IOT-Based Home Automation System

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Abstract: Home automation, also known as domestics, is the process of implementing automation in the home. A home automation system monitors and/or controls home features such as lighting, climate, entertainment systems, and appliances. It may also incorporate home security features such as access control and alarm systems. Mobile communication technology is playing a significant role in automation. This project focuses on reliable home control for remotely turning on and off appliances via a smartphone application. Using this technology, the system enhances the living standard at home, lowers human work, increases energy efficiency, and improves accessibility, resulting in a smarter house.

Index Terms – Home Automation, Safety.

I INTRODUCTION:

House automation allows you to automate duties linked to security, well-being, and comfort using a smart system placed in your house or business. In other words, it incorporates technology into the design of an environment. One of the primary benefits of home automation systems is energy efficiency. Home automation has grown in popularity in recent years due to its safety and security benefits. Nowadays, home automation is more advanced and precise in operating all household equipment. house automation systems have evolved into energy-efficient, user-friendly smart house techniques. It includes fundamental functions to keep the user satisfied and comfortable. This proposed system is a precise mix of an Android smartphone and an embedded system that includes NodeMCU, a Wi-Fi module, a Bluetooth module, and a relay circuit.

Fig 1: Automated House

How does Home Automation works?

House automation connects a network of gadgets to interact and automate your house. Typically, there will be a central device that controls everything. That may be a smart speaker or display powered by Alexa, Google Assistant, or Siri. Home automation uses smart devices to control and manage your home. Examples of home automation include:

Smart lighting:

Smart lights can be controlled by voice commands or smartphone apps. They can also be programmed to turn on and off at specific times.

Smart plugs

These plugs connect to wall sockets and can be controlled remotely to turn on or off lights, fans, and other devices.

Smart locks

Smart door locks can be locked and unlocked with a mobile app or voice commands.

Home security

Smart security systems can include motion sensors, door and window sensors, and surveillance cameras.

Personal assistants

Personal assistants like Amazon's Alexa can be used to control smart devices.

Appliance control

Many appliances, like washing machines, dishwashers, and ovens, can be controlled remotely.

Energy saver

Smart devices like lighting controllers, dimmers, and sensors can help you save energy.

Advantages:

- ➢ Comfort : Personalized scenarios: Create customized scenarios to meet your needs, such as shutting off lights and closing shutters before going to bed.
- ➢ Control the appliances: Control the lighting, heating, air conditioning, and other equipment.
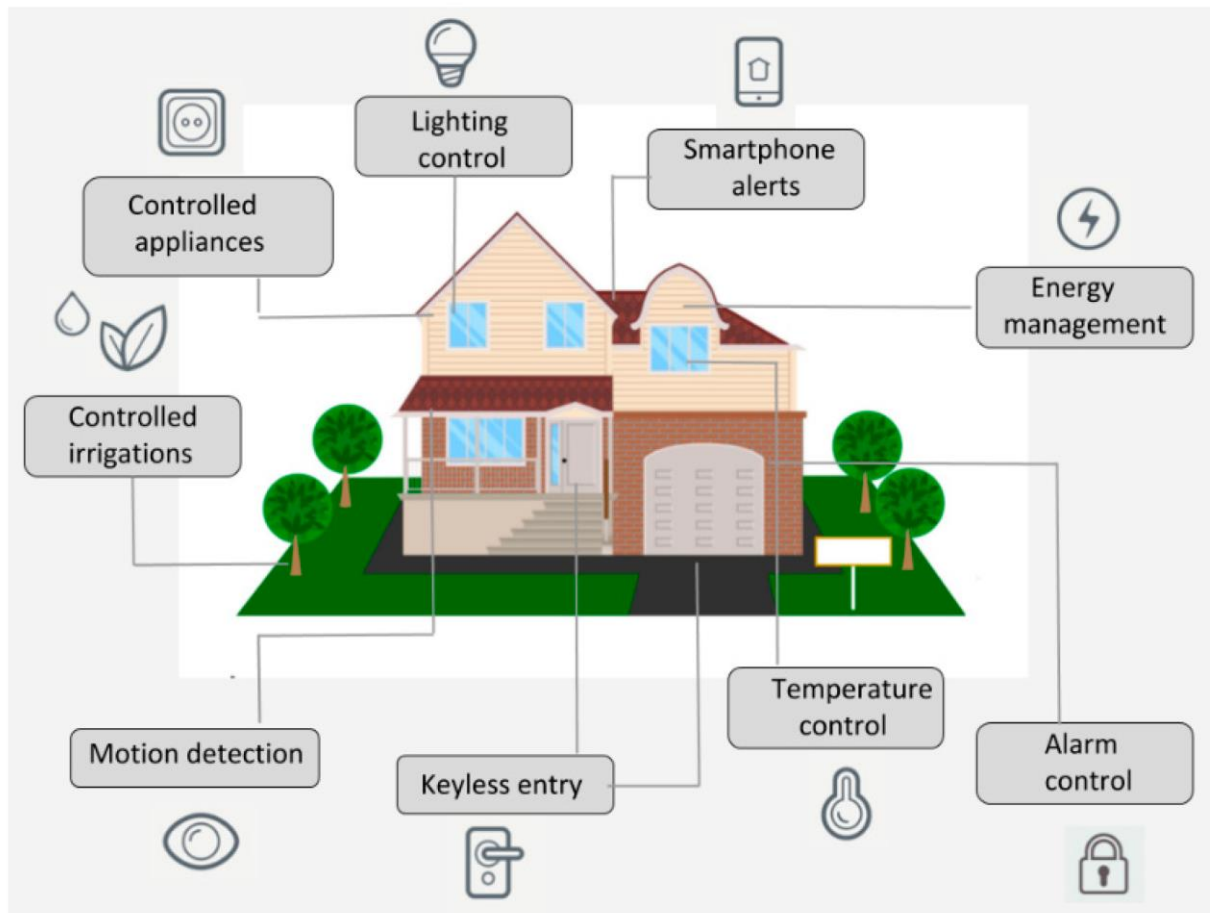- ➢ Security: Monitor your home remotely using cameras, motion sensors, and smart locks.

Fig 2: Home Automation Functions

Function of Home Automation:

Home automation functions include controlling lighting, temperature, security, and more. These functions can be controlled remotely using a smartphone or tablet.

Home automation features:

➢ Lighting: Turn lights on and off or alter the brightness.
➢ Temperature: adjust the thermostat or environment.
➢ Security: arm and deactivate alarms or watch security cameras.
➢ Door locks: Lock and unlock doors.
➢ Control appliances, such as air conditioners and washing machines.
➢ Audio-video: Control entertainment equipment like televisions and stereos.
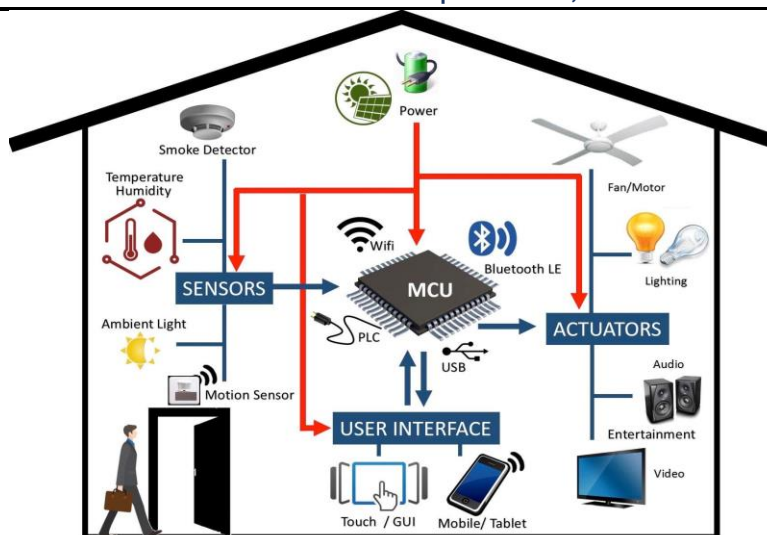➢ Window blinds: Raise and lower them.

Fig 3: Functions of Home Automation

Objectives of the work:

➤ Make the porch light turn on automatically whenever you open the front door after dark. Lighting and audio settings may make an empty home appear and sound occupied.

➤ Set the temperature on your Omni state to automatically turn on when the security system is activated in the morning. It is then automatically turned down one-half hour before you regularly arrive home, ensuring that you arrive home to a comfortable environment.

II.LITERATURE REVIEW:

An automated home might be a relatively simple set of controls, or it can be extremely automated, with any appliance hooked into an electrical outlet being remotely controlled. The primary costs are for equipment, components, furniture, and custom installation. house automation is intended to bring convenience and efficiency to the house. People with physical disabilities may rely on the capabilities of a home automation system to complete tasks that would otherwise be difficult or impossible.

III.METHOD AND METHODOLOGY:

A methodology diagram for home automation functions would typically depict a system with three key components: sensors that collect data about the environment, a central controller that processes this data and makes decisions, and actuators that execute actions based on those decisions, all connected via a communication network, allowing for user interaction.
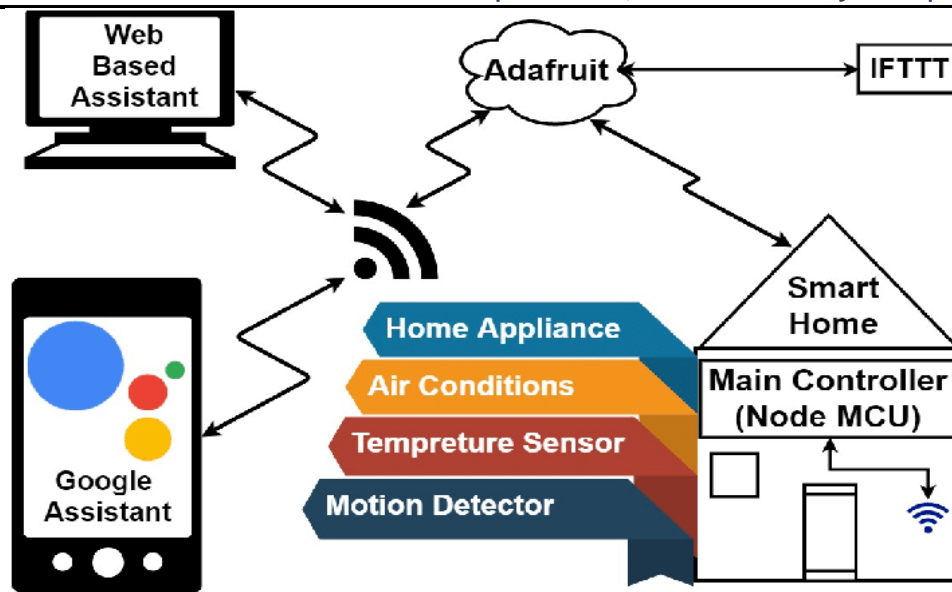
Fig 4**:** Block Diagram of Home Automation system

They link to a hub using a separate communication technology, such as Bluetooth, Zigbee, Z-Wave, X10, or Matter, and the hub then connects them to the internet. Home automation operates on three levels. Monitoring means that consumers can remotely check in on their devices using an app.

Hardware Components of Home Automation System:
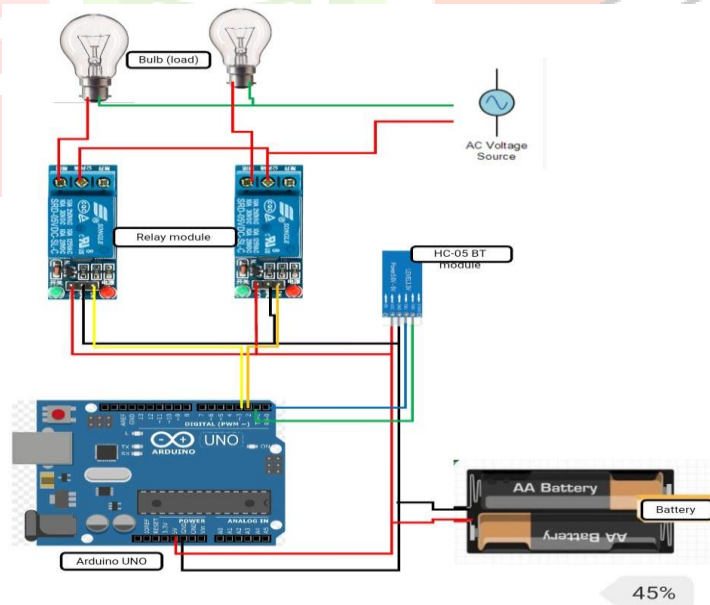
  ➢ NODEMCU
  ➢ RELAY
  ➢ MODULE

Fig 5: Circuit of Home Automation System

IV. RESULT AND DISCUSSION:

A software interface is built between the microcontroller and the appliances using a server. This is designed to work in both online and offline modes. The graphic below depicts the development of a Bluetooth module for the project.
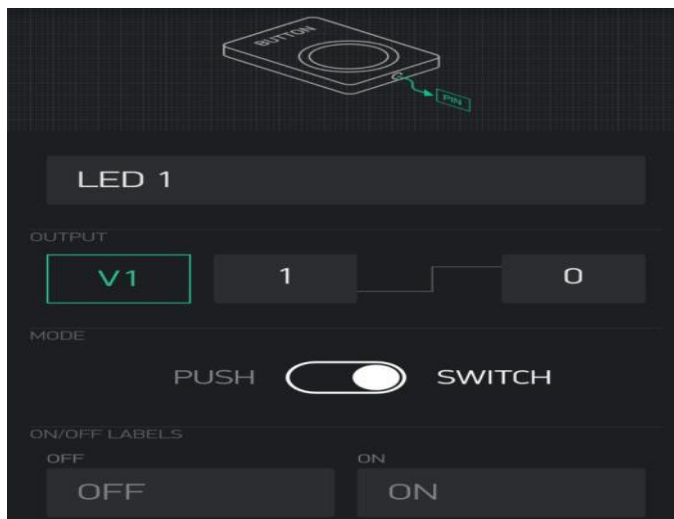

Fig 6: Results of Home Automation

Fig 7: Results of Home Automation

V.CONCLUSION:

To summarize, the question "what is a smart home?" can be simply defined as a gateway to better living through technology. By embracing the potential of smart gadgets, you may streamline daily tasks, strengthen security, and boost energy efficiency in your house. Building automation systems provide numerous benefits for controlling complicated building systems. These systems can improve energy efficiency, comfort, and indoor environmental quality, as well as safety and security, while also simplifying maintenance and repair.

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