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Design Smart Home Control System Based On Android Using IOT

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***Abstract:** This project demonstrates the general layout of a wireless, inexpensive home automation system. It focuses primarily on the creation of an IOT-based home automation system capable of remotely controlling multiple components or being automatically set up to function based on environmental circumstances. In this project, we plan to create a firmware for smart control that can successfully be automated while minimising human contact to maintain the integrity of all the electrical appliances in the house. To carry out the automation process, we made use of Node MCU, a well-known open source IOT platform. To transfer the user's control of the devices through Node MCU to the real components of the system, various system components will employ various transmission modes. Remote access via a smartphone is made possible by the main control system's use of wireless technology. By giving unrestrictedaccess to the equipment for the user regardless of location, the project would become more realistic thanks to the deployment of a cloud server-based communication system. To enable increasedautomation, we offered a data transmission network. With arelatively low cost design, an easy-to-use interface, and an easy installation process, the system aimed to control electrical gadgets and appliances in homes. An android platform would allow for control of the appliance as well as access to its status. In orderto meet the needs of the elderly and disabled in their homes, this system is intended to help and offer support. Additionally, the system's use of the smart home idea enhances*
***Keywords:** Cloud Computing, Wi-Fi, Sensors, Arduino, IOT, Home Automation.*

I. INTRODUCTION

In today's culture, technological advancements and innova- tions are ubiquitous, and people's living standards are increas- ing as well. Individuals' lives have been inspired in recent years by cell phones. The mobile phone has become the most significant element in people's life in recent years. With the aid of these sophisticated devices, humans are able to carryout a variety of tasks both on and off the internet, such as enhancing the sophistication and beauty of our homes and workplaces. We showed how to use an Android app and a Wi-Fi module to connect to and control electric applianceslike fans, air conditioners, and lights.

The Wi-Fi transmitter uses radio waves to transmit the data provided by the apps. The Wi-Fi data is changed Wi-Fi is based on radio signals technology, which converts radio waves into electronic signals that are subsequently transmittedvia an antenna. To the Controller is delivered this signal. The Arduino then manipulates the data and carries out the necessary procedures. To transfer the current after creating the magnetic field, this controller may be connected to the Relaying terminals of various switches. In the future, we could be able to leverage networks for widespread access, for instance as part of Intelligent City programmes. The reliability of the system can always be ensured by installing new appliances. Automating is the word that is most frequentlyspelled incorrectly in the electronics industry.

A unique automated system that makes use of Wi-Fi man- ages the home's technology.Home automation is particularly important in today's society since it can be used accurately ina number of settings, saving time and money by minimising human effort. Automating the control of household equipment including lights, fans, doors, and air conditioners is the main objective of this technology. This academic article covers home automation in great detail.

II. LITERATURE SURVEY

There are several factors driving the development of smart home systems, but the most important ones are comfort, security, energy management, connectivity, and luxury. Oneof the more recent scientific fields that has not yet been fully incorporated into our culture is smart home systems. This is sothat the research can create a useful smart house, which needs many different research and engineering disciplines. Another significant barrier to the market entry of smart home systemsis the price of installing one. Even though the majority of homes were constructed in the recent past, technology has been increasing dramatically, which has increased the cost of the installation. This indicates that the majority of houses were constructed before this technology was available.A few years ago, smart devices become an essential component of our everyday life.

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As a result, providing amenities andsecurity on smart devices is becoming more significant. This article aims to build an Android mobile device compatible home automation system. The system and the mobile device can communicate with one another thanks to Wi-Fi. Recent research examines IoT-based smart home automation. Themobile application can be loaded and used to communicate with the system on any appropriate device. A simple andappealing GUI application that is easy to use by the typical user can be used to send commands from mobile devicesto turn on/off electrical equipment like lights, fans, and air conditioners as well as establish timers

After receiving these commands, the system responds by carrying out the tasks listed in the commands and notifyingthe user of the results. The user may also access the outcome via an Android mobile application if they are within Wi-Fi range.Therefore, establishing a home automation system fora luxury lifestyle that aims to construct an advanced home automation system using Wi-Fi technology is a good option. Home automation is particularly important in today's society since it can be utilised in a number of settings with excellent accuracy, saving money and time by minimising human effort. Automation of home equipment including lights, fans,doors, and air conditioners is the main objective of this technology. This study paper goes into great detail about home automationand security systems that use Arduino, as well as how we can control home appliances using an Android application.

