

Voice Controlled Home automation

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Abstract— Now-a-days we are expected to achieve a lot more in a limited amount of time. Thus our project aims to help by using Home Automation System which can be controlled via voice. We will be using Jasper software for voice recognition. The software will recognize the voice command given at the microphone and will generate according data. The pi will use this data in the code to produce according output. Thus the various devices will be controlled through voice. Also in addition we have designed a code which will automatically switch on/off the devices according to schedule of the user.

Index Terms -Home automation, Raspberry pi, Jasper.

internet so your personal information is safe. The recognition is performed offline. Disadvantages are that it does not have a very high recognition rate and it has a lot of dependencies.

1 INTRODUCTION

It often happens that we might forget to put off a light or a fan in another room. That is why, we have created a way in order to put all the appliances off/on without touching the switch this will require the pi to enable or disable the switch depending on the voice command. Also we have designed a code to run and synchronize the on and off time of the devices based on the schedule of the owner.

Main Components:-

Raspberry pie:

Raspberry pie is a microcontroller which contains raspbian as an OS which executes the code to give us the desired output. We are going to use to Raspberry pie 3 model b which has 1gb ram, wireless LAN and Bluetooth 4.1 installed already. It is interfaced with raspbian into the external RAM provided using the memory card. Here the main programming language is python which is programmer friendly and is very memory efficient too. Raspberry pi is used instead of Arduino because of Arduino's limitations on interrupts and processing speed.

Relay Switch:

Relay switch is a device which is used to switch on/off the particular device according to the code or the voice commands. We use a relay as it uses low power to move an armature that is able to switch a much larger amount of power.

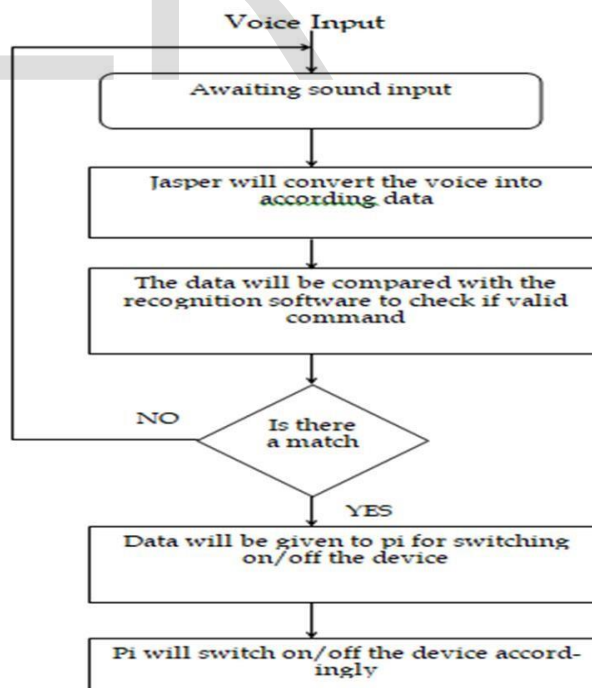
Voice control module:

We will be using Jasper software for voice recognition of the commands given at the microphone used. The jasper software will use pocketsphinx for further processing. Pocketsphinx is an open source speech decoder. Advantages are that it is quick and is developed especially for android and embedded systems like the Raspberry Pi. It does not transfer microphone data over the

2.1 Proposed idea

The microphone will receive the voice commands given from the user. Jasper will use the recognition software in this case Pocketsphinx a STT engine used to produce according data. This data will be given to raspberry pi which will switch on/off the devices with the help of a relay switch. Thus home automation will be implemented using our voice. In addition, we have also designed a code based on the working schedule of the user. Based on his/her usage of the appliances on each day the data will be used to automatically switch on/off the devices for that interval of time.

2.2 Flowchart



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Paper name	Authors	Year	Work done
Email interactive Home automation system	Sirisilla Manohar and Mahesh Kumar	2015	Worked on Wireless Sensor Networks (WSN).They concluded that WSN can have combined sensing, communication on a single unit making it possible to use a device with wireless communication on and computation.
Implementation of Internet Things for Home Automation. International Journal,	Khatu, M., Kaimal, N., and Jadhav, P	2015	Had a vision to maximize automation by ways of low cost sensing system. They mentioned it would create a relay of machines minimizing human intervention with ease of access using remote devices
Android Phone Enabled Home Automation. Journal of Academia and Industrial	Vidyasagar, K., Balaji, G., and Reddy, K. N.	2015	Making app for automation of appliances individually.
Smart Home Automation control Using Bluetooth and Gsm	Anandhaval, D., Mubina, N. S., and Bharathi,P	2015	It is useful in notifying in cases of keeping the appliances on when not needed eg : fridge
The framework of Home remote Automation	Akbar Satria et.al	2015	Using arduino microcontroller AT- mega Measuring tool power and Ethernet shield. The device is activated with the support of a 5V AC power supply which is converted to DC. The device can then communicate to a smart phone using the Internet.This enables the user to control the device using his phone.
Energy Switch: a Home-Automation System for Renewable Energy Self-Consumption Optimization	Daniel Sora	2015	The use of simple electromagnetic relay with just a coiled of wire tightly wound around a soft iron core calculating when to switch on/off based on the flux.

Jasper:

Jasper is an open source platform used for creating voice controlled applications. Together with some hardware Jasper provides always-on tool which you can ask questions or can be applied to control your home with your voice from several meters away.

Jasper’s design was specifically tailored for the Raspberry pi (Model B). It requires a USB microphone or any other input hardware should be connected to Raspberry Pi. An internet connection is needed for logging in to the Pi from computer during the software installation.The profile created by Jasper uses information to customize responses of Jasper modules. For example, taking accurate notifications of weather of your area/locality,time zone details, etc. Profile data is private and not shared with third parties unless configured otherwise. Profile, mic, and conversation instances are created by jasper.py. Mic and profile take conversation instance as input based on which notifier is created. All interactive components are loaded into memory.After downloading the necessary modules and contents, we wont be needing an internet connection to run jasper.

Speech recognition within Jasper:

Jasper is applied to develop always-on, voice-controlled applications with Raspberry Pi. You can finetune such apps using out-of-the-box modules or write your own with a help of very simple interface for developers.To be able to understand what you say, Jasper still needs a Speech-to-Text (STT) engine. Jasper also needs a Text-to-Speech (TTS) engine to answer to your commands. Jasper aims to be modular and thus gives you the choice which STT/TTS engine you want to use. Depending on your choice, it may be required to install additional software. You can choose among several STT engines:

- 1.Pocketsphinx is an open source speech decoder. Advantages: lightweight and quick; developed especially for mobile devices and embedded systems like the Raspberry Pi; does not transfer mic data over the internet so your personal information is safe; recognition is performed offline. Disadvantages are that it is not having a very high recognition rate and it has a lot of dependencies.
- 2.Google STT is an STT engine designed at Google. Advantages are that it is very accurate and flexible over the speech recognition capabilities. Disadvantages are that the amount of speech processed per day is limited and that it always needs active internet connection.
- 3.AT&T STT is a speech decoding software developed by AT&T. Advantages are that it is low cost, highly accurate speech functionality via API having good vocabulary and grammar configuration. Disadvantages are that its commercial, always needs an active internet connection because recognition is performed online.
- 4.Wit.ai STT is another speech to text decoding software which is used by developers to work on various projects like

mobile apps, home automation and wearable devices.

Advantages are that it is stable and that it relies on the AI cloud services for processing text to speech transformations. It has customizable vocabulary and language, trains speech recognition algorithms via crowdsourcing. Disadvantages are that the recognition is performed online and thus needs a good internet connection.

5. Julius is an open source speech recognition engine.

Advantages are that it has high-performance and does not need an active internet connection. Disadvantages are that it is complex because you will have to design your own acoustic model.

We will be using Pocketsphinx from all the softwares specified, the reason being that Pocketsphinx is free and offline which makes it safe and cost-effective.

CONCLUSION

Raspberry Pi will switch the devices on&/off depending on the voice command. The code based on the schedule is able to automate the devices on/off making it convenient and time-efficient for the user.

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