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SMART HOME AUTOMATION

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ABSTRACT:

In recent decades, home automation systems have gained substantial popularity, and their proliferation continues to be a topic of discussion. Nowadays, the majority of home automation setups typically involve a smartphone and a microcontroller. These systems rely on smartphone applications to manage and supervise household appliances using various communication methods. This paper introduces a concept for home automation through voice commands utilizing Google Assistant. Considering that smartphones are now almost ubiquitous, with a cost assumption of $10 USD, it is possible to control up to 8 appliances via Google Assistant. The paper details the development of such a system, which utilizes common household appliances. The user issues natural language voice commands to Google Assistant, and these commands are deciphered and transmitted to the microcontroller using applications like IFTTT (If This Then That) and Blink. The microcontroller, a Node MCU (ESP8266), controls the connected relays as necessary, switching the associated devices on or off based on the user's instructions through Google Assistant. Communication between the microcontroller and the application is established via Wi-Fi over the internet.

Introduction:

Smart homes based on Internet of Things (IoT) technology are gaining immense popularity. The core idea behind IoT is to connect the physical world to the internet. The emergence of the Web of Things (IoT) has made it simpler to link sensors to the web, gather data, and exchange information generated by these devices. To comprehend IoT technology thoroughly, we have extensively reviewed numerous journals, research papers, conference papers, and project reports. Additionally, we've explored various IoT-based projects developed in the past. Several proposed and existing smart home platforms are available.

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The SmartHomes project aims to simplify daily life in homes where time constraints are an issue. It generates various models that function through the internet, leveraging IoT technology, among other aspects. However, it falls short in addressing critical IoT domains like cost-effective home automation and the need to integrate a reasoning engine for IoT data analysis. The smart home project is implemented in various ways; it can utilize more robust processors like the Raspberry Pi or other System-on-Chip (SOC) options with built-in Wi-Fi, such as the ESP12E or ESP32. Nevertheless, we chose the ESP8266 to maintain cost-effectiveness and avoid overengineering.

For communication with Google Assistant on our mobile devices, we employ IFTTT services, configuring the assistant to listen for specific commands and initiate a link when the command is received. The ESP8266 can access internet information exclusively through API calls. To facilitate this, we utilize ThingSpeak, which allows us to modify a field in our ThingSpeak channel based on voice commands given to Google Assistant. The ESP8266 periodically checks the field's value through API calls and communicates this value to an Arduino via serial communication. The Arduino then executes the required actions, such as toggling a relay, based on the received data.

We utilize the Node MCU ESP8266 module for internet connectivity in our project. In reality, the home automation landscape is witnessing rapid growth, primarily driven by the pursuit of enhancing comfort, convenience, quality of life, and security for residents. Present-day home automation systems are not only aimed at simplifying life but also at providing support to elderly and disabled individuals while reducing human labor in the production of goods and services. These systems can be designed and implemented using a single controller capable of managing various interconnected devices, such as power outlets, lighting, temperature and humidity sensors, smoke, gas, and fire detectors, as well as emergency and security systems. One of the most significant advantages of smart home automation is its accessibility and manageability via a range of devices like smartphones, tablets, desktops, and laptops.

The project places a strong emphasis on home security and user-friendly applications, incorporating various sensors like gas detectors, IR sensors, and fire detectors to safeguard homes and enhance security measures.

SYSTEM DESIGN:

Block diagram

The block diagram of the proposed methodology is shown in below fig. A triac switch is present in the circuit board which detects the instruction and these triacs are acts as switches nothing but relays

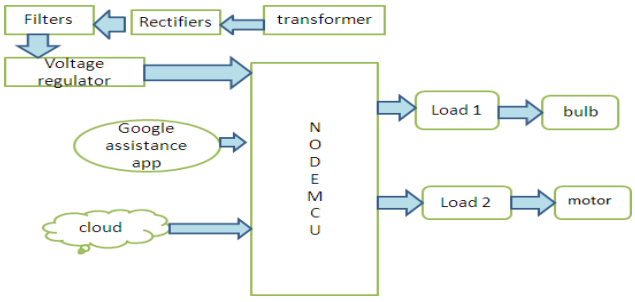

Fig1: block diagram

In the above block diagram we are using some components such as Transformer,

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Rectifiers, Filters, Voltage regulators, Google assistance app, Loads. Here transformer which converts high voltage level to low voltage level i.e., Step down transformer, which transforms the electrical energy from one device to another device. It consists of two windings i.e., primary and secondary. Depending upon windings we can decide then whether the transformer is step up (or) step down transformer. If primary greater than secondary then that transformer is step down transformer. Rectifier is a device which converts an Alternating current (AC) to Direct current (DC). Filters are used to filtering the signals which removes the unwanted part from the signal. We are giving input to the circuit through voltage regulator. In Google assistance app we are giving input commands to circuit with the help of using arduino IDE software. We are sending information to the cloud through the Internet. Loads are taken as Bulb and Motor

SCHEMATIC DESIGN:

The schematic design of the circuit is shown in below figure

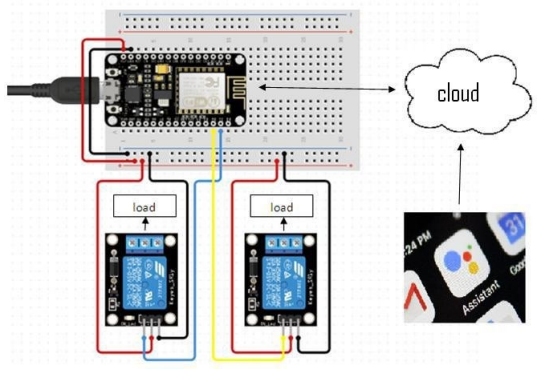

Fig2: Schematic design

The primary operation of this smart home automation system relies on the NodeMCU Wi-Fi module, specifically the ESP8266. This module includes an integrated Wi-Fi chip, allowing it to communicate with our Wi-Fi network, which is protected by a password for security purposes. Data exchange with the cloud is facilitated through IoT (Internet of Things) technology. The core programming language used in this project is Embedded C.

In this setup, user input commands are transmitted via a mobile app, such as Google Assistant. Additionally, sensors are incorporated to detect changes and environmental conditions. The culmination of all these components results in the desired output for the smart home automation system. This encapsulates the fundamental working principles of this smart home automation project.

RESULT:

Here first connect the Wi-Fi connection and power supply to the circuit after Lcd is displayed and temperature is displayed on the lcd with the help of DHT sensor then lights and motor are on or off depending the commands given through the help of Google assistance as shown in below fig.

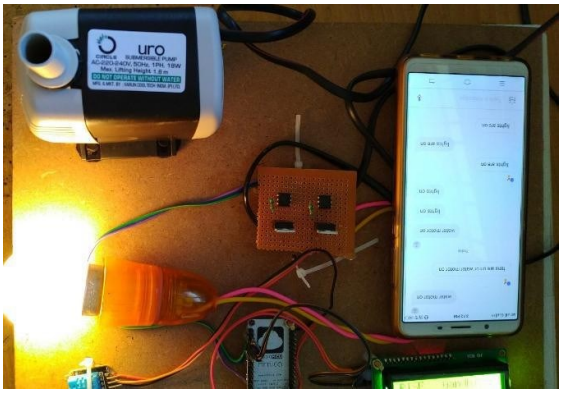

Fig3:out put diagram

CONCLUSION:

In this paper, we have introduced the event of a home management using Node MCU and internet of things technology. The

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system is suitable for remotely controlling the home appliances. A smart home system integrates various electrical appliances in a home with each other using information devices automatically according the users need. The automated mode makes life easier for users by complete automation of necessary appliances without any human effort through voice commands.

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