III. PROPOSED SYSTEM

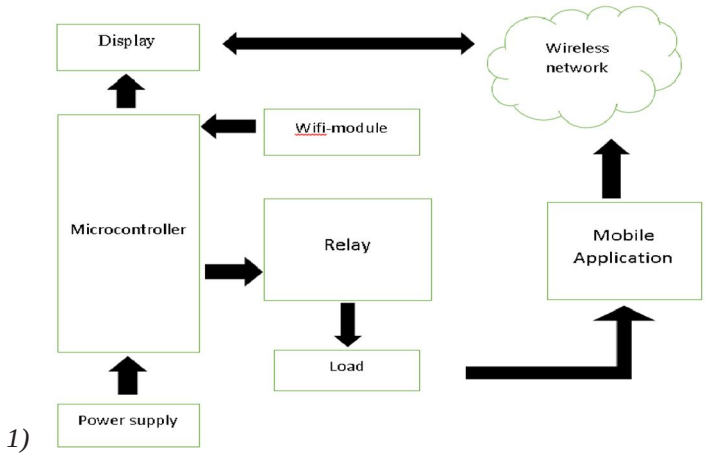
The functionality of the entire project is shown in the block diagram. The Node MCU unit is the system's primary controller, or microcontroller. The user makes advantage of The functionality of the entire project is shown in the block di-agram. The Node MCU unit is the system's primary controller,or microcontroller. The user utilises the mobile applicationto programme commands for the appliances' operation. The mobile app understands the user's voice or switch instruction and delivers a signal to the Node MCU unit over a wireless network set up by Wi-Fi communication. Because of this,the Wi-Fi module, which is really embedded into the Node MCU, enables the microcontroller to connect via Wi-Fi to a device and receive commands from an application through a wireless network. After receiving the signal, the Node MCU uses a relay to switch the appliance on or off. The relay,final appliances, and Node MCU are all physically connected. The microprocessor,he relay, and the finishing appliances are all powered by a separate power supply unit. The state of the application is also shown on a display unit.

A. Algorithm

Description of the Android Application Control

1) Open Application.

2) Enter the IP Address of the Ethernet Shield on theActivity SetIP.



1)

Fig. 1 System Architecture

3) If the button on Activity is pressed it will open the Main Activity, otherwise the process stays on the Activity SetIP.

4) On Main Activity there are two types of Button is Toggle Button that serves as a substitute switch.

5) If one of Toggle is pressed then Application will send command in the form of a datagram package which will then be processed by Arduino. If the datagram has been successfully submitted and processed by Arduino it will enter Feedback or message from Arduino according to the value of the datagram that has been sent.

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B. Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 . It contains a 16 MHz crystal oscillator, 6 analogue inputs, 14 digital input/output pins (of which 6 canbe used as PWM outputs), a USB port, a power jack, an ICSP header, and a reset button. It comes with everything requiredto support the microcontroller; to use it, just plug in a USB cable, an AC-to-DC adapter, or a battery to power it.

C. Wi-Fi Module

The ESP2866Wi-Fi Module is an integrated TCP/IP proto- col stack-equipped self-contained system on chip (SOC) that allows any microcon- troller to access your Wi-Fi network. Both hosting an application and offloading all Wi-Fi network-ing tasks to another application processor are both possible with the ESP2866. Every ESP2866 module is already pre- programmed with an AT command set firmware, so all you have to do is connect it to your Arduino device to receive nearly the same amount of Wi-Fi functionality as a Wi- Fi Shield (and that's right out of the box)! The ESP2866module is a very affordable board with a sizable and expanding

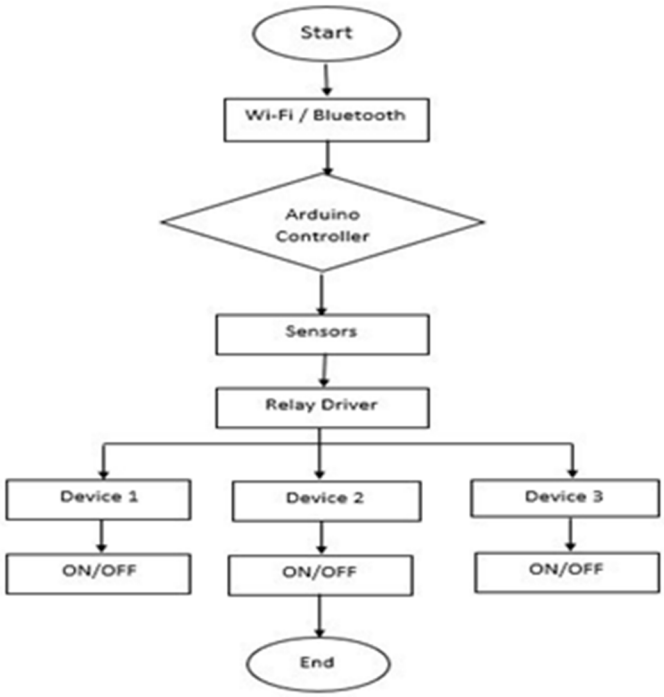


Fig. 2. Flowchart of the training procedure

community. Through its GPIOs, this module may be coupled with sensors and other application-specific devices with a minimum of upfront development and runtime loading thanks to its robust on-board processing and storage capabilities. Its high level of on-chip integration allows for less extra circuitry,and the front-end module is made to take up little space onthe PCB.

D. Android Studio

The quickest tools for creating apps for every type of Android device are offered by Android Studio. A configurablebuild system, world-class code editing, debugging, perfor- mance tooling, and An rapid build/deploy mechanism enables you to concentrate on creating exceptional and high-caliber apps

E. Fame Sensor

When the ignitor receives AC power, a flame sensor detects a weak DC signal. This signal is corrected to DC by the flaming rectifying phenomenon, which changes the polarityof electricity passed through a flame to DC. In our project,this detector is used to detect a fire within the house and then send a buzzer-based alert.

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F. Relay

An electrically controlled switch is a relay. Although strongswitches and strong relays have a variety of methods, many relays use an electromagnet to me-chanically activate a switch.Relays are employed whenever a single little signal is required



Fig. 3.Android Framework

to operate a circuit or when multiple circuits may be controlledby a single signal.

G. Embedded C

The word ”sketches” refers to computer programmes createdwiththe Arduino Software (IDE). The text editor was used to create these sketches,which were then saved as files with the.ino extension. Text-searching and text-replacement tools are included in the editor. Errors are also displayed in the message section, which also provides feedback during saving and exporting. Complete error warnings and other text output from the Arduino Software (IDE) are shown on the console

IV. ACKNOWLEDGMENT

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V. FUTURE SCOPE

We can create cross-platform systems that can be used on other operating systems, such as iOS and Windows, based on the present scenario. By expanding automation of all other home appliances, the restriction to control only a few devices can be abolished. The prototype may include sensors to implement automatic control of household appliances, such asan LDR that can sense daylight and switch lamps accordingly,a PIR that can detect motion and be used for security purposesby sounding an alarm, or a DHT11 sensor that can detect ambient temperature and humidity of the air and switch fansor air conditioners accordingly. The project’s scope can be broadened to include a variety of locations by including small offices as well as homes.

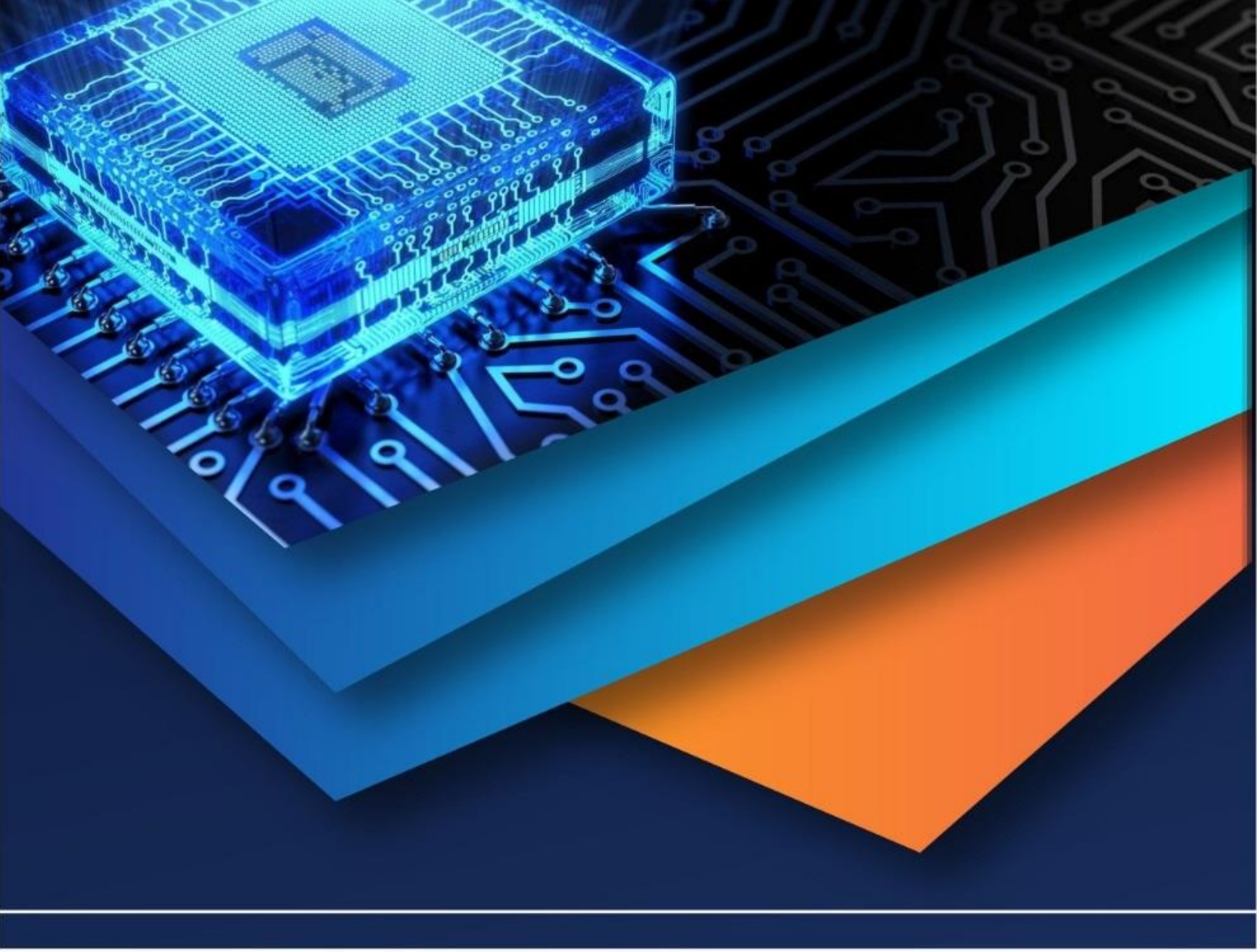
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VI. CONCLUSION

This project offers a solution that is low-cost, safe, acces- sible to everyone, auto-configurable, and remotely operated. The method mentioned in the paper is novel and successful in controlling household appliances remotely by utilising Wi-Fi technology to link system components, meeting user wantsand expectations. Wi-Fi technology-enabled solutions havedemonstrated the ability to be operated remotely, provide homeprotection, and be less expensive than earlier systems.Theprototype shows the fundamental level of home appliance control and remote monitoring has been implemented after the system design and architecture were discussed.Finally, the suggested system outperforms currently available home automation solutions in terms of flexibility and scalability.

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