# DESIGN AND IMPLEMENTATION OF CLOUD BASED HOME AUTOMATION CONTROLLER

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**ABSTRACT**

The Raspberry Pi was used in the development of Raspi-Cloud, a home automation system that is hosted in the cloud and gives customers the ability to remotely operate electrical equipment in their homes via the use of the internet. Through the use of cloud connectivity, directives are sent to the Raspberry Pi, which then activates the relay modules that are linked to a variety of home gadgets. At the same time as it enables real-time monitoring and switching of appliances via a smartphone or computer interface, this system contributes to the advancement of energy efficiency, convenience, and contemporary living. In order to provide backup and offline access, the SD card stores all of the control signals and the current condition of the device locally.

KEYWORDS: Raspberry Pi, ThingSpeak, Website, Relays, Bulbs

## I.INTRODUCTION

Automating everything is the guiding concept of today's technology society, which makes life easier, secure, and saves time and power. One of the main features of home automation is the ability to turn on and off household appliances automatically. One way to describe home automation is a way to accomplish a task without the involvement of a person. In order to increase convenience, comfort, energy efficiency, and security, it may integrate various systems, such as machines, security door locking, heating, ventilation, air conditioning, and lighting. Many years ago, the concept of automating every household device began with the simple act of connecting two electrical wires to a battery and then closing the circuit by adding a load, such as a light. Different firms may later extend it and employ various devices, such as sensors, controllers, actuators, busses, and interfaces, to construct their own automation systems. There aren't many ways to manage home automation systems. The proposed method and the paper as organized as I. Introduction Section II as literature survey section III as existing method and its operation section IV Proposed method block diagram and its operation and section V conclusion and its future scope

## II.LITERATURE SURVEY

Smart home automation systems have become more popular as a result of recent developments in the Internet of Things (IoT). Because NodeMCU and ESP32 microcontrollers are inexpensive, have built-in Wi-Fi, and are simple to integrate, many academics have looked at using them. Using NodeMCU and the Blynk app, Kumar and Rajasekaran (2016) presented a simple Internet of

Things (IoT)-based home automation system that allows smartphone users to operate appliances wirelessly. By adding sensors including motion, gas, and temperature detectors, Sumathi et al. (2018) improved environmental monitoring and safety in smart houses. Hossain et al. (2019) demonstrated enhanced system performance and dependability by using the ESP32's dual-core processing capabilities to create a responsive home automation system with real-time data recording via Firebase. By introducing voice control using Google Assistant and IFTTT with ESP32, Agarwal et al. (2020) enhanced accessibility for users, particularly the elderly and crippled. Using Firebase Cloud, Patel and Thakkar (2021) developed an ESP32-based system that allows remote control of appliances such as fans and lights via a secure database-driven interface. Meena et al. (2021) employed fingerprint recognition and ESP32 to build a smart door lock with a security emphasis. More recently, Sharma and Patil (2022) focused on energy efficiency utilizing Node-MCU with sensor-triggered automation and mobile dashboards, while Arora et al. (2022) used MQTT and Node-RED for a modular voice-activated system. These studies demonstrate how Node-MCU and ESP32 may serve as key platforms for safe, scalable, and adaptable smart home automation.

