

IMPLEMENTATION OF DOMOTIC APPLIANCES POWERED BY ARTIFICIAL INTELLIGENCE

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ABSTRACT

This project describes a design and implement of cost-effective IOT based Smart Home. A custom made module is made to be controlled by programming in the desired way. Smart Switch, Smart Voltage Regulator and Smart Juice Dispenser are made to control any appliance state. Control of each of the modules is done through multiple methods which include a web switch, a control app, a phone(Google Assistant) and a smart speaker. Voice processing is done in the Raspberry Pi that includes Google API. Working of each module is independent within the same network. Rendering of voice control for different appliances is done by AI services.

INTRODUCTION

Smart home technology, also often referred to as home automation or domotics (from the Latin "domus" meaning home), provides homeowners security, comfort, convenience and energy efficiency by allowing them to control smart devices, often by a smart home app on their smartphone or other networked device. A part of the internet of things (IoT), smart home systems and devices often operate together, sharing consumer usage data among themselves and automating actions based on the homeowners' preferences. When home automation company Insteon came on the scene in 2005, it introduced technology that combined electric wiring with wireless signals. Other protocols, including Zigbee and Z-Wave, have since emerged to counter the problems prone to X10, though X10 remains a widely installed communications protocol to this day. Nest Labs was founded in 2010 and released its first smart product, the Nest Learning Thermostat, in 2011. The company also created smart smoke/carbon monoxide detectors and security cameras. After being acquired by Google in 2015, it became a subsidiary of Alphabet Inc. in the same year.

Literature Survey

This system is to design and implement a cost-effective and yet flexible and powerful application based smart home automation system using the Internet of Things. Our system is designed to detect burglary, increase in the concentration of harmful gasses, smoke and fire flames [1]. This system is to implement the home automation voice gateway using Pi Frame framework. With this system, user can control home appliances through voice command, by recognizing the keyword in the speech of the user [2]. Devices like Hue Lights and Hive Bulbs are playing a major role in converting our homes into smart homes. Smart homes do need smart protection against any sort of thefts or dangers to home[3]. This system is to construct a fully functional voice based Home automation system that uses Internet of Things, Artificial Intelligence and Natural Language Processing (NLP) to provide a cost-effective, efficient way to work together with home appliances[4].

Existing method

The existing system is designed in such a way that it can configure itself dynamically based on the change in needs of the user. The entire home environment can be monitored by various sensors positioned all over the home and controlled by a user-friendly android application. This system and application support dynamic addition or removal of devices without changing the home system or architecture.

Two level of security access is provided by the security system which prevents the access of the home to intruders. Internet of things technology is widely used to integrate the system with control tools like web and Android application. Remote video surveillance, automatic scheduling of devices, monitoring of environment based on live weather updates, voice controlled devices are some of the features mentioned in this paper. This papers also focused on lack of compatibility among devices and proposed solution for integrating various methods into a single integrated home automation system. With this system installed, the user can control and monitor the home remotely and a person can travel any place on the planet with the affirmation of complete safety of his/her home.

Proposed System

Now a day's, mobile devices are integrated in today to day life. The security and remote surveillance system is growing to be an important concern for every technology user. The main objective of this project is to make a module that can be used to convert any home appliance into a smart appliance that can be controlled through multiple methods of access. So we made two modules (Smart switch, Smart voltage regulator) and a Smart juice dispenser (Sample Appliance) that can be used to demonstrate control almost any appliances at Home. Each appliance can be controlled through multiple method which includes a smart speaker, a control app, a web switch and a phone(Google Assistant).Raspberry pi is programmed to work as a smart speaker using the digital AI assistant GOOGLE ASSISTANT. Working of each module is independent within the same network. All the systems are directly connected to the cloud platform instead of a local centralized hub. Google authenticator have been used to ensure the safety of personal data. Smart speaker not only enables you to control the appliances but can also do the other functions of the smart speaker available in the market such as telling you a JOKE, Weather Forecasting, Playing you a song etc., all at the convenience of your voice.

Methodology

An efficient and cost effective smart home system is adapted in our design. In our project, the Raspberry Pi is used as the hub for transmission and control of the data and commands given by the user and is implemented as IOT with voice recognition from Google Cloud Platform. Each Node, i.e Device has its own hardware setup to upload data to the cloud and receive command. Relay switches are connected to the **Wi-Fi interface with ESP8266** that enables the effective

controlling of the relay. The user may use the login id and password to change the status of any appliances saving time, energy and money. In addition to that our proposed model provides absolute security for user Data.

RESULT

SMART SPEAKER AND JUICE DISPENSER:



FIG 8.1 DISPLAY VIEW OF SMART SPEAKER AND JUICE MIXER

The above diagram represent the Smart speaker and Smart Juice Dispenser. The Smart Speaker can be used to control the custom made module by using our voice. Apart from controlling the modules, it works as a Google Home Device. The Juice Dispenser act as a robotic home bartender, it wipes up your favorite mixed drink at your command and serves you a splash of small talk while you wait.

SMART SWITCH AND SMART VOLTAGE REGULATOR:



FIG 8.2 Display View Of Smart Switch And Smart Voltage Regulator

The Smart Switch turns ON the relay, if any one of the input is accessed with the reliable internet connection.

The Smart Voltage Regulator varies the output voltage from 0V-230V according to the input given. The input for the Voltage Regulator is given by application.

Conclusion & future developments

A smart home appliance was setup and was controlled successfully. The system successfully recognized the data from the various input methods like voice, app and web. The system provides efficient control of appliances without any middle agent. The system also does the work through the app. The system was also able to recognize and do other works like forecasting weather, singing song, telling you a joke and much more. The webhook worked successfully in achieving the desired output through GPIO of the raspberry pi. When the system detects an input from the app or voice through the *ineering (IJARECE)* Volume 4, Issue

cloud, it transmits the command to the desired device directly from the cloud and the execution was done successfully.

As a future work, this project can be extended with further development such as providing a high definition camera to identify the users, reliable algorithms and high performance system. The design can be further implemented in a more advanced way by introducing the sensors to record audio and use any audio error as a feedback and gesture sensor to allow the user to control the module using gestures.

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