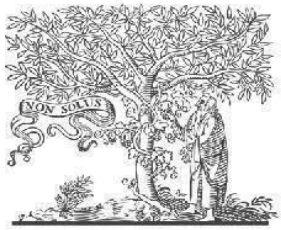
International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

COPY RIGHT



ELSEVIER
SSRN

IJIEMR Transactions, online available on 18th Dec 2024. Link

https://ijiemr.org/downloads.php?vol=Volume-13&issue= Issue12

DOI:10.48047/IJIEMR/V13/ISSUE12/26

Title: " AUTOMATIC CONTACTLESS SWICTH FOR SMART HOME"

Volume 13, ISSUE 12, Pages: 216- 222

Paper Authors
K. Mounika, Ms. A. Vaishnavi, Ms. G. Akanksha, Ms. N. Susmitha

USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper as Per UGC Guidelines We Are Providing A ElectronicBar code

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

AUTOMATIC CONTACTLESS SWICTH FOR SMART HOME

K. Mounika[1], Ms. A. Vaishnavi[2], Ms. G. Akanksha[3], Ms. N. Susmitha[4]

[1]Assistant Professor, Department of Electronics and Communication Engineering, CMR Institute of Technology, Medchal, Hyderabad.

[2,3,4]Bachelor's Student, Department of Electronics and Communication Engineering, CMR Institute of Technology, Medchal, Hyderabad.

ABSTRACT-The Automatic Contactless Switch for Smart Home project aims to develop an innovative, user-friendly solution for controlling home appliances without the need for physical interaction. By leveraging cutting-edge technologies such as infrared sensors, capacitive sensing, and motion detection, the system enables seamless control over devices, enhancing convenience, accessibility, and hygiene in smart home environments. The switch operates by detecting the presence or motion of the user in its proximity, automatically triggering the activation or deactivation of connected appliances. The integration of wireless communication technologies like Wi-Fi or Bluetooth allows for remote control and integration with other smart home ecosystems. This system offers a hands-free, efficient, and energy-saving approach to managing home devices, ensuring enhanced comfort, security, and sustainability in modern living spaces.

1.INTRODUCTION:

The project leads to an enhancement of home automation by using Ada-fruit server and WiFi technology. The home devices can be operated and sensors can be read through PC, tablets, mobiles or Wi- Fi. Automation is taking place in common day to day life as compared to older days of manual ON/OFF procedures. It also reduces the tragedies like electric sparks and short circuit. With the help of Wi- Fi technology automations adds the values and used for controlling the home appliances. Wi-Fi uses the radio frequency for signaling purpose to transfer its data wirelessly with the speed of 1 Mbps to 3 Mbps. It has 2.4 GHz frequency and range is 10-50 meter. Smart switch is master switch which controls Also switch can be operated through PC. Then they can manage their electric appliances in a convenient way. This switch operated by three methods:- 1. By using smart phone application. 2. by voice recognition. 3. by manual operation. For the failure of operation of the smart phone application and voice recognition there is the option of the manual operation.

The project focuses on designing a contactless switching mechanism that leverages motion detection, infrared, and capacitive sensing technologies to detect user gestures or proximity. This innovative approach allows users to control lights, fans, and other home appliances with simple hand gestures or even by simply being in the vicinity of the switch. The system's ability to operate wirelessly ensures it can be easily integrated into existing smart home ecosystems, adding an extra layer of functionality and convenience.

The Automatic Contactless Switch is not only a more hygienic solution but also helps in conserving energy by automatically turning off devices when not in use. Furthermore, with the integration of

wireless communication technologies like Wi-Fi or Bluetooth, users can control their devices remotely through smartphones or other smart devices. This project envisions transforming the way we interact with home appliances, making everyday living more efficient, comfortable, and aligned with the growing demands for smart, sustainable homes.

2.LITERATURE REVIEW:

This proposed design and implementation of GSM based smart home system based on Arduino Uno microcontroller [3]. Mobile may be a revolutionary invention of the century. It had been designed for creating and receiving calls & text messages, however it's occupied this generation through its trending applications. This project is regarding building a smart home system, wherever the user will manage the household appliances by mobile phone as well as GSM module, simply by sending SMS through the phone [5]. During this project simply a recent GSM phone is enough to change ON and OFF any household appliances from anyplace. The proposed method is exposed to be a easy, cost effective which makes it appropriate for the future smart home . The GSM based smart home system is the system that permits us to operate and manage all the home appliances once we are away from home [6]. The smart home system will connect multiple devices like home security system, lighting control system, air condition etc. It provides ease, convenience and safety to home owners. There are so many technologies that are used for smart home [1]. This includes X10, Z-Wave and Zigbee. The system is helpful to old people and to save electricity. It connects to most all the devices and control remotely. The user can send SMS that is received by GSM system and microcontroller is distinguishing the command from SMS and do actions according to command [9].

A low cost and user-friendly smart home system, which uses an Android application to communicate with the cloud and provides switching functionalities, is presented [10]. The System eliminates the use of Personal Computer (PC) and other Computer Peripherals which leads to overall reduction in the cost of the system. Unlike the similar system which uses either of the Bluetooth module network, the proposed system uses Internet of Things (IoT) for monitoring and controlling the Electrical/Electronic Appliances, remotely. Switches of Electrical/Electronic appliances are integrated to the system in order to demonstrate the effectiveness and feasibility of the system. IoT is a trending concept in which the machines or things are made to interact with the environment by exchanging data and information sensed by the sensors [2]. The devices gather information and data from the surrounding environment by using various latest technologies and then there is a data flow between devices. Typically, IoT offers advanced connectivity of devices, systems, and services which is beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains, and applications [4]. The interconnection of these embedded devices will usher in automation in nearly all fields, right from a Smart Grid, to the areas such as smart cities. IoT is a concept which is expected to rule the world within a few years [7]. Tsunami Detection System using IoT: The System consists of sensors, satellites, active monitoring system etc. Not only sensors, but also satellites play an important role in IoT. The changes in position of Z-axis are

measured by the sensor using GPS. The satellite collects data from the sensor nodes. The data gathered s then sent to the base station via. Wireless networks [8].

3.SYSTEM MODEL

The Block Diagram of our prototype is as shown below:

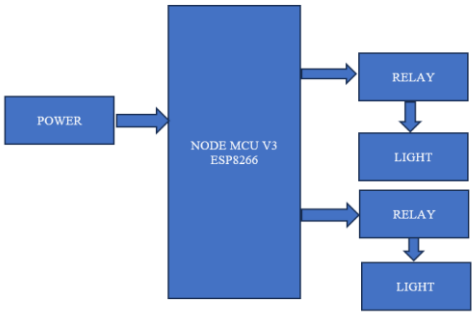


Fig 1 Block Diagram

Arduino: The Arduino board serves as the central controller for the system. It processes data from sensors, communicates with the mobile app, and controls the Power Supply: You'll need a suitable power supply to provide power to the Arduino, water pump, and other components. Ensure it can provide the necessary voltage and current.

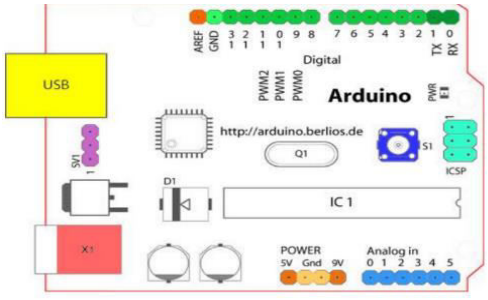


Fig 2: represents arduino layout

Node MCU (ESP8266):

ESP8266 is Wi-Fi enabled system on chip (SoC) module developed by Express if system. It is mostly used for development of IoT (Internet of Things) embedded applications.

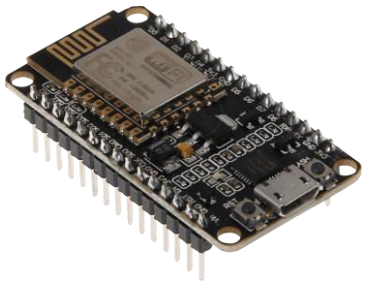


Fig 3: Node Mcu (ESP8266)

DB107: Now -a -days Bridge rectifier is available in IC with a number of DB107. In our project we are using an IC in place of bridge rectifier.

Fig 4: DB107

The Capacitor or sometimes referred to as a Condenser is a passive device, and one which stores energy in the form of an electrostatic field which produces a potential (static voltage) across its plates. In its basic form a capacitor consists of two parallel conductive plates that are not connected but are electrically separated either by air or by an insulating material called the Dielectric. When a voltage is applied to these plates, a current flows charging up the plates with electrons giving one plate a positive charge and the other plate an equal and opposite negative charge. This flow of electrons to the plates is known as the Charging Current and continues to flow until the voltage across

the plates (and hence the capacitor) is equal to the applied voltage Vcc.

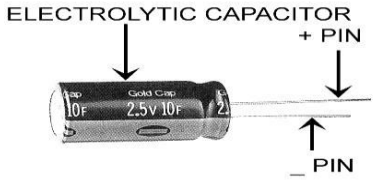


Fig 5: Electrolytic Capacitor

Voltage Regulator: A voltage regulator (also called a 'regulator') with only three terminals appears to be a simple device, but it is in fact a very complex integrated circuit. It converts a varying input voltage into a constant 'regulated' output voltage. Voltage Regulators are available in a variety of outputs like 5V, 6V, 9V, 12V and 15V. The LM78XX series of voltage regulators are designed for positive input.

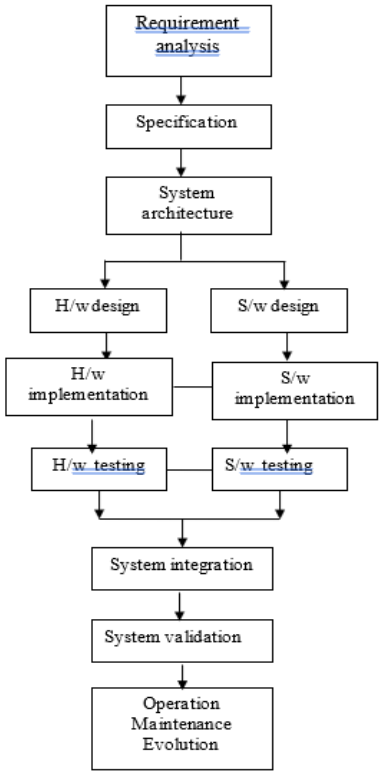


Fig 6: Voltage Regulator

Resistor :Resistors are elements of electrical networks and electronic circuits and are ubiquitous in most electronic equipment. A resistor is a two-terminal electronic component that produces a voltage across its terminals that is proportional to the electric current passing through it in accordance with Ohm's law

Fig 7: Resistor

LED :A light-emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness.

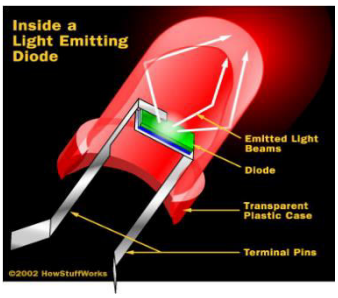


Fig 7: LED

Component Selection: Choose Arduino, Wi-Fi module (ESP8266), relay module, LCD, and power supply.

System Architecture: Design a block diagram with input (Blynk app), controller (Arduino), communication (Wi-Fi), and output (relays, LCD).

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

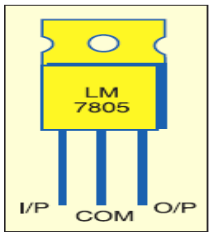


Fig 8: design flow of the project

Circuit Design: Connect Arduino to relays for appliance control, LCD for status display, and Wi-Fi module for communication.

Software Development: Program Arduino using the Blynk library for cloud communication and device control.

Testing and Deployment: Verify hardware connections, test system functionality with Blynk app commands, and deploy in a smart home setup.

The working of this project begins with thesystem powering up, initializing all components such as the Arduino microcontroller, relay module, Wi-Fi module (e.g., ESP8266), and LCD display. The Wi-Fi module connects to the local Wi-Fi network and establishes a link with the Blynk cloud server, which acts as the intermediary between the mobile app and the hardware. Once the system is ready, users can control home appliances through the Blynk mobile app.

When the user sends a command via the app, such as turning a specific appliance ON or OFF, the command is transmitted over the internet to the Blynk server. The server forwards this command to the Arduino through the Wi-Fi module. The Arduino processes the received command and determines which relay needs to be activated or deactivated. The relay acts as a switch to control the connected appliance—closing the circuit to turn the appliance ON or breaking it to turn it OFF.

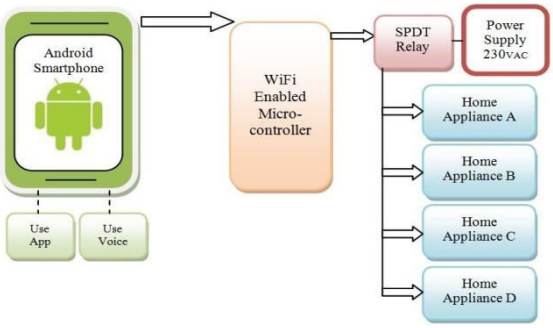


Fig 9: Working of Smart Home

The system also provides real-time feedback for user convenience. As soon as an appliance's statechanges, the Arduino updates the LCD to display the current status (e.g., "Light ON" or "Fan OFF"). The status is simultaneously updated on the Blynk app, allowing the user to monitor the state of their appliances remotely. Additionally, the Blynk app offers scheduling features, enabling users to set predefined times for appliances to turn ON or OFF, which helps conserve energy and enhances automation.

To ensure safety and reliability, the system incorporates mechanisms to handle potential issues. For example, if there is a voltage fluctuation or the Wi-Fi connection is lost, the Arduino deactivates the relays to prevent damage to the appliances. This feature ensures the system operates securely even under adverse conditions.

Overall, the project leverages the combination of Arduino, Blynk software, and IoT technology to provide a seamless and efficient method of remotely controlling home appliances, making it a practical and user-friendly solution for smart home automation.