## III.EXISTING METHOD

### BLOCK DIAGRAM

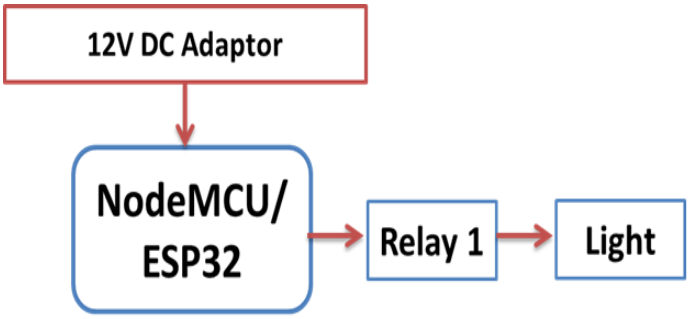


Fig.1. Existing block diagram

The block diagram shows how to control lights and other household appliances using a cloud-based home automation system that uses an ESP32 or Node-MCU. The Node-MCU/ESP32 microcontroller is powered by a 12V DC adapter that has been turned down to a safe voltage level. The ESP32 or Node-MCU, which interacts with a cloud server (such Firebase, Blynk, or MQTT) and connects to a Wi-Fi network, is the central component of this system. A command sent by a user via a web interface or smartphone application is processed by the cloud and sent to the ESP32/Node-MCU. The microprocessor receives the instruction and uses the relay module, which acts as an electrical switch, to activate it. In this instance, the light is turned on or off by the user using Relay 1. Users may operate their appliances from any location in the globe because to this cloud connection, which offers ease, adaptability, and energy efficiency. To keep track of the device's condition, real-time status monitoring may also be used. Automation capabilities like scheduling, voice management via Alexa or Google Assistant, and sensor integration for intelligent reactions may also be added to the system. An inexpensive, scalable, and effective Internet of

Things-based home automation system is this configuration.

## IV.PROPOSED METHOD

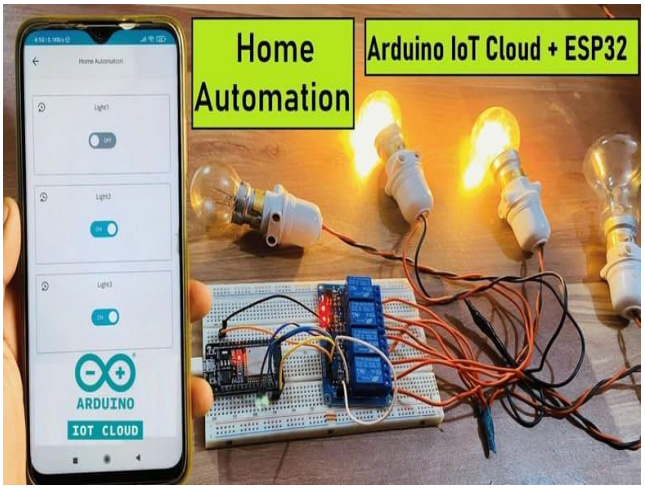


Fig.2. Proposed block diagram

## OPERATION

RaspiCloud suggests a cloud-based controller for controlling home appliances that makes use of a Raspberry Pi and relay modules. Users may use a mobile app or the web to engage with the system. Upon receiving a command, the Raspberry Pi interprets it, turns on the relevant relay, and modifies the cloud dashboard. By notifying device states and recording activities on the SD card for transparency and data backup, the system guarantees two-way communication.

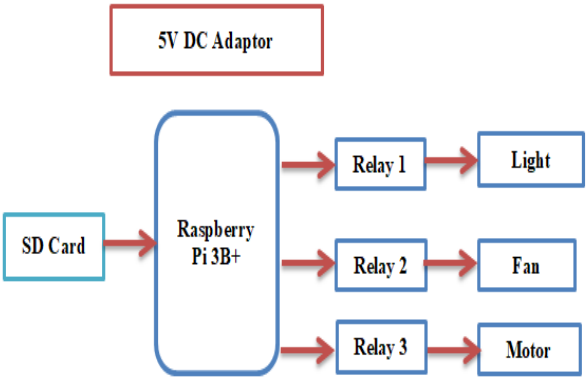


Fig.3. Proposed block diagram with applications

## CONCLUSION AND FUTURE SCOPE

Because of its overclocking and future extension potential, the Raspberry Pi has proven to be a simple, affordable, and effective platform for creating home automation systems in this highly technologically advanced setting. The findings demonstrated how simple and effective it is to utilize a Raspberry Pi to read email as a basic home automation application. Future applications such as power grid protection and control, surveillance, power monitoring, fault monitoring, security, etc., may readily build upon this work. This method is superior to other home automation techniques, but it has a significant disadvantage in that it does not use SMS and DTMF as the call tariff. Additionally, unlike web server-based home automation, this method eliminates the need for a web server and the space it requires by utilizing Gmail's existing web space.

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