Voice Based Home Automation using Raspberry Pi and Echo-Dot

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Abstract:
Internet of Things (IoT) involves collaboration different devices to achieve efficient home automation. Smart home automation is a system that has the technology to control devices automatically in order to meet the attributes like security, comfort and efficiency. The Virtual instrument such as Google assistant acts as a voice recognizer in this system. Raspberry Pi, a tiny, affordable computer is used to automate the home appliances such as lights, fan, and motor using the user's voice commands. The work process involves installing Google assistant on Raspberry Pi and programming it with the set of commands in a customized manner. In addition to this, by including a security device such as web camera and telegram, the user gets an alert regarding the unknown person in the home. The user gets the video message about the detected person and can authenticate to unlock the door using telegram.

Keywords: Google assistant, Home automation, Human detection, telegram, Voice command, Web camera.

I. INTRODUCTION

Home automation is automation of home, household activity or house work. With internet and Wi-Fi technologies these may include centralised light control, heating, air conditioning, ventilation, security locks and in home appliances like fan, motor, television, etc by voice commands. a single complete system to control home appliances by voice and to provide security to home is a must-demand. This system mainly focuses to provide a low scalable and an efficient home automation along with a secure door unlocking mechanism. The current buzz of technology is IoT in home. By connecting the Raspberry pi to internet and relays, home appliances can be controlled by voice commands. And by connecting Raspberry pi to internet and PIR sensor secure door unlocking mechanism can be achieved. Hence, with Raspberry pi and internet, a smart voice based home automation can be accomplished.

II. LITERATURE SURVEY

Title: Smart Home Automation System using IR, Bluetooth, GSM and Android.
Author: Anuja shinde, Shoba Kanade,
In this paper a home automation system that uses IR remote, Bluetooth and GSM to control AC appliances using android app is introduced that is easy to use over the traditional method of the switch. Therefore, the motivation behind the development of this system is to let people know about these technologies, and make the system as simple as possible for an ordinary person to understand. The result of this research is the implementation of home automation system which involves control and automation of home appliances through mobile application from remote locations.
Disadvantages: Processing time is more.

Title: Super Secure Door Lock System for Critical Zones
Author: Meera Mathew, Divya R S
The main objective is to design and implement a digital security system which can deploy in critical zone where only authorized person can be entered. a secure door locking system with two-factor authentication and multiple encryptions using RFID, which can activate, authenticate, and validate the user and unlock the door in real time for secure access has been proposed.
Disadvantages: Vulnerable to power outages as the systems are battery operated.

III. EXISTING SYSTEM

TITLE	ABSTRACT	YEAR
1. Smart Home Automation System using IR, Bluetooth, GSM and Android.	The implementation of system involves control and automation of home appliances through mobile application from remote locations. Uses IR remote, Bluetooth and GSM to control AC appliances using android app.	2017
2.Arduino Based Door Unlocking System with Real Time Control	The system proposed is a door unlocking system containing multiple doors any of which can be used to access a critical zone e.g. a laboratory or library. The system is implemented using a central server which contains a central database gathering all information about the authorised personnel.	2016

IV. PROPOSED SYTEM
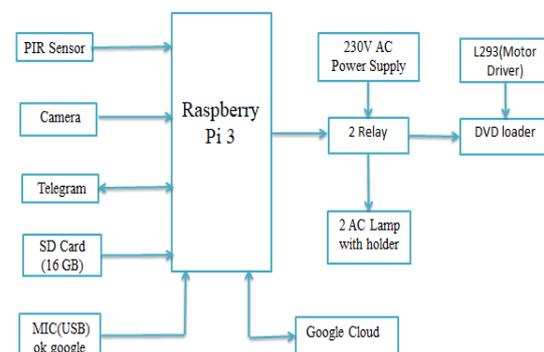
In our proposed system home appliances can be controlled using raspberry pi and Google assistant which is cost effective and useful for elderly people living alone in their houses. The ultimate motive of the system is providing a sophisticated and efficient automation of home appliances by voice commands. The users command is directed to the Raspberry pi which in turn actuates the relay to switch ON/OFF the home appliances. In addition to this web camera and telegram is integrated to Raspberry pi to build a secured home. Software is implemented in Raspberry Pi which allows PC get connected to camera via Raspberry Pi to watch for movement when the human motion is detected by the PIR sensor. The web cam is used to capture the video and sent to the authorized user through telegram application. The user can authenticate to unlock the door with the help of the pop-up message which is displayed at the end of the video.

Motion Detection Work flow:
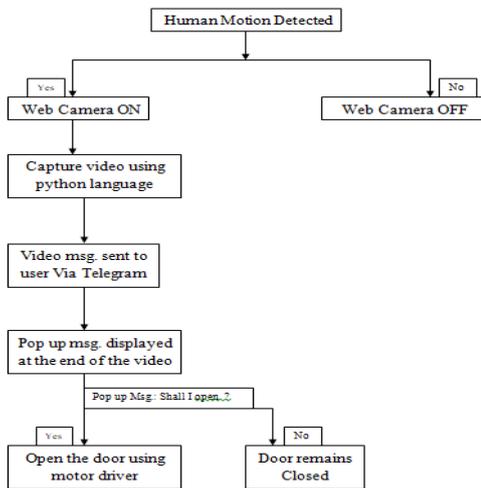
REQUIREMENTS

The hardware requirements are listed below:
- Raspberry pi 3
- PIR sensor
- Relay
- 2AC Lamp with holder
- Web Camera
- L293(Motor Driver)
- DVD Loader.

Similarly, the software requirements are listed as follows
- Open CV
- Raspbian OS
- Python
- Telegram

V. DESCRIPTION

Raspberry Pi 3: Raspberry Pi is the low cost computer that runs Linux, but it also provides a set of GPIO pins that allow you to control electronic components for physical computing and explore the IOT. The central core part of whole proposed system. It is used to get command (user's voice) via USB Mic. According to the commands, it control the appliances connected to it on the output port.

**PIR sensor:** A device used to detect motion by receiving infrared radiation. When a person walks past the sensor, it detects a rapid change of infrared energy and sends a signal to make the camera begin to operate.

Webcam: A webcam streams its image in real time when "captured" by the Raspberry pi3, the video stream may be viewed or sent on to the user through IoT application.


L293D: The L293D is a monolithic integrated four channel driver. It accepts standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors.
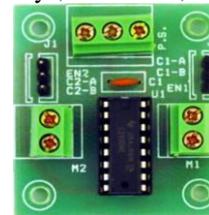
Open CV: A library of programming functions mainly aimed at real-time computer vision acquired by Intel. The library is cross-platform and free for use under the open-source BSD license. The algorithms in open CV can be used to detect and recognize faces, identify objects, classify human actions in Video, track camera movements to produce a high resolution image.

VI. METHODOLOGY

Voice Based Home Automation:
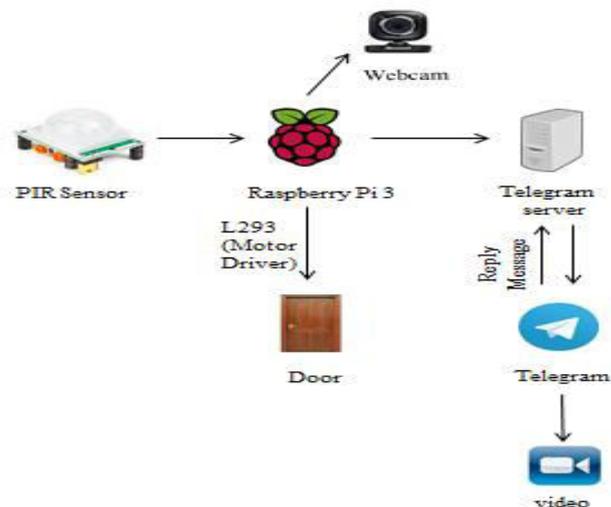
1. The system is initiated by installing a Google API on raspberry Pi
2. Raspberry pi recognize the command specified by the user and sends the response to Google server.
3. The command is redirected to the GPIO ports of raspberry pi to activate the relay.
4. Relay is connected to the home appliances which can be controlled by user command.

Motion Detection Domain:
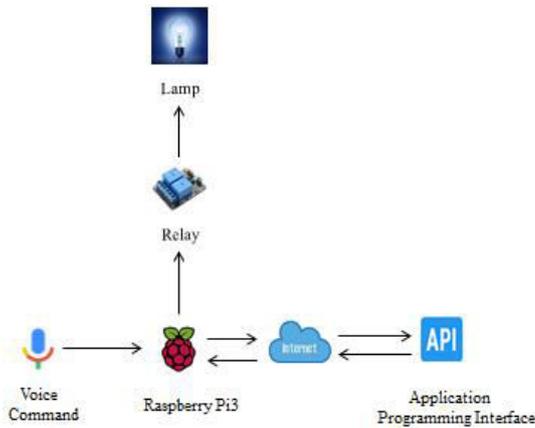
1.   PIR sensor detects the human motion by sensing UV radiations
2.   It sends the response to Raspberry pi.
3.   Raspberry pi is initiated and camera starts to record the   environment.
4.   The recorded video is sent to the authorized user through telegram app.
5.   The response of user is redirected again to Raspberry Pi through the telegram app.
6.   According to the command given by the user the door will be opened or remain closed.

VII.   CONCLUSION

•   The project proposes an idea of ideal smart home.
•   Our smart home contains wireless connection between sensors and actuators.
•   Telegram, Virtual assistant are the main technological advances used in this project.
•   The wireless camera is incredibly easy, requires little time, and allows you to angle the cameras in whatever direction you choose.
•   Voice based home automation and wireless cameras for motion detection come with an increased amount of flexibility.

VIII. REFERENCE

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