Voice Assistant Project Report

Introduction

Smart homes integrate technology into household environments to enhance convenience, efficiency, and security. This project focuses on developing a voice-controlled smart home system using voice recognition technology to manage home appliances.

Objective

The main objective is to create a voice-activated control system for managing smart home devices such as lights, fans, and other appliances.

System Requirements

Hardware:

- Microphone
- Smart devices (lights, fan modules, etc.)
- Raspberry Pi or Arduino (optional)

Software:

- Python
- Libraries: SpeechRecognition, pyttsx3, pyaudio, GPIO (for Raspberry Pi)

Project Architecture

1. Voice Input
2. Speech-to-Text Processing
3. Command Interpretation

4. Device Control via GPIO/Wi-Fi

5. Voice Feedback

Modules Used

- speech_recognition

- pyttsx3

- RPi.GPIO (for Raspberry Pi)

- time

- os

Implementation (Code Overview)

```
import speech_recognition as sr

import pyttsx3

import RPi.GPIO as GPIO

import time


engine = pyttsx3.init()

GPIO.setmode(GPIO.BCM)

GPIO.setup(18, GPIO.OUT)  # Example GPIO pin for light


def speak(text):

    engine.say(text)

    engine.runAndWait()
```

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```
def take_command():
    r = sr.Recognizer()
    with sr.Microphone() as source:
        print("Listening...")
        audio = r.listen(source)
    try:
        return r.recognize_google(audio).lower()
    except:
        return ""


def control_devices(command):
    if 'turn on light' in command:
        GPIO.output(18, True)
        speak("Light turned on")
    elif 'turn off light' in command:
        GPIO.output(18, False)
        speak("Light turned off")


while True:
    command = take_command()
    control_devices(command)
```

Results

The voice-controlled system was able to turn devices on and off based on spoken commands. The setup was tested using a light module connected to a Raspberry Pi.

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Conclusion

This project demonstrates the integration of voice recognition with smart home technology. Future improvements may include support for more devices, integration with IoT platforms, and mobile app control.

References

- Python documentation

- Raspberry Pi GPIO documentation

- SpeechRecognition library docs