4.RESULT

The project yielded successful results, showcasing its effectiveness as a smart

home automation system operated via a mobile app. The implementation demonstrated reliable and seamless control of home appliances using the Blynk mobile application. Users were able to send commands through the app to turn appliances ON and OFF, with near-instantaneous response times observed under stable Wi-Fi conditions.

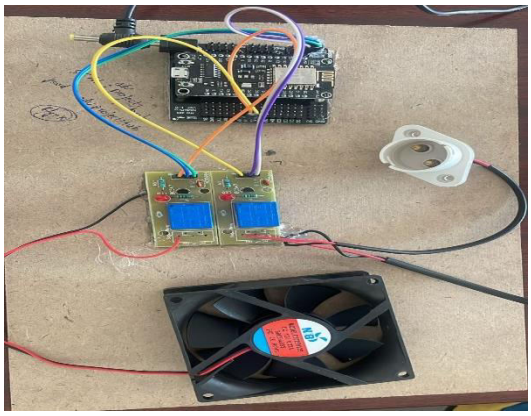


Fig 10. Result

During testing, the system handled multiple appliances effectively, with no noticeable delays or failures in relay switching. The Wi-Fi module (ESP8266) maintained a stable connection to the Blynk cloud server, even during extended periods of operation. In cases where the Wi-Fi signal was temporarily lost, the Arduino correctly deactivated the relays as a safety measure, preventing potential hazards or unintended appliance operation.

The overall system was tested for scalability by adding multiple relays to control additional appliances, which worked without any major modifications to the software or hardware. The project also highlighted its practicality in real-life scenarios, as the contactless operation eliminated the need for manual switches, improving hygiene and reducing wear and tear.

5.CONCLUSION

The development of mobile-operated, contactless smart home switches represents a significant step towards modernizing home automation by combining convenience, energy efficiency, and accessibility. By leveraging IoT technologies and mobile applications, this project demonstrates how intuitive controls, real-time monitoring, and automation can transform everyday living spaces into smarter, more sustainable environments.

The integration of wireless communication protocols such as Wi-Fi and Bluetooth, along with compatibility with voice assistants, ensures a seamless user experience and adaptability to evolving technology trends. Additionally, the focus on contactless operation enhances hygiene and reduces physical wear, making it suitable for diverse use cases, including public or shared environments.

This project underscores the potential for scalable, cost-effective solutions to democratize smart home automation, contributing to global efforts in energy conservation and the creation of sustainable living ecosystems. As IoT technologies continue to evolve, this system provides a solid foundation for future enhancements, such as AI-driven automation and broader interoperability, ensuring that smart homes remain at the forefront of technological innovation.

REFERENCES

1. K. Radhakrishna, D. Satyaraj, H. Kantari, V. Srividhya, R. Tharun and S. Srinivasan, "Neural Touch for Enhanced Wearable Haptics with Recurrent Neural Network and IoT-Enabled Tactile Experiences," 2024 3rd International Conference for Innovation in Technology (INOCON), Bangalore, India, 2024, pp. 1-6,

2. Karne, R. K., & Sreeja, T. K. (2023, November). Cluster based vanet communication for reliable data transmission. In AIP Conference Proceedings (Vol. 2587, No. 1). AIP Publishing.
3. Karne, R., & Sreeja, T. K. (2023). Clustering algorithms and comparisons in vehicular ad hoc networks. Mesopotamian Journal of Computer Science, 2023, 115-123.
4. Karne, R. K., & Sreeja, T. K. (2023). PMLC-Predictions of Mobility and Transmission in a Lane-Based Cluster VANET Validated on Machine Learning. International Journal on Recent and Innovation Trends in Computing and Communication, 11, 477-483.
5. Mohandas, R., Sivapriya, N., Rao, A. S., Radhakrishna, K., & Sahaai, M. B. (2023, February). Development of machine learning framework for the protection of IoT devices. In 2023 7th International Conference on Computing Methodologies and Communication (ICCMC) (pp. 1394-1398). IEEE.
6. Kumar, A. A., & Karne, R. K. (2022). IIoT-IDS network using inception CNN model. Journal of Trends in Computer Science and Smart Technology, 4(3), 126-138.
7. Karne, R., & Sreeja, T. K. (2022). Routing protocols in vehicular adhoc networks (VANETs). International Journal of Early Childhood, 14(03), 2022.
8. Karne, R. K., & Sreeja, T. K. (2022). A Novel Approach for Dynamic Stable Clustering in VANET Using Deep Learning (LSTM) Model. IJEER, 10(4), 1092-1098.
9. RadhaKrishna Karne, D. T. (2021). COINV-Chances and Obstacles Interpretation to Carry new approaches in the VANET Communications. Design Engineering, 10346-10361.
10. RadhaKrishna Karne, D. T. (2021). Review on vanet architecture and applications. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12(4), 1745-1749.