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SMART ROOM

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ABSTRACT

The main objective of this project is to develop a smart room using a Nodemcu (esp8266), Raspberry-Pi, Raspberry-Pi camera module and being remotely controlled by any Android OS smart phone with voice control. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. The current generation also has a number of security issue (such as theft etc), such kind of the problems should also be avoided. One of the solution to the above mentioned problems is a remote controlled smart room. The entire room including the security system can all be controlled using a single application. To achieve the home appliances, a relay board is interfaced to the Nodemcu at the receiver end while on the transmitter end, a IFFFT application which is connected to google assistant on the cell phone sends ON/OFF commands to the receiver .Then by voice control we can operate the electronic devices. A facial recognition is used for the security purposes. This gives the user complete control to control both the security system and the appliances in the room. The user can also monitor the activities going on in the room.

INTRODUCTION

Have you ever wondered about smart room which would give the user complete access of controlling tube lights, fans, electrical appliances and also the windows, doors and other security systems at home using a remote control? Off-course, Yes! But, are the available options budget friendly? The answer is Yes, and we have found an app to achieve it. We have come up with the idea of a smart room which mainly uses Nodemcu (esp8266), Raspberry-Pi.

The user will have complete control of both the security system and the electrical appliances in the room. The things the user can do is switch on/off the electrical appliances, monitor the activities going on in the room. This is a much efficient method which not only reduces the burden of the user but also help in time management.

HARDWARE USED

- Nodemcu wifi module(esp 8266)
- Relay board
- Power source(9V Batteries)
- Leds
- Connecting wires
- Smart phone(connected to internet)
- Raspberry pi
- Raspberry pi camera module

NodeMCU (ESP8266)

The NodeMCU(Node MicroController Unit) is an open source software and hardware development environment that is built around a very inexpensive System-on-a-Chip called the ESP8266. The ESP8266 contains all crucial elements of the modern computer: CPU, RAM, (wi-fi), and even a modern operating system.

The NodeMCU aims to simplify ESP8266 development.
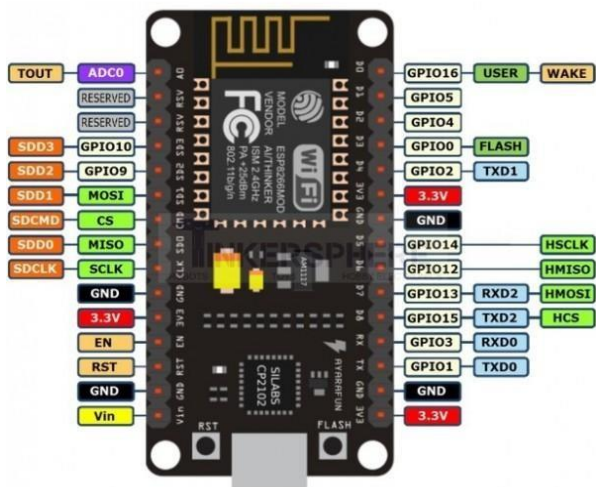
It has two key components.

An open source ESP8266 firmware. The firmware provides a simple programming environment based on eLua.

A development kit board that incorporates the ESP8266 chip on a standard circuit board. The board has a built-in USB port that is already wired up with the chip, a hardware reset button, Wi-Fi antenna, LED

lights, and standard-sized GPIO (General Purpose Input Output) pins that can plug into a bread board.

RELAY BOARD

A relay is an electromagnetic switch. It is activated when a small current of some microampere is applied to it.
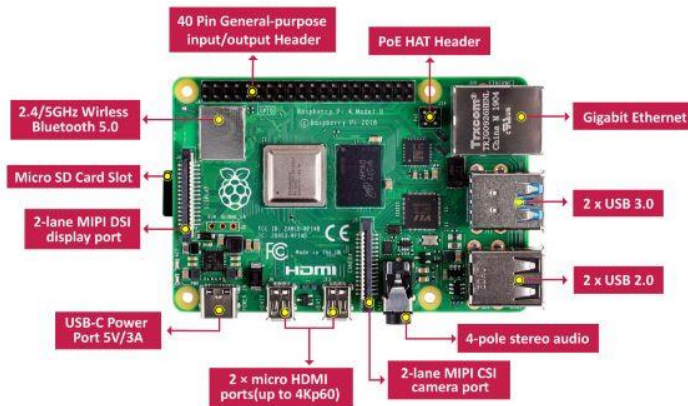

Normally a relay is used in a circuit as a type of switch, an automatic switch. There are different types of relays and they operate at different voltages. When a circuit is built the voltage that will trigger it has to be considered. In this system the relay circuit is used to turn the appliances ON/OFF. The high/low signal is supplied from the NodeMCU microcontroller. When a low voltage is given to the relay of an appliance it is turned off and when a high voltage is given it is turned on. The number of appliances can be modified according to the user's requirements.
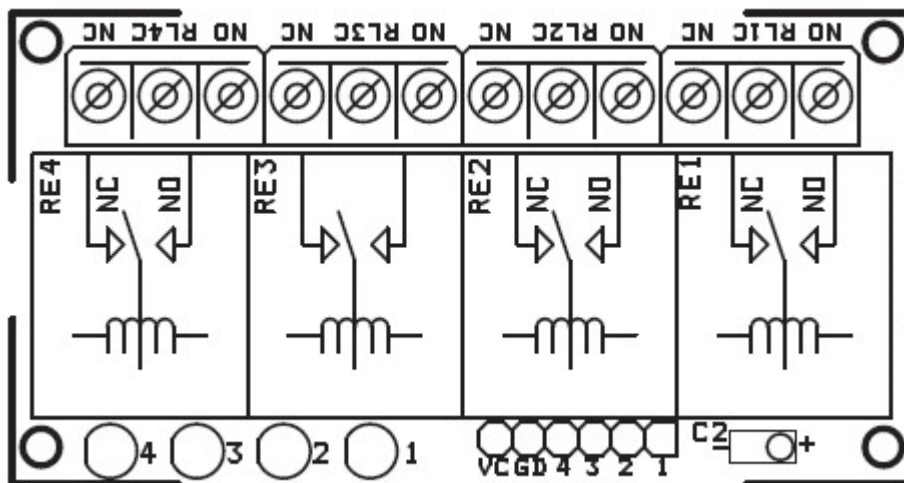
Raspberry pi

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games. Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras. We want to see the Raspberry Pi being used by kids all over the world to learn to program and understand how computers work.
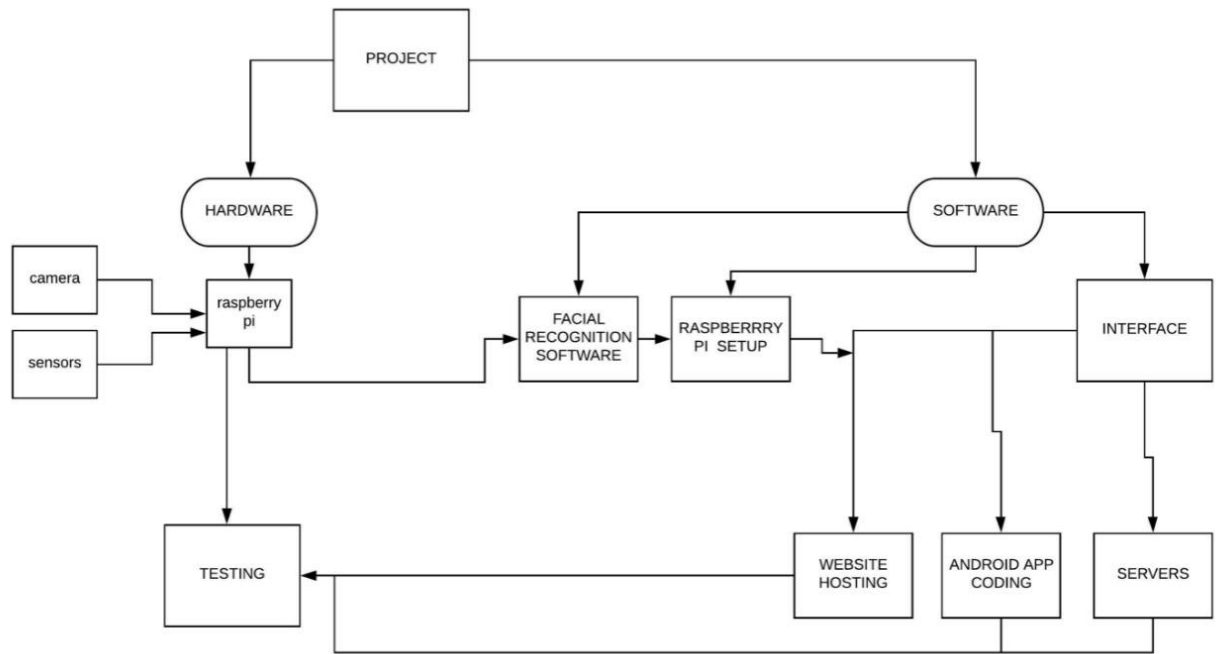
PROJECT MODULE
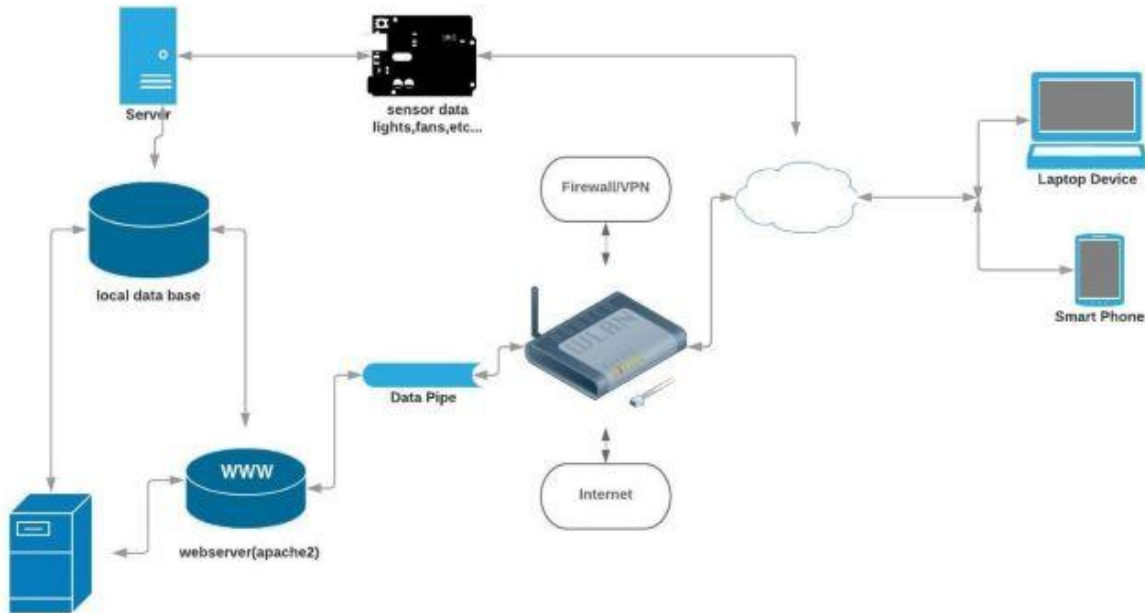
Explanation:

The project mainly consists of two parts the hardware and the software. The hardware parts consists of connecting the camera module and the sensors to the raspberry pi. The software part consists of Raspberry pi setup, facial recognition software and interface.

The brief procedure of our project is given in the below figure.

APPLICATIONS AND FUTURE DEVELOPMENT

Any day-to-day, repeatable process is automatable with smart home applications. The greater the control and flexibility of these processes, the more energy and cost savings the resident experiences, which are factors anyone who pays utilities strives to moderate. The smart room revolution is likely to be more of an evolution, with the incorporation of one or two home systems at a time, gradually automating our households through smart mobile devices.

> ➢ Using this project we can turn on or off appliances through voice control
> ➢ This module saves electricity when compared to the usual one
> ➢ No physical contact with the switches is required. This reduces risk of electric shocks.
> ➢ You can control the electrical appliances in your home from anywhere in the world.
> ➢ You can monitor the house or office or any other building from anywhere in the world.
> ➢ You will get live stream surveillance data.
> ➢ The project can be further expanded to a smart home automation system by including some light sensors, safety sensors, temperature sensors etc. and automatically adjust different parameters like room lighting, air conditioning, door locks etc. and transmit the information to your phone.
> ➢ You can control the entire house/office or any other building (even open/close the door, temperature adjustment and many more things) using your voice or by a smart phone app

CONCLUSION

The smart room system is has been experimentally proven to work satisfactorily by connecting sample appliances to it and the appliances were successfully controlled from a smart phone with voice control or with an app.

We learned many skills such as arduino coding, application designing and other tools that we use for this project and we are able to work together as a team during the project

Hence we can conclude that the required goals and objectives of smart room system will be achieved. The system design and architecture were discussed. The prototype will present the basic level of home appliance control, remote monitoring, surveillance, face recognition. Finally, the proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems.