

Review on Robot using Raspberry Pi for Home Automation

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ABSTRACT

The project's major goal is to create a cost-effective and performance-oriented robot for home automation based on the Internet of Things, Speech Recognition, Natural Language Processing, and Artificial Intelligence ideas. People who use it can offer speech orders, and the device answers by itself using voice commands. It can get the date, time, and weather, as well as play music and search for information on the internet and control your household appliances. The appliances that receive commands from the Raspberry Pi are controlled by NodeMCU chips. The Raspberry Pi online processes the user's vocal inputs via the microphone, translates them to text, and then performs the command. The entire project is implemented using a Python script that includes both online Speech to Text and Text to Speech conversion codes. The NodeMCU is programmed separately using the Arduino IDE in order for it to operate the appliances and be accessible via its IP address. The device will respond to the user in a courteous manner such that the user feels like he or she is talking to their own personal assistant. This technology makes day-to-day tasks less difficult.

INTRODUCTION

A robot is a machine that assists humans in performing their tasks. These devices have been programmed and are capable of meeting the programmer's requirements. A robot does not have to appear like a Human rather, a simple contraption that makes our work easier can be dubbed a robot. Robots can be autonomous or semi-autonomous depending on the application, allowing the user to evolve to meet his demands.

Home automation is sometimes known as smart houses or homes. Lighting, heating, ventilation, air conditioning, and security, as well as home appliances, are all controlled and automated.

LITERATURE SURVEY

"Home automation using voice via Google assistant," Manish Prakash Gupta (2018) proposed. The spoken orders from Google Assistant transmit a message to a microcontroller, which then sends the message to a relay, which turns the appliances on and off.

"UJALA- Home Automation System Using Google Assistant" by Aayush Agarwal, Anshul Sharma, Asim Saket Samad, and S Babeetha was published in 2018. This project offers a design and prototype for a Home Automation system that will link to other appliances using the ESP8266 Wi-Fi module as a network provider. We'll also link the individual residence to our database, which will be accessible from anywhere via a specific IP address or website. In addition, an app will be developed that will allow users to use the Google Assistant to operate their gadgets.

"Efficient low cost supervisory system for Internet of Things enabled smart house," Md Sarwar Kamal in 2017. This study presents a low-cost, efficient supervisory system for smart home automation that can be controlled via the Internet of Things. The suggested system is based on the Apriority algorithm and will aid in the efficient and reliable monitoring and control of all home appliances and electronic gadgets via a supervisory system. By monitoring electricity use, both consumers and providers will have the ability to manage power distribution.

Nikhil Singh, Shambhu Shankar Bharti, Rupal Singh, Dushyant Kumar Singh "Remote control home automation system" (2014), Advances in Engineering Research and Technology (ICAETR) This article describes

an investigation into the potential of operating remotely controlled home automation systems. It examines the problems associated with their implementation, discusses possible solutions through different network technologies, and shows how to optimize the use of these systems. The house is a perpetual, heterogeneous and distributed computing environment (Greaves, 2002), which certainly requires an in-depth study before developing a suitable "HAS" home automation system. who will fulfil his request. However, the latest efforts to bring home automation systems into real homes for all types of users are beginning to reap success thanks to the continuing process of standardization which is driving down prices and make devices more useful and easy to use for end users. Evenso, some important issues still need to be strictly resolved before developing and installing a home automation system; Factors such as safety, reliability, usefulness, robustness and price are key factors in determining whether the final product meets the expected requirements.

Sean Dieter Tebje Kelly, Nagender Kumar Suryadevara, Subhas Chandra Mukhopadhyay (2013) "Towards IoT Deployment to Monitor Environmental Condition in Home" In this paper, we have reported the effective implementation of Internet of Things used to monitor common home condition using a low cost common sensor system. Describes the integrated network architecture and interconnection mechanisms for reliable measurement with smart sensors and data transmission over the Internet. The vertical learning system can provide self-testing mechanism so that the devices perform better during the monitoring phase. The monitoring system framework is based on a combination of common distributed sensing units, information systems for data aggregation, reasoning, and contextual awareness. The results are encouraging as the reliability of detection information transmission over the proposed integrated network architecture is 97%. The prototype was tested to generate real-time infographics rather than a testscenario.

"Micro-controller based Remote Monitoring utilising Mobile via Spoken Instructions" by Jawarkar, Ahmed, Ladhake, and Thakare (2008) proposes remote monitoring through mobile phone using spoken commands. The spoken commands are generated and sent to the control system as text SMS, and the microcontroller then decides on a specific task based on the SMS.

Potamitis, Georgila, Fakotakis, and Kokkinoss, G. (2003) proposed using speech to interact with home appliances remotely to conduct a certain activity on the user's behalf. The method encourages persons with disabilities to undertake real- life tasks at home by using speech to control appliances. Speech recognition uses a voice separation approach to make an acceptable judgement.

Tan, Lee, and Soh (2002) proposed the creation of an Internet-based system that would allow a distributed control system to monitor crucial process variables (DCS). It presents hardware and software design considerations that allow the user to remotely access process variables on the DCS and rent designation effectively.

Prof. Era Johri's (2001) project on "Remote Controlled Home Automation" was finished successfully.

EXISTINGSYSTEM

There are voice controlled home automation systems where main purpose of these systems is switching, i.e. turning appliances on and off, and doing nothing more. The current system limits the possibility of technological advances that could be considered obsolete. Some systems use mobile phones to process natural languages and implement them. But it is still a vacuum of specialized equipment that we can count. The current system is therefore not very reliable. There are several virtual assistants available as dedicated devices are much more expensive to pay for. So it becomes economically inefficient.

While devices like Amazon Echo, Google Home are available, additional setup and configuration may be required to make viable for automating devices that require technical support. In addition, there must be some physical interaction with the devices to wake it up to perform tasks in the existingsystem.

Open source platforms like Jasper can be used to develop voice enabled applications But that requires a lot of works by default in the CMU Sphinx Speech tools basically offline. To overcome all existing system problems our project runs on a single dedicated python script that requires minimal setup and installation and makes installation easy.

PROPOSEDSYSTEM

This project aims to provide the simplest and most effective way to interface with the system by using natural language voice commands. This project avoids the time- consuming process of settings and setups, as well as system overheating, which has an impact on performance. The user believes he is conversing with another human because of the natural language discussion and the system's reaction, and he ignores the fact that a system is handling all of theactivities.

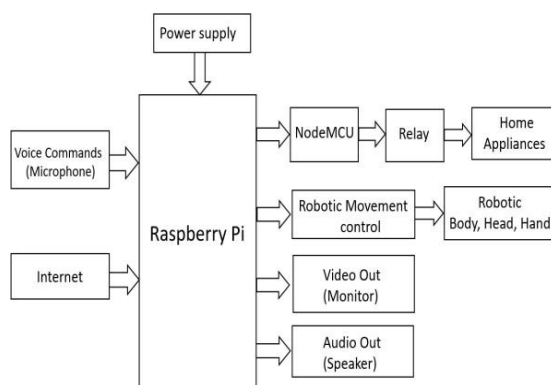


Fig 1: Proposed System Model

CONCLUSION

Existing voice recognition-based Home Automation systems rely on a limited set of commands, resulting in a stereotypical operation. As time passes, the user's interest wanes. This proposed system incorporates a dedicated python script that is totally interactive, not with a fixed set of commands but with dynamically changing responses, to break the stereotype and overcome all of the challenges and problems in the previous system. This method gives the user a personal experience while using the technology.

The software and hardware used in this system are primarily open-source and inexpensive, which means that when mass-produced in large quantities, the cost of production will drop dramatically, making it affordable to practically everyone.

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