Home Automation With Smart Bluetooth Socket Based On Google Voice Recognition

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Abstract- *By progressing information technologies now a days, the home living syatems has been increasingly supplanted by smart home. Google Smart home style can bring large benefits to people. This technology becomes ubiquitous in these years. Enterprises cannot integrate the functional divisions of smart home mode. Customers do not get the products they need. Therefore, we have to build a tailor-made function for users. we have use the Google Home's voice recognition with the conception of machine-learning about fulfilling the users' needs by a smart home pattern with the design of machine learning. In this experiment let users give comments to Google Home's voice recognition, then transfer the Bluetooth signal to Raspberry Pi to control devices.*

Keywords- smart home; IoT; machine; raspberry pi; bluetooth 4.0

I. INTRODUCTION

The development of Internet Of Things had been evolved in several study fields .In this field, numerous studies of smart home systems certificate that smart home becomes a important role in IoT studies. Smart home entails the buildings which furnish are expedience circumstance to suffice the needs of modern lifestyle. Therefore, among all the applications of technology industry development technology, the construction of living needs in response to the smart home during the current stage become the inevitable trend of housing construction. Smart home is mainly in the construction of residential housing must provide convenient functions, such as security, disaster prevention, health care, and comfortable, and energy savings which rely on sustainable development and carbon reduction function. By playing a specific effect to enhance the quality of living space, the construction of these tasks needs to use the technology of communication technology. Through the Netcom facilities platform, the integration to play a specific effect to enhance the quality of living space and to achieve the purpose of smart home. Smart home is a one of the variety of home automation equipment. It plays efficient service functions to ensure the safety of house living, health living environment, and to provide a comfortable quality of house living. To create

humanized living environment, smart home can also reduce the waste of electricity to bring great benefits. The problem may be quite tricky to install the extra system function or replace the responsible company. If you want to add system, you will need to destroy the decoration which may be expensive. This paper is committed to the way through the machine learning that users do not need to spend a lot of costs under the premise of the need to use the smart home system functions. In addition to the convenience of the system of smart home, it needs to be improved control convenience. Lärka and Markus Schinle proposed smart home with mobile devices to get the convenience of remote control. Not only can efficiently deal with the home systems but also to further enhance the user's desire to use the home system. The system expands the wisdom of the family system to smart city system. This paper focuses on researching the machine learning model to combine Google Home's with Google Assistant Personal Voice Assistant to customize a service to meet the new needs of users. The goal is by learning the user's voice commands that Google Home can use Bluetooth to open the Smart Bluetooth Socket to control devices. Home Automation is conveniences installed and designed to perform chore in your living place. Smart homes are often referred to as intelligent homes as they perform services that become part of our life. Many of the automated systems that silently perform their jobs unnoticed this is automation at its best. Speech Recognition is a technology allowing the computer to identify and understand words spoken by a person using a microphone or telephone. Using a set of pre-programmed commands and instructions, user can talk with computer. Computer system that understands input speech enables user to have conversations with the computer. User and the computer speaking as commands or in response to events, input, or other feedback would be included in these conversations. Speaking is easier and more sensitive than selecting buttons and menu items. Human speech has changed over many thousands of years to become an efficient method of sharing information and giving instructions. Home automation system has been around for more than a decade. The main concept is to form a network connecting the electrical and electronic appliances in a house. This is a growing technology, which has changed the way people live.

II. LITERATURE REVIEW

In this section of related works firstly there are mentioned various technologies of home automation and then stated the researches that have been similar to this topic.

[1] INTERNET OF THINGS

Internet of Things (IOT) is to allow all the functions of independent objects to achieve interoperability on the Internet. Internet of things has wireless network technology as an infrastructure for things and objects connection. Due to Internet of things, everyone can use electronic tags to connect real objects to the Internet. These tags can be found on their specific information. In the era, the Internet of Things has involved rapidly. Everyone's life is getting more and more convenience. Therefore, in the era that network developed prevailing and high penetration of mobile devices and use Internet of Things to develop a conception of smart home. The system combines the mechanisms of the home with the network and performing remote operations through mobile devices and voice-activated technology. The major companies have also launched such as Amazon-echo, Apple TV 4 Home-Kit and other intelligent home control center products. Google also had officially launched the Google Home as the products. Google Home is a smart home control center with remote control of home appliances and monitoring of home environmental data. However, Google Home itself combines the home wireless play center and Google Smart Voice Assistant. Google Assistant voice assistance allows users to simple control instructions to achieve the needs of the functions by speaking commands. Seyit Alperen Celtek proposed smart home and the user's remote interaction mode, through voice controls the Smart Bluetooth Socket and to combine with the machine learning to achieve the new model which can satisfy the needs of smart home users.

[2] MACHINE LEARNING

Machine learning is the branch of "artificial intelligence". In this field, aiming to automatically analyzes the law from the data, and use the algorithm to predict the unknown information. Machine learning has developed into a multi field interdisciplinary, involving the theory of probability, statistics, approximation, computational complexity theory and other disciplines in the past 30 years. Bluetooth helps to connect the coordinates and through three different machine learning methods (K-meanings analysis, support vector machine analysis, and linear discriminant analysis) to carry out Bluetooth indoor positioning. Machine learning mainly with the inferred statistics is more closely, So it is called Statistical Learning Theory. In this paper, the method of keyword analysis is primarily used to make the device understand and implement the user's commands. In this paper, we use LSA (Latent Semantic Analysis) and TF-IDF (term frequency–inverse document frequency)to analyze user's commands

[3] RASBERRY PI:

Raspberry Pi is also a Linux single board computer. British Raspberry Foundation developed Raspberry Pi which aimed to promote basic computer science with low-cost hardware and free software. The 700 bit BCM2835 processor, 256MB of memory (B-type has been upgraded to 256 MB of memory). Raspberry Pi use the SD card as a storage medium and has an Ethernet, two USB interfaces, HDMI (support sound output) and RCA terminal output support. The operating system is open source of Linux. In the studies of the Internet of things, the raspberry pi has many applications. Its operating system can not only operate itself but also has access to wireless networks and Bluetooth chips. With the development of things networking conditions, raspberry itself has variety of hardware connections with USB interface.

[4] BLUETOOTH 4.0

Yuan-Yu Ding proposed Smart Bluetooth Socket which uses Bluetooth 4.0 chip and control chip through the Raspberry Pi to control the Smart Bluetooth Socket. Smart Bluetooth Socket is a device of IoT .This device has RTC (Real Time Clock) device to record time. It records the time at a certain point and in time switch or after a certain period to turn off the device or open the device. User can uses the background control device program to control the function. Smart Bluetooth socket structure includes the different modules like Bluetooth module, RTC module, Bluetooth smart socket. In this development, it can find a technology which has not only low power consumption but also carry fast reaction time. Bluetooth technology is currently responsible for maintaining its technical standards by the Bluetooth Technology Consortium, which has more than 20,000 corporate members whose territory is distributed in telecommunications, computers, and consumer electronics. The RTC module which is used in this experiment refers to an electronic device that can output the actual time like a clock. It is usually used to integrate circuit and is also called a clock chip.

III. PROPOSED SYSTEM

The suggested system for the theory of this idea can be easily explained by using following block diagram.
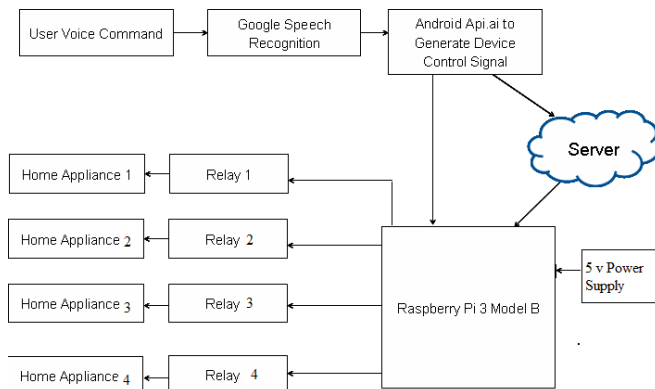
Fig. 1 System block diagram

A. System overview :

Android application act as interface between smart phone and Bluetooth. Users give the input via the smart phone either by using touch button or voice command. To ensure the Arduino Uno can communicate with the android, we used a different character for identifying different function of the speed of fan and switch ON/OFF the light. For example to turn on the fan at lower speed, we have set 'speed 1' in android with character 'A', 'speed 2' for character 'B' and etc. When the user touch the 'speed 1' button, the character 'A' will be sent to the Arduino and the output of 'speed 1' will be turn on.

B. Software development of android application

The smart applications can be developed using several platforms such as Android, Windows, iPhone. The application for home automation system is developed in android phone. Java programming language with SDK (Software development kit) is used to develop the applications. SDK is a set of software development tools which allows to create the applications for a software package, software framework, hardware platform and computer system or similar development platforms. Eclipse which runs on Windows 7 platform officially supports integrated development environment (IDE which is used as conjunction with (Android Development Tools).The designed app for the home automation system provides the following functionalities to the user:

1. Remote connection through internet to the web server.
2. Provides IP and user authentication.
3. Controlling and monitoring of home appliances.
4. Scheduling tasks and to home automation system.
5. Password change option.
6. Provides voice activation for switching functions.

This paper investigates the establishment of an open domain chatbot database through the services provided by API.ai and compiles an API.ai that can interact with the user on the basis of the specific keywords. Once the user issues the instruction, the API.ai will set the protocol according to the intent. In response to the user's instructions and in the intention, we established the thesaurus (as an entity).

IV. IMPLEMENTATION

As the process of implementing a theoretical concept for a technology into the reality needs a pathway to characterize the particular components. Hence to utilize most of the available resources to give a sustainable system that works efficiently on the described concept is the ultimate goal of every project. Most important part of this project development cycle is to start with the flow of the development process. Here we have stated the flowchart to indicate the function executed in each and every step. So the entire logical activities become clearer and it will help to design the module easily. Record user speech in real-time on Mobile phone. Use Google speech recognition feature and recognize user command. Develop android api to decide device control action based on recognized speech. Send Control signal to Raspberry pi over Bluetooth protocol to control devices. Send control signal to server though internet to control devices from remote location. Write Python application on raspberry pi to turn On/Off respective relays for corresponding device. Update status of devices on server for remote monitoring.

The major idea of the project hides behind the presence of a certain 'controller' that can manage the state of electricity and other devices in your house. We also need to create a specific smart home mobile app to interact with the controller remotely ('smart house' system concept). We can use Raspberry pi,a small single-board computer as the 'controller' for this domotics mobile app. The device contains the same advantages and opportunities as of ordinary computers. The only difference is that it's smaller in size and allows to control various household appliances and devices. To manage the 'controller' a user can interact with it by means of their smartphone (in our case, it's the Android-based one, but you can experiment with whatever OS you wish). As the result it turns out to be quite a comfortable home automation and control system.
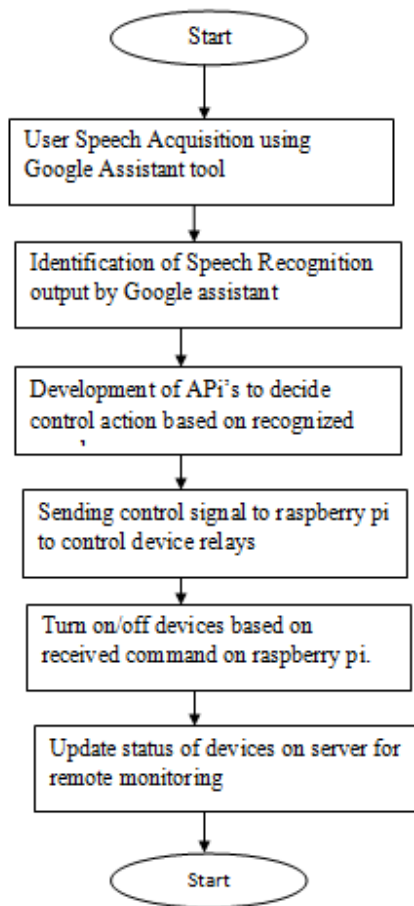
Fig. 2 Flowchart

V. RESULT

We have analyzed performance of speech Recognition based home automation for three device commands Fan, Bulb and TV. We have extracted accuracy, True acceptance, True Rejection, False Acceptance, and False Rejection by conducting experiment on 100 real time speech inputs for each device command.

Device ON/OFF Command	Accuracy	True Acceptance	True Rejection	False Acceptance	False Rejection
Fan	95%	92%	8%	4%	96%
Bulb	94%	91%	9%	5%	95%
TV	96%	94%	6%	3%	97%

VI. CONCLUSION

In this paper we proposed architecture for a new intelligent family service for users through the machine learning applications. The system is highly feasible to complete the smart home control through machine learning using Google Home voice command, Raspberry Pi and Smart Bluetooth Socket. In the future, we will further improve the system structure and machine learning ability. We will try to figure out how to work with different users in the system to complete the machine learning training and to meet the needs of users. In addition, we hope to build a combining machine learn and remote operation of smart home to integrate the smart home model. We will try to manipulate more intelligent smart home devices with mobile devices.

VI. ACKNOWLEDGEMENT

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