IoT BASED ON WIRELESS HOME AUTOMATION

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ABSTRACT:-

Home automation is an increasingly popular topic because of its many advantages. Home automation can be done by connecting home appliances to the internet. Home automation uses two IoT-based voice control systems in this project: Voice and Voice Recognition. The term "Internet of Things" (IoT) refers to the concept of using the Internet to connect and track physical objects. This concept can be applied to our homes, making them smarter, safer, and more functional. The first method is to use GSM/GPRS technology to allow users to manage electronic devices online via the web.The second way is to use Bluetooth technology to voice control home appliances via Android. Pic 16f877a microcontroller was used to realize the proposed system. The goal of this project is to create a home automation system that gives users full control of their home remote control. Networked hosts, smartphones, and central hosts can control the automation system. Home automation systems provide control and monitoring of equipment and security cameras for ease of access, comfort, energy efficiency, and security.

Keywords: Home Automation System (HAS), Internet of Things (IoT), Voice Control, PIC 16f877a Microcontroller, Smartphone

1. INTRODUCTION:-

As automation is a hot topic in the 21st century, it has become more and more common in our daily lives. Reducing the work, effort, time, and error caused by human responsibility is the main purpose of every technology. One such industry that seeks to simplify while increasing efficiency is automation. Central control of appliances, lighting, HVAC (heating, ventilation, and air conditioning), and other systems will be part of home automation to improve safety, comfort, and economy. Using IoT (Internet of Things) technology and voice recognition, this project shows how to build an inexpensive home automation system.

The Internet of Things (IoT) is the interconnection of physical devices such as furniture, machinery, vehicles, and buildings, including electronics, software, sensors, actuators, and network connections to store and exchange information. This project uses Internet of Things technology to wirelessly work online in home appliances. A 16f877a microcontroller that analyzes the user's commands and controls the device to manipulate electronic measurement data. Bluetooth, a widely used wireless technology for data transfer, creates connections between microcontrollers and smartphones. In addition, the plan hopes to provide customers with voice control so they can use the device. Voice Assistant is an online Speech to Text conversion platform for speech recognition. When the speech is heard from the user's voice, the home automation system listens to it and takes the appropriate

action to turn the device on or off. Voice recognition makes it easier for people with physical limitations to use the device.

The parameters that should be in the plan are:

A. Comfort - sound, light , and fan, smart irrigation, automatic door

B Security - alarm system

C. Security - gas detection system

Mobility can be difficult for the elderly or disabled who need help with most household chores. Even after a long day of work, it can be difficult for a person to complete simple tasks such as turning on the fans and lights or going to the generator to turn various appliances on and off. In this article, we will address these issues. With the introduction of voice-activated automatic home automation, it is possible to operate many home appliances as well as the various functions that make up the home automation system.
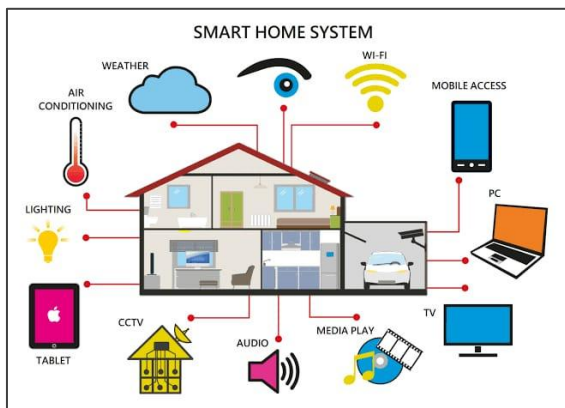
Fig No. 1 IOT

1.1. WHY HOME AUTOMATION SYSTEM?

The purpose of IoTbased advanced home automation is to enable users to issue commands to their home appliances and operate them over the Internet.

The main objectives of the project are:

A. To develop a low-cost, easy-to-install home automation system.

B. Provide users with a secure and reliable website to manage their home appliances online.

C. voice control interface is included to help control the device by people with physical disabilities.
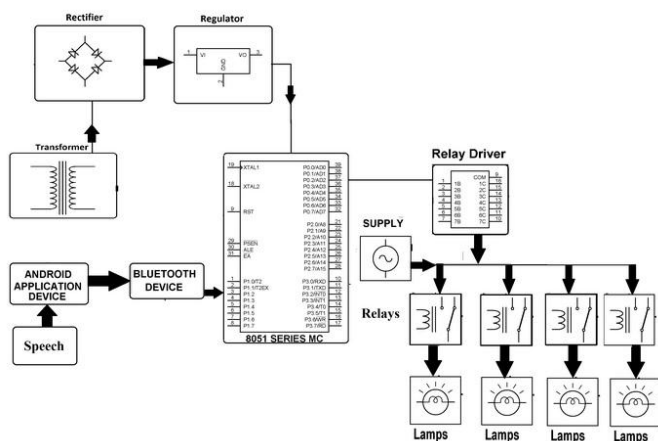
2. SYSTEM DESIGN AND WORKING:-

Fig.No.-2 Block Diagram

This system is especially useful for elderly or disabled people who have difficulty walking and use electrical switches to turn them on and off. This technology solves this problem because it only needs one sound to turn the load on and off. Here, four lights (light, fan, heating, and cooling) are used to indicate each load. These loads can be

switched on and off simultaneously or separately. The system solves this problem by interacting with home equipment, which changes this load according to input from the Android device. The Android app also provides a functional GUI to provide these functions.

Generally, GUI activities are performed directly by controlling the graphics. In addition to PCs, GUIs are used in many handheld devices such as MP3 players, portable media players, game consoles, mobile phones, and small controls for home, office, and industry. Because time is limited by the possibilities of 2D displays capable of describing a wide variety of information, it tends not to be used for other low-resolution types of interaction, such as video games (Hub-up), in the tradition of the Xerox PARC research computer. display (HUD).) is preferred) or flat images such as stereoscopic images are excluded.
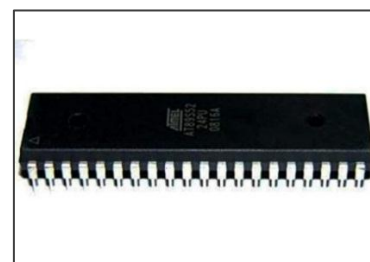

Fig No.-3 8051 Microcontroller

The system uses a microcontroller called 8051. Intel developed the 8051 microcontrollers in 1981. It is an 8-bit microcontroller. It has 40 DIP (dual in-line package) pins, 128 bytes of RAM, two 16-bit timers, and 4 KB ROM memory. It has four parallel 8-bit ports that can be operated and addressed as needed. The microcontroller contains an on-chip crystal oscillator with a crystal frequency of 12 MHz. The microcontroller and Bluetooth receiver are interconnected so that the microcontroller can receive commands and respond appropriately. It controls the load using a driver relay IC and a set of relays.
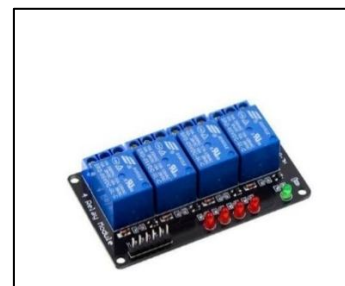

Fig. No.- 4 Chanel Relay Module

4 relays are connected to control AC loads. The relay is operated only in web mode via the web interface. In offline mode, they can work over Bluetooth. A relay is used between the load and the control unit. Therefore, the system can be used in both domestic and industrial areas.
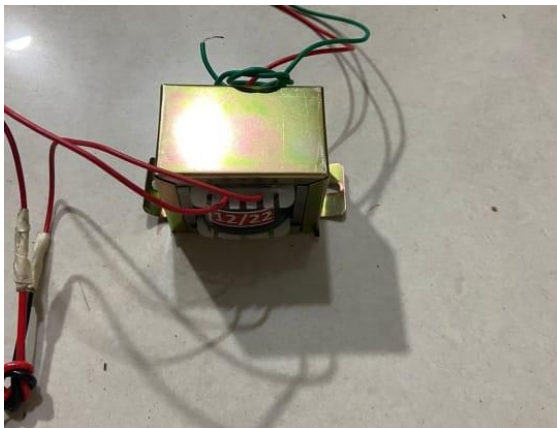
Fig No. - 5 Center Tapped Transformer

Rectifier circuits often use a neutral tap transformer, sometimes called a two-phase three-wire transformer. When a digital project needs to use AC power, a transformer is used to step down the voltage (24V or 12V in our case), which is then converted to DC using a generator electrical rectifier. Since the peak reverse voltage of the neutral tap transformer is twice that of the bridge rectifier, it is often used in full-wave rectification circuits. The 230/12V step-down transformer is used to step down the voltage to 12VAC in the power regulation of the system. A bridge rectifier is used to convert this to DC. To reduce ripple use a filter capacitor set to the +5V required for the microcontroller and   other devices to operate using the 7805 regulator. Notification of information received from the Internet is done using LEDs.

Fig. No.- 6 LCD

The LEDs indicate whether there is data (if any) on the receiver.Status and measurement parameters are displayed on a 16 x 2 LCD. LEDs are used to indicate status and a bell is used for confirmation.

The following peripherals are connected to the system via optional interfaces:

LPG gas sensor	ADC
LCD	Digital IO
Relays	Digital IO
Bluetooth	Software UART (Timer)
Buzzer	Digital IO
LEDs	Digital IO

Gas leak detection is done with LPG sensors. If the sensor detects a leak, the alarm will continue to sound to indicate the situation. As the situation is still considered a security threat, those concerned will receive text messages. An internet video of the event is also available. Use infrared sensors to detect thieves. When it detects an obstacle first, it will sound a small alarm is also considered a security breach, and notifies interested parties. An online video of the episode is also available. PIR sensors are used to activate the garage door. The garage door will open if there is a movement within 180 degrees of the sensor.

The door will automatically close again when the preset time is reached. The software serial interface used by Bluetooth is Link, which operates at 9600 bits per second. Build Track has 15Amp outputs and nodes to control high-capacity needs like water heaters. It can be controlled by a smart app or voice. Programming the kettle also provides convenience and energy savings. Build Track provides smart devices with switches and controls for adjusting fans to existing buildings, and the same control is provided via a smart app or voice assistant. Build Track Smart Touch Switch also lets you control the fan speed.

3. USED VOICE COMMANDS

VOICE COMMAND
Light ON
Light OFF
AC ON
AC OFF
Fan ON
Fan OFF
Heater ON
Heater OFF

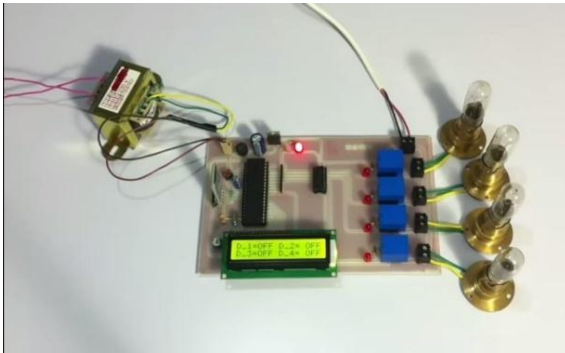By using above voice command home appliances are used.
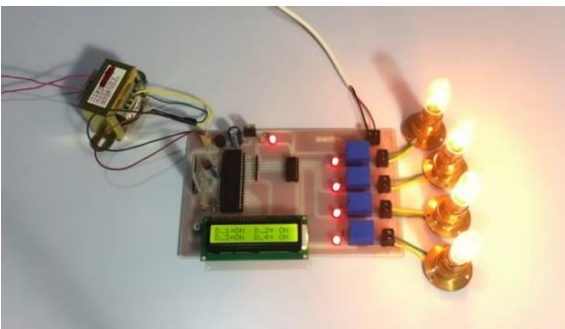
Fig No. - 7 IoT Based Home Automation

Fig No.- 8 Result of IoT Based Home Automation

4. ADVANTAGES OF HOME AUTOMATION SYSTEMS:

- The option to switch from voice control to web control takes care of how the user can customize the device according to their needs.

- You don't have to worry about security vulnerabilities as the system can only be accessed with the special code specified in the web API that sends the SMS. This increases the integrity of the security system.

- Home automation has some additional benefits such as flexibility, time savings, voice control and energy savings.

- Unlike traditional home solutions that still do not have Bluetooth or infrared control over the Internet, the Wi-Fi-equipped system allows users to control the product used from anywhere in the world.

- Users do not need to activate their phone's data connection using a safe house. The system does not work properly when Launch Pad is connected to Wi-Fi at home or work.

5. FUTURE SCOPE

- It is true that there were many problems with the previous application. IoT application in advanced, energy-efficient, and self-learning home automation is

the subject of this chapter. The main goal is to create and use smart, energy-efficient homes. The current model is designed to use a PIC microcontroller designed to control home appliances via the web. Because these devices are semi-automatic, they require user commands to operate. In HVAC and lighting, motion detection, temperature, etc. The

- CCTV or IP cameras with face recognition can be used for security, providing video directly to the user's smartphone and sounding an alert if no one is seen. Future applications will also include commands in multiple languages.

6. CONCLUSIONS

The system, whose main purpose is to reduce the number of employees, is also important for the elderly and physically disabled. This project allows us to control every device in every corner of our house from a single point without having to stand up and turn the device on and off. Since we use websites to access our devices, we can do this even if we are away from home and WiFi is available. The system works well and can be controlled wirelessly with great precision.

It will also represent a small improvement in the accessibility of today's technology for people with disabilities in the   community.

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