduino and web application and control the home appliances through WLAN network. Advantage is that it uses Arduino which is inexpensive [3]. Mobile based home automation solution that can facilitate people to remotely control home appliances using their personal android smart phones anywhere and anytime. Android based mobile application is developed using Android studio (Ver-1.5) that provides complete development environment for developing any mobile application including tools for compilation, verification, debugging and packaging [9]. In this paper we have implemented an ON/OFF switch which will be controlled using the android application provided to the user.

III.SYSTEM DESIGN

3.1 Arduino Board

Arduino Ethernet board is a microcontroller based on the ATmega328. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The proponents make use of the ability of the Arduino Uno R3 board to regulate the switching functionality.



Fig. 1.1 Arduino Uno R3

3.2 Relay Module

A relay functions as a switch that has the capacity of switching multiple circuits which can be either individual, simultaneous or in sequence. The proponents use a relay to accommodate 3 output devices. Arduino Ethernet's output pins are connected to each of the input pins of the relay module.



Fig. 1.2 Relay Module

3.3 Node MCU

Node MCU is an open source IOT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC, and hardware which is based on the ESP-12 module. Node MCU is used to establish internet connection between the module and cloud. It is a microcontroller specific to the network layer. It works in parallel with the Arduino board.



Fig. 1.3 Node MCU

IV.CLOUD COMPUTING

Cloud computing is an IT paradigm. It enables remote access to a pool of resources ranging from infrastructure, development environment to software. Depending on these, cloud services can be classified as Software as a Service(SaaS), Platform as a Service(PaaS), Infrastructure as a Service(IaaS). Services hosted on the cloud can be open source or paid depending on the organization that hosts them. Benefits of cloud computing are that it is remotely accessible as long as the user has internet connectivity. It is also useful to store data and provides a certain level of security. A cloud service can be Private, Public or Hybrid. In this paper we are hosting a Private cloud that provides Software as a Service(SaaS).

V.SYSTEM ARCHITECTURE

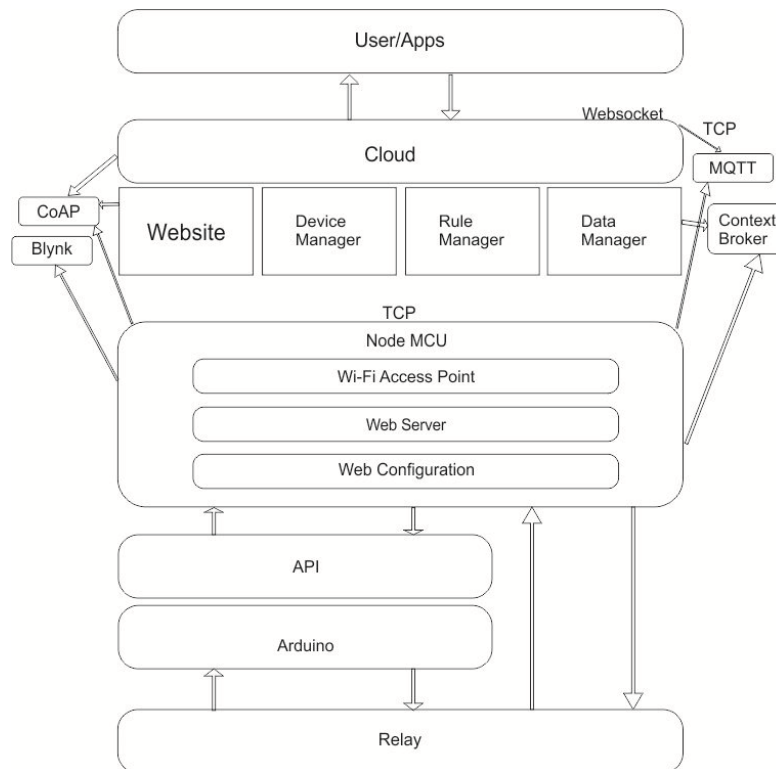


Fig. 1.4 System Architecture

The architecture consists of the following components, which will work together. The first component is the API, which has a specific implementation for different microcontroller solutions. The function of this API is very important, because with this, Arduino gives instruction to IoT protocol. The system will use the same code for sending data to MQTT Server or to the Cloud Server. The second component is Node MCU, which is an IoT chip, that can be programmed to the most common IoT protocols like MQTT, SMQ, etc. which helps in sending information to the cloud. Node MCU will be used as dedicated microcontroller for network layer. Node MCU will be configured to connect to cloud service. For that we developed the Cloud Server, which includes all the components needed to manage devices from anywhere in the world. Cloud Server is used to manage devices, set rules and to manage the data. Context Broker is used as an implementation of the Publish/Subscribe Protocol. It helps in sending data from the device to the IoT stack and it also sends command from application to the device. Blynk is being used to create drag and drop for user interface.

VI.ALGORITHM

1. Start
2. Turn on the smart board. (connected with Arduino board)
3. Connect with internet connection (Wi-Fi router)
4. Start web application using VPS (host IP)
5. Login through the Web application.
6. Establish connection with server and cloud (database)
7. Take user input selection through web application
8. Web application sends commands to Arduino board.
9. Relay will use step-up and stepdown for working of devices (control the electricity).
10. User send stop command to Arduino board (stop working of devices)
11. Close the web application.
12. Turn off the smart board.
13. Stop.

VII.CONCLUSION

Using IoT based Smart Board user can control the home appliances. Web application provides platform for controlling the home appliances. The smart board uses the Arduino board for controlling all components inside the smart board. The Arduino board is low cost and powerful board. Compared with existing home automation systems, this system has following characteristics: Low cost, simple and portable board, which can control basic home appliances like fan, tube light, etc. Other home automation system are costlier. The smart board analyses use of electricity parameters and create an electricity usage report. The smart board is controlled through web application which can work in mobile phones, browsers etc. To date, we have built the smart board which can control the basic home appliances.

VIII.FUTURE SCOPE

In future, we plan to extend the board which can control all home appliances and can be access through the iOS application as well as through smart wearable devices.

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