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Google Assistant Controlled Home

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Abstract: This paper proposes IOT based home automation using Raspberry Pi, IFTTT (If This Then That), particle.io and Google assistant. Technology is developing day by day and gone crazy these days. We are rarely finding a house without home automation. Automation means controlling various devices by using smart technology. This home automation term is innovated by Jim Hill and became popular all over the world, but smart installation needs extreme investment. For smart home basic setup cost is nearly Rs 20000, for smart lights controlled with Google assistant, Siri etc., it costs nearly Rs3500. So, in order to make cost effective are making conventional appliances in a house into smart ones by using IOT technology. This Project main intention is to control home appliances such as fan, indoor and outdoor lights etc., automatically by using IOT technology. This project is implemented by giving voice commands to the Google assistant with the help of IFTTT (If This Then That) application and Particle.io platform the given commands are sent to the raspberry pi board. The Raspberry Pi is a microprocessor process the data inside it, these instructions reach the relay and based on user request the relay turns on/off the home appliances.

Key words:-Home automation, Raspberry pi, IFTTT (If This Then That) web service, Particle.io platform, Google assistant, Smart phone, Relays.

1.Introduction:-

Home is a place where people stay comfortable and feel relaxed. People who used to go for a work gets exhausted after a long-tired day and some are way too tired that their find it hard to move once they land on their bed. So, any technology which helps them to get their work done like switching lights on/off by giving simple voice commands from their smart phone would be more helpful to them. Now adays people are interested to buy smart lights and thermostats which can be controlled by google assistant through voice commands so that it will make their work relatively easier. Even though these technologies are available it is mostly used by rich people because of high cost. However not everyone is wealthy enough to bear the cost of devices. So, in order to help the normal people, the need for developing an inexpensive smart assistance keeps growing.

So, in this project a developed smart assistant is build which can help even normal people also. This project works with the principle of IFTTT (If This Then That), Particle.io platform, Google assistant and group of relays. The communication between apps and microprocessor is built through internet.

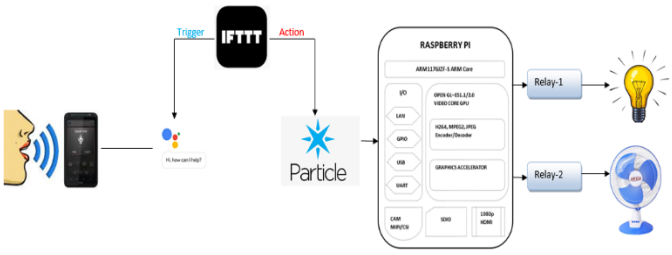


Fig:-1 Block Diagram

2.System Design and Implementation:-

The system design composed of two things i.e., software and hardware.

Hardware:- This system hardware has the capability of connecting to the LAN network, which is used to turn off/on the home appliances like fans and lights. It is also called as Control Unit.

Software:- IFTTT, Particle.io and Google assistant comes under software configurations which are connected with smart phones.

Control Unit consists of microprocessor Raspberry Pi, 4 channel Relay board. IFTTT installed on android mobile communicates with the Raspberry Pi and sends the signals required by the user through internet. The Raspberry Pi Board digital output pins are connected to the Relay board.

2.1 Raspberry Pi:- Raspberry Pi is a Single Board Computer. It can be connected to the peripherals like keyboard, mouse, display so it is also called mini personal computer. This is developed in UK by Raspberry Pi foundation to provide teaching of computer science in schools. It is mostly used for real time image processing or IOT based and Robotics applications. Although it is slower than desktop, but it is still a computer which has the ability to do all expected features at low power consumptions.

Raspberry Pi is ARM based Broadcom Processor System on chip device which will provide access to on chip hardware like we will GPIO pins for building a application. Through GPIO pins we can connect and control devices like LED, motors, sensors, etc.,

The CPU speed of Raspberry Pi model ranges from 700MHz to 1.2GHz. The Different types of Raspberry Pi models are Raspberry Pi 1 Model A, Raspberry Pi 1 Model A+, Raspberry Pi 1 Model B, Raspberry Pi 1 Model B+, Raspberry Pi 2 Model B, Raspberry Pi 3 Model B, Raspberry Pi Zero.

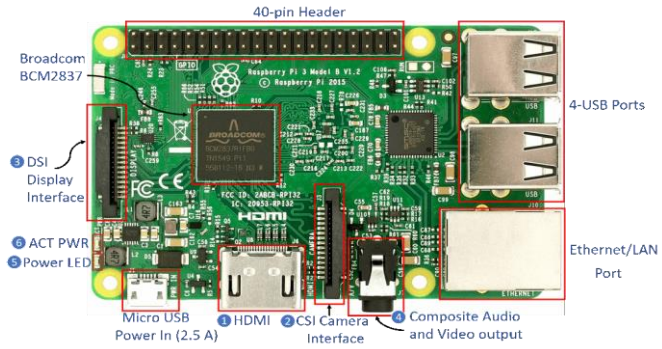
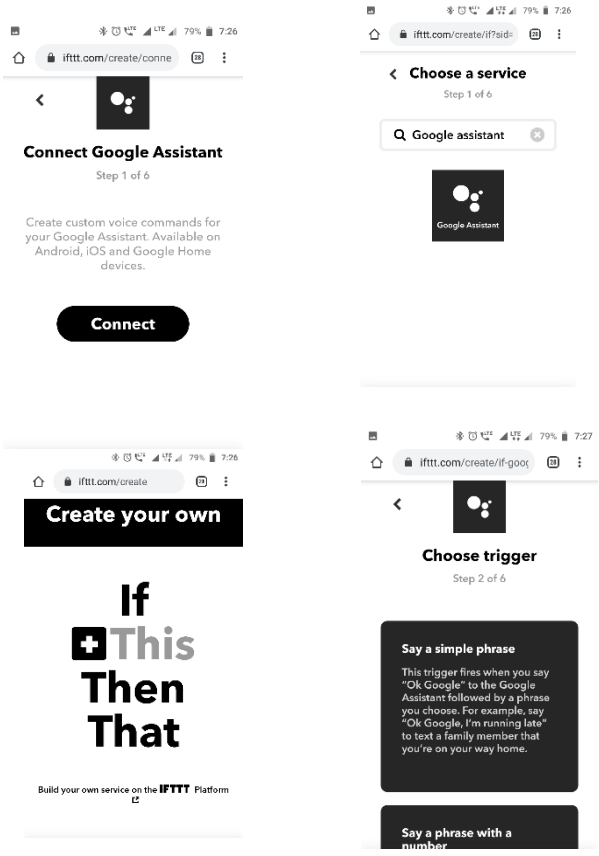


Fig:-2 Raspberry pi Board

2.2 IFTTT:- IFTTT (If This Then That) is a web-based service developed by Linden Tibbets and Jesse Tane launched on 2010. Their introduced this with a slogan "Put the internet to work for you". IFTTT is mainly created for automation from web-based application, services to app enabled accessories and smart mobiles. IFTTT name derived from a programming statement like If this, then that. In IFTTT 'If' is known as Trigger and Then is known as action. The whole If This Then That is known as Applets. IFTTT is accomplished through this Applets itself.

Hence there is need to log in to it to use the services of IFTTT. In this project Google Assistant acts as triggering point and we need to give commands in simple phrase, so that whenever we give voice commands through our smart phone the Google Assistant respond to it and control Relay by switching it on/off accordingly. For action we are using particle.io platform where we installed on raspberry pi terminal and dump program to raspberry pi through it. Whenever we flash the program in particle.io platform and give commands to the Google Assistant the Relays are triggered according to user.



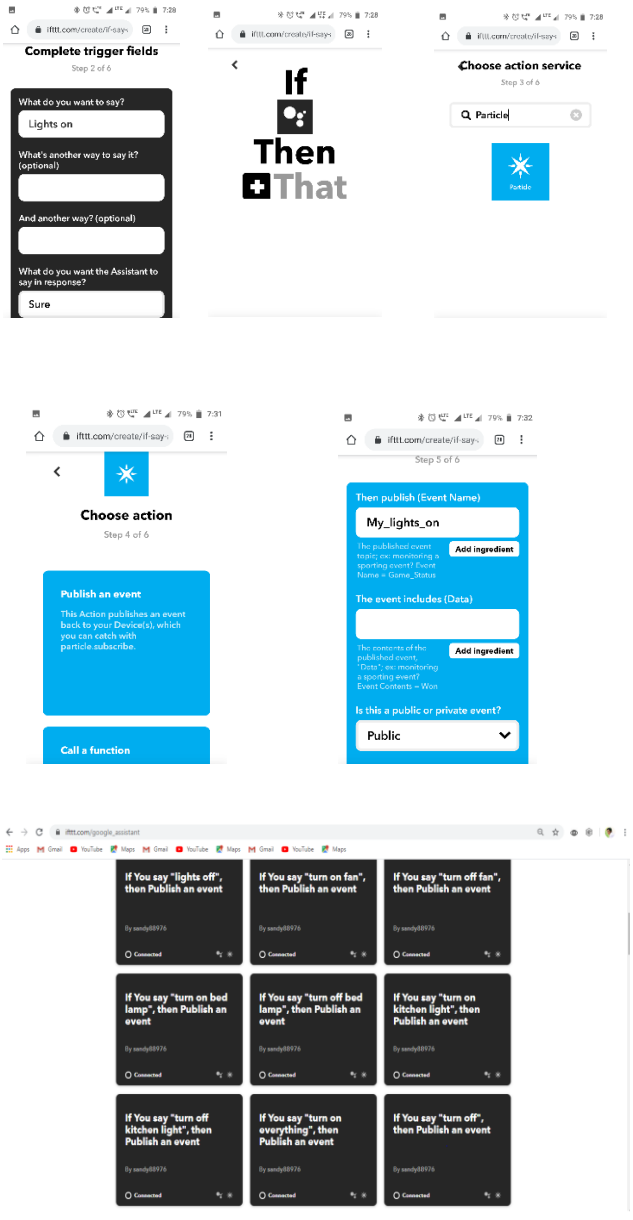


Fig:-3 These are the screenshots of applets created in IFTTT

2.3 Particle.io:-Particle is an IOT based platform made us to build a interface between apps, services and devices quickly and easily. It will provide an easy way to connect our staff to Internet. Particle platform provides everything that helps to provide a bridge between application and devices to work like a smart home. All particle devices are accessed to cloud services So the user can control its devices through everywhere. It provides a gateway to the devices and the web. It became recognized because of its security and Robust technology. Because of its advanced features it became different than other IOT platform like Thing Speak, Blynk, etc. Now Particle platform added Raspberry pi to

2.4 Relay:- Relay is electromechanical switch which will turn on/off the device automatically when current flows through it. Relay is mainly used for controlling high power devices by a low power signal and low power devices can be controlled by high power signal. The voltage capacity of relay is 5V-250V and maximum current is 10A. Raspberry Pi cannot be connected to the high-power devices directly, so it is connected to the relay.

Fig:4 Relay

Com:-Common pin of the relay is connected to one end of the device load that is needed to be controlled.

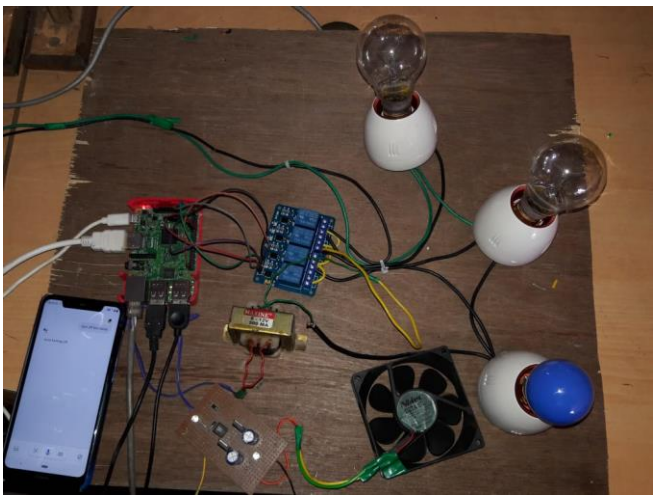
VCC:-To VCC pin of relay Raspberry pi 5V supply is given.

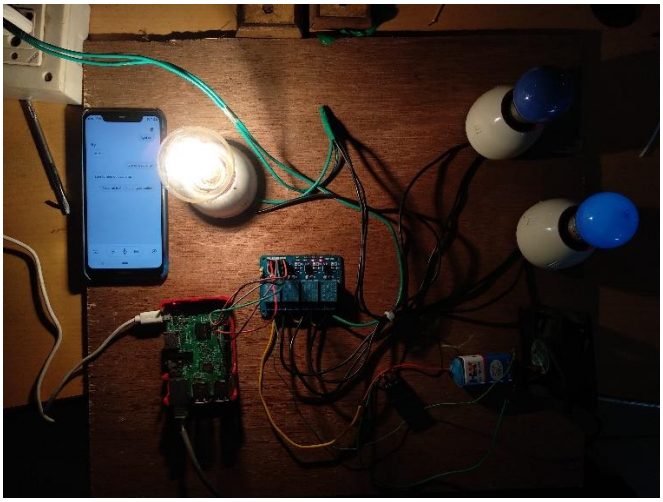
IN:-To IN pin the assigned GPIO pin of device is connected

2.5 Google Assistant:- Google assistant is AI (Artificial Intelligence) based virtual assistant build by google and made it to available on smart phones and smart home devices. It is an extension to the Google Now designed to be personal by using existed Google voice controls named 'Ok Google'. Google Assistant will support both text and voice entries from the users and it respond to everything and will make a conservation with you. Now Google Assistant is playing a vital role in controlling smart home. With a simple voice we can control home appliance like lights, fans, thermostat etc. Hence in-home automation google assistant is preferred for easy access to control home appliances.

Result:-

The result got positive and system respond well to the input commands and got output respectively. The below figures show the implementation of proposed system





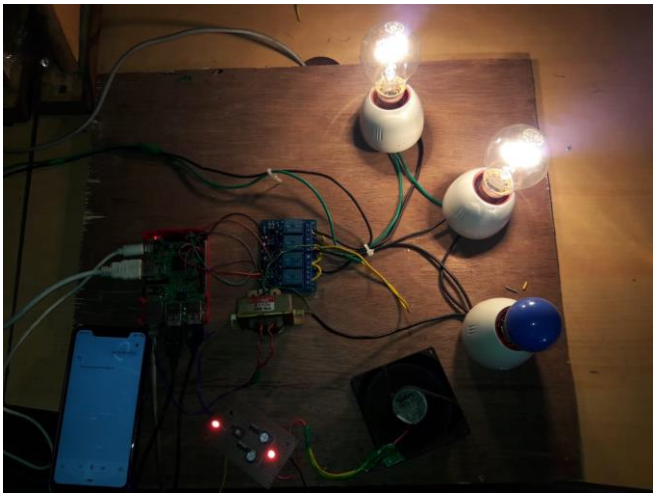


Fig:-5 Results of the proposed project

Conclusion and Future Work:-

The main aim of this project is to make a cost-effective voice controlled automated home which can control home appliances found in our home both electronically and electrically. It is very effective, secured and easy to handle for all people and make their life more comfortable and simpler. The designed system works in a way that when a person gives command over a smart phone to turn on/off appliances through IFTTT, then IFTTT trigger the google assistant and make particle.io platform to perform the action, the particle agent runs in the background of Raspberry Pi terminal and make Raspberry Pi board to control home appliances through relay according to the users command.

The future of home automation is expanding day-by-day, from here on it will get more better and powerful. In future a greater number of devices can be connected to it which will make it more effective. So, there is always a scope in technology to improve in future and in present scenario as the technology is changing day by day, there is no doubt that it will only improve from here on.

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