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Voice Based Home Automation System Using Raspberry Pi

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Abstract: ***Voice Based Home Automation System using Raspberry Pi is the project which will be very useful for old age people and disabled people, basically for one's who cannot perform basic activities efficiently. It is the idea which corresponds to the new era of automation and technology. The main aim of the home automation system is to make life easier. Mobile devices are very common among everyone due to its user-friendly interface and portability features. In this project we aim to control electrical home appliances by android voice commands using Wi-Fi as communication protocol between Raspberry Pi and Android device. Raspberry Pi 3 becomes a better option for home automation via internet due to its feature of inbuilt Wi-Fi and Bluetooth.***

Key Words: Raspberry Pi, Android, Home Automation System, Voice, Ubuntu.

I. INTRODUCTION

In today's day to day life automation can play a major role. Automation makes thing simple. The main attraction of any automated system is reducing human labour, efforts, time and errors due to human negligence.[1] A Raspberry Pi is a credit card-sized computer which can be used for developing various applications.

Fig 1: Raspberry Pi

This project is based on Internet of Things (IoT). Internet of Things is a network of devices such as electrical appliances for connectivity which enables these devices to connect and exchange data. This project represents a flexible way to control devices. In this project we are working on an android application where a user will provide voice commands for controlling devices such as "Turn light on" which will be connected to raspberry pi and according to it the required process will work via Wi-Fi. MySQL database and PHP arerequired for connectivity. This automation can be used majorly not only in home but offices and hospitals also user can register and authenticate himself/herself in android device and after successful login can give the input commands and operate the devices. It also provides security from third party users. It allows controlling number of home appliances simultaneously. Python is used as the main programming language which is default, provided by Raspberry Pi. This system requires micro-SD card with an OS (Ubuntu Mate) for Raspberry Pi. Using this we can say a regular home is converted to smart home.

II. LITERATURE SURVEY

In this paper [1], The Home Automation System is done by Arduino Uno microcontroller and for the connectivity to smartphone HC-05 Bluetooth module is used.

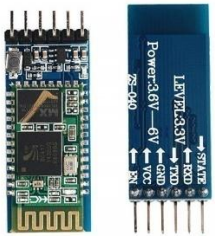

Fig 2: Bluetooth Module

Anothertechnology which is in this project is natural language processing which helps to control devices. Voice controlled Home Automation System influences the power of Arduino to provide a full voice-controlled automation system. With the help of NLP and the various hardware in mobile phone, it transmits voice to be used for controlling electrical devices.In this paper [2], Automation System based on ATmega328P by Arduino Uno. Various Sensors are used like Temperature Sensor (LM35), LPG Sensor (MQ5) which senses any leakages of LPG gases and Humidity Sensor (DHT11) which senses humidity also weather sensing is possible. Bluetooth module is used for connectivity HC-05module. The voice control system can be implemented

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with accuracy in voice recognition and better pitching analysis. More devices can be simulated and timer could be set for automatic operation..In this paper [3], Home Automation is done by voice recognition input to the raspberry pi. Voice command is given by the mic and a webcam is used as an input.

S. No	Table	Technology used	Result
1)	Design of an Intelligent Voice Controlled Home Automation System.	Arduino Uno micro controller, HC-05 Bluetooth module.	Automation using voice command via Arduino.
2)	Home Automation System Using Android Application.	ATmega328 P, Various sensors like LM35, MQ5, DHT11.	It helps in automation such as sensing humidity, temperature and LPG gas leakages.
3)	Voice Controlled Home Automation	Raspberry Pi, Webcam, Microphone.	It does the home automation by voice recognition; input is given by microphone.
4)	Android Based Home Automation using Raspberry Pi.	Raspberry Pi, Zigbee, GSM, PIC.	The communication protocol is Zigbee and GSM for raspberry pi.
5)	Voice Recognition Based Home Automation System for Paralyzed People.	Arduino, Voice recognition module V3, Microphone	It is used for paralyzed people for controlling bed and buzzers.

Table -1: Literature Survey Overview

The user could set a particular keyword which is given with the appropriate command for output. The AI present in the hardware will politely ask the user to speak the command after the keyword and will execute the command with audio acknowledgement. In this paper [4], Home Automation is done by the raspberry pi by communication protocol Zigbee and Global System for Mobile Communication (GSM). Zigbee contains too low bandwidth and GSM as comparatively high bandwidth. It is depending on Peripheral Interface Controller (PIC) which 8-bit microcontroller. In this paper [5], Home Automation system is controlled by Arduino with the main motive of providing an easier life for paralyzed people.

Fig 3: Voice Automation system connection

It uses Voice Recognition module V3 and microphone. The detected voice command makes system to switch the relay and change the direction of motor due to which jack lifts the bed up or bring back bed to lower elevation angle, turn on off the lights and sound the buzzer when disabled person need help.

III. SYSTEM ARCHITECTURE

The system architecture gives overall flow of the project and how system components are connected to each other and perform their role of work in this project. Raspberry pi is main technology used in this project. A 5v power supply is provided and passed through regulator so that it can be converted to 3.3v and provided to raspberry pi. The voice command is given as input to android device which is connected to raspberry pi and the output from raspberry pi is given to relay switch. Relay switch is connected to electronic device which does the main function of switching on/off.

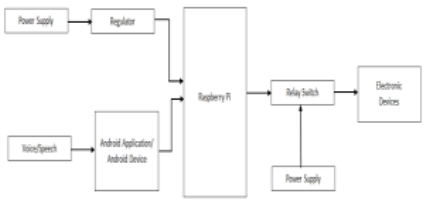

Fig -1: System Architecture

IV. TECHNOLOGY USED

The technologies used can be specified as:

A. Raspberry Pi: The main technology is Raspberry Pi it is a credit sized computer in which main programming of automation is done using the

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powerful language of python on an open-source operating system Ubuntu mate.

B. Android: Android devices are used to give input as a voice command to Raspberry Pi. Where android programming is done using an IDE Android Studio.

V. CONCLUSION

This project covers most important feature, in which it could provide the complete smart home environment. The voice-controlled home automation using Raspberry Pi is proposed for the benefit of easy use and control of devices by elderly and disabled people. This project provides a basic system of home automation which can be easily implemented and used effectively. This system allow user to take decisions and to regulate the home appliances with the help of an android application, thus making one's life comfortable and at the same time remotely accessible through portable devices like android phones.

VI. FUTURE SCOPE

The future scope of this project is:

1. Authentication: In future use, we can give voice authentication to provide security. In this only authenticated person voice can access secured device (like locker).

Fig 4: Future Lock System

2. Sensor: By using sensors we reduce the effort of declaring each and every device a particular name. Example: If a person gives a command "lights on" the sensor will sense person location and only that light will get on.
3. Smart Doors: The smart Doorbell can be made by implementing voice and video calls with the person standing right outside the door and the owner remotely. Thereby increasing the safety quotient of the system.

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