Multiple Device Automation using Google Assistant

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***Abstract*— This paper deals with the design and implementation of a Raspberry Pi device with the help of Google assistant based home security system which uses the heart of the system was Raspberry pi and PIR sensor. The system was designed to assure home security through surveillance. The device depended on PIR sensor associated with a coordinated circuit for the generation of a voice input. HDMI transmits pictures and recordings to a showing screen which spares this data and sends an alarm to a predefined mail beneficiary. Raspberry pi is answerable for the activity and control of movement. Locators and Pi camera, then again, sense development and give observation and stream live video or record events for later playback. The sensor sees Infrared Radiations (IR) produced from people inside their field of view at that point gives an advanced yield. The yield was applied to the IC creating endless supply of human interruption. The structure additionally gave the quantity of people situated, with the assistance of a Passive Infrared sensor. When PIR Sensor recognizes movement, the camera consequently starts recording and Raspberry pi device cautions the proprietor of a potential interruption having a presentation on the screen and sending an email alarm to a predefined email address. The system is modest, and its electronic security system is profoundly secure.**

Keywords— Home automation, Raspberry Pi, PIR Sensor, Pi Camera, Google Assistant.

I. INTRODUCTION

At the point when home automation was first presented during the 1970s, it had neglected to improve the way of life of its clients because of a few reasons. Right off the bat, it was difficult to decide the financial advantages of home automation advancements. Furthermore, the impacts of introducing savvy home innovation must legitimize their expenses. Home automation advancements are required to be savvy, easy to use, simple to introduce and adaptable with different system framework and apparatuses. A keen individual associate is equipped for sorting out and keeping up data and furthermore overseeing messages, documents and schedule occasions. Some close to home colleagues can give data dependent on voice sources of info or orders.

Motivation behind this gadget is to diminish the exertion placed in by the client to control a device physically. This framework utilizes Google Assistant SDK gave by Google, to speak with the Raspberry Pi and the clients. The clients provide voice orders to the device to control the machines in their home, change in temperature of the indoor regulator if accessible, converse with the Google Assistant to get consistent data and news, and furthermore use it to interface with the keen lights and shrewd TVs to utilize Chrome cast or some other brilliant tech.

II. LITERATURE SURVEY

Table I

Sl. No	Title	Technology Used	Result
1	Design of an Intelligent Voice Controlled Home controlled System.	Arduino Uno Micro controller,HC-05 Bluetooth module.	Automation using voice command via arduino.
2	Novel and Latest home automation system	Used different types and series of microcontrollers with efficient sensors	Mainly it protect from different automation like sensing, gas, humidity.
3	Voice Controlled Home Automation	RaspberryPi, Webcam, Microphone	Here speech signal does the control the system with microphone
4	Android Based Home Automation using Raspberry Pi.	Raspberry Pi, Zigbee, GSM, PIC.	The communication protocol is Zigbee and GSM for raspberry pi.

TABLE I : Shows the comparison of Technology used.

III. SYSTEM OVERVIEW

A.Raspberry Pi:

Raspberry pi is a progression of little, Master card estimated PCs of minimal effort created for PC instruction in UK. PI is accessible on different variants. Here the Raspberry Pi-3 model B utilizes a Broadcom BCM2837 system on-chip (SoC). The speed of the processor ranges from 0.7GHz to 1.2 GHz and it varies in different arrangement of Pi. The working framework is put away on Secure Digital (SD) card. The Board contains four USB 2.0 ports for powerful activity. HDMI is utilized for video yield with fundamental 3.5mm sound jack. It has 40 GPIO pins to control things on run time. It has quad center ARM Cortex-A53 CPU and supports organizing through Ethernet, 802.11n locally available Wi-Fi and Bluetooth.

Fig 1. Raspberry Pi module

B. PIR Sensor

The advancement target is to have a minimal effort security framework for home applications. The framework utilizes little PIR (Pyroelectric Infrared) sensor worked around a microcontroller. The microcontroller human movement by identifying infrared radiations from a human body. Underneath shows the square graph; Source of intensity must be dependable.

The home security framework utilizes wires to make associations between the focal controller and gadgets essential for observation and home security. These gadgets incorporate the cameras, sensors, video shows, keypads, movement finders, camera switches and speakers.

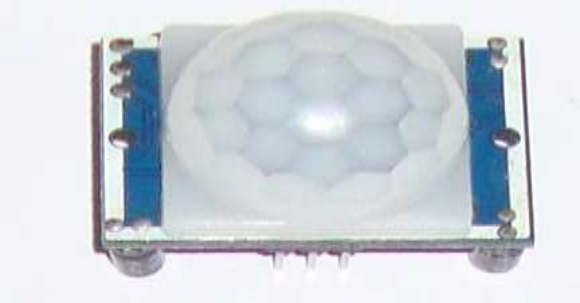

Fig 2: Pi sensor

C. IR Sensor

IR exhibits join a lattice of IR sensors to frame cluster indicators. As the name proposes the sensor signals are given as a grid, where every component of the framework relates to one IR sensor. Example acknowledgment calculations can distinguish individuals moving over the sensor's view at an asserted exactness of 95%. This remains constant regardless of whether two person on foot's ways cross, or individuals stroll in equal. IR exhibits give a financially savvy arrangement and furthermore work with no encompassing light source. IR clusters are generally utilized in business frameworks.

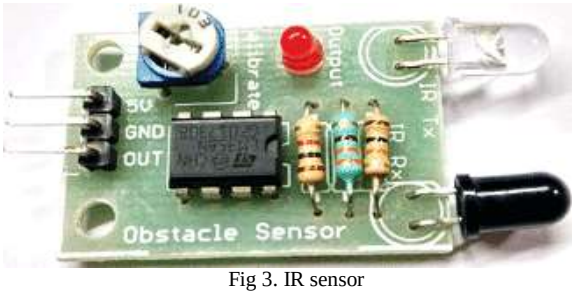

Fig 3. IR sensor

D. Servo Motor SG-90

Depiction the SG90 scaled down servo is lightweight, high-caliber and extremely quick. The servo is intended to work with practically all the radio control frameworks. It is with brilliant execution and high torque of 1.5kg cm gives you the opportunity to utilize it for an assortment of tasks. The SG90 smaller than normal servo with adornments is ideal for R/C helicopter, plane, vehicle, pontoon and truck use. Particulars:

Fig 4: Servo Motor SG-90

E. Channel Relay

Presentation this is a 4-Channel Relay interface board that permits you to control different machines, and other gear's with huge current. It very well may be controlled legitimately by Micro-controller.

Fig 5: 5V, 4 Channel Relay

F. Pi Camera

The device is empowered by bringing in and introducing the Pi camera from the Raspbian working framework. The Pi camera on the board is little with determinations of 5 MP which are expressly madefor the pi. The camera utilizes 250 mA; along these lines, an outside controlling of the pi is adequate for use in this observation framework. Raspberry pi empowers an arrangement of the edge to the quantity of pixels required for appropriate recognition of development by the pi camera. An expansion in the breaking point to 3000 pixels guarantees that the camera takes pictures just when a satisfactory development has occurred.

Fig 6: Pi Camera

IV. SOFTWARE USED

A. VNC SERVE:

This Guide discloses how to utilize VNC 5.x remote access and control programming from Real VNC to interface two PCs over a system and assume responsibility for one (the host PC) from the other (a customer PC), regardless of where the two are on the planet, or contrary qualities they may have in stage, engineering, or working framework. VNC 5.x comprises of two segments: VNC Server and VNC Viewer. All the data in this Guide applies to associations built up between a customer PC running the most recent variant of VNC Viewer and a host PC running a similar form of VNC Server with an Enterprise permit.

B. IFTTT

It is shortened as though This Then That. It is a free electronic assistance for connecting other web benefits by restrictive explanations. Here it joins Google assistant with Adafruit IO.

C. Adafruit IO

It is a MQTT API (application program interface) that permits associating things over web. It's straightforward and interfacing takes around 80 bytes for association and 20 bytes for information membership. It very well may be run on a system.

D. Python

A deciphered language, Python has a plan reasoning which accentuates code intelligibility (eminently utilizing whitespace space to delimit code squares instead of wavy supports or catchphrases), and a sentence structure which permits software engineers to communicate ideas in less lines of code than conceivable in dialects, for example, C++ or Java. The language gives develops proposed to empower composing clear projects on both a little and enormous scope.

V. PROPOSED WORK

As we are utilizing the Raspberry Pi 3, we need to ensure that it is introduced with Raspbian working framework (Raspbian Jessie). We have to make an Amazon engineer record to get to the Google right hand voice administration. The Raspberry Pi 3 is sequentially associated with the screen. The discourse we offer is to be changed over in advanced structure utilizing a USB Microphone which is likewise associated with the Raspberry Pi 3. The Microphone perceives the discourse which we give and sends it to the Raspberry Pi board. The necessary data will be sent to the Pi sensor through a stage called Adafruit. To associate this Adafruit to Google right hand administration, we have an online assistance called IFTTT. As we know about the truncation, this shows Alexa voice benefits, that demonstrates Adafruit. A record is to be made in both IFTTT and Adafruit. The IFTTT account is to be associated in the Adafruit. The Pi sensor is associated with Adafruit utilizing the key AIO which is created in the Adafruit account. The mentioned yield is produced at the Pi sensor. The Pi sensor is associated with the hand-off board and the transfer board changes to the mentioned yield i.e., machines. A similar procedure is proceeded until the working of Pi sensor for the line following robot. The Pi sensor is associated with the Motor driver board just as the IR sensors with the assistance of GPIO and VCC sticks in the Pi sensor. The IC is associated with the battery and the engine. The engine capacities utilizing sensors as for the orders from the Pi sensor.

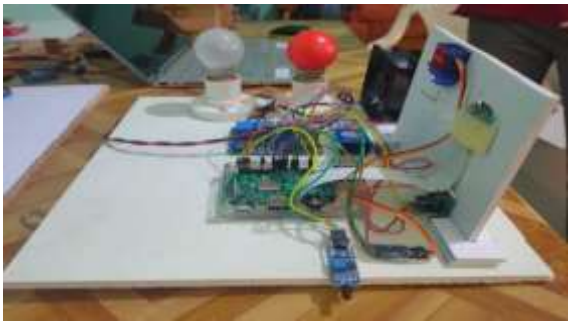

Fig 7: Implemented home automation system

Fig 8: Picture movements and detection

Fig 9: Turn on the light and turn off the light

Fig 10: Turn on the light and turn off the light

Fig 11: Messages received in the mobile for switch on the light and off the light

Fig 12: .Fire detection observations

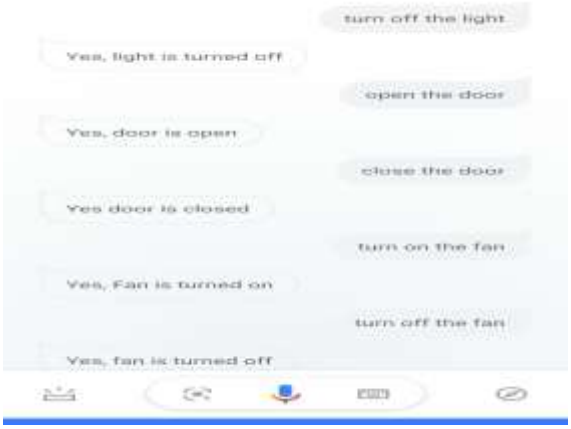

Fig 13: Google assistant response displayed with all home automation functions

CONCLUSION

This paper covers most critical component, in which it could give the absolute sharp home condition. The voice controlled home automation using Raspberry Pi is proposed to serve straightforward use and control of gadgets by old and debilitated people. This endeavor gives a fundamental course of action of home automation which can be easily completed and used effectively. This system license customer to take decisions and to coordinate the home mechanical assemblies with the Google help of an android application , thus making one's life pleasant and all the while remotely open through adaptable gadgets like android telephones.

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