

Android Based PC Controller Using Speech Recognition

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Abstract- Every day a Smartphone user may look for a new application dedicated for his need. Android makes it easier for consumers to get and use new content and applications on their Smart phones. This paper presents an extremely on-demand, fast and user friendly Android Application “voice recognition”. Voice recognition is an alternative to typing on a keyboard. Put simply, you talk to the mobile and your words appear on the screen. For the past several decades, designers have processed speech for a wide variety of applications ranging from mobile communications to automatic reading machines. However, with modern processes, algorithms, and methods we can process speech signals easily and recognize the text. The software has been developed to provide a fast method of writing on mobile physical disabilities who often find typing difficult, painful or impossible. Voice-recognition software can also help those with spelling difficulties, including users with dyslexia, because recognized words are almost always correctly spelled. This paper is about to develop a speech-to-text engine. The recognized text can be stored in a file. Our speech-to-text system directly acquires and converts speech to text. However, the transfer of speech into written language in real time requires special techniques as it must be very fast and almost correct to be understandable.

Keywords- Speech recognition, Speech-to-text system, SLDM, Network service discovery, HMM.

I. INTRODUCTION

The mobile phones having Android Operating System have become common in the recent years. These Android mobile phones are an integral part of our day-to-day lives. The need arises to access and control the desktops remotely from our android mobile phones and it is very convenient using speech recognition. We cannot access and control the desktops remotely from the mobiles. Also, the facility of controlling the desktops through Speech Recognition is not available. Speech recognition facilitates hands-free computing which is advantageous in many real-life situations. We cannot perform computing in a more convenient way than conventional input-output methods.

Voice is the basic, common and efficient form of communication method for people to interact with each other.

Today speech technologies are commonly available for a limited but interesting range of task. This technology enables machines to respond correctly and reliably to human voices and provide useful and valuable services. As communicating with computer is faster using voice rather than using keyboard, so people will prefer such system. Communication among the human being is dominated by spoken language, therefore it is natural for people to expect voice interfaces with computer. This can be accomplished by developing voice recognition system. Speech-to-text system allows computer to translate voice request and dictation into text. Speech-to-text is the process of converting an acoustic signal which is captured using a microphone to a set of words. The recorded data can be used for document preparation.

Using computer serial port communication technology we can any time read the information of state of the control device to the database in PC through serial port, monitoring equipment and analyzing data. Android mobile via wifi wireless network can make interconnection to PC, establishing communication mechanisms based on TCP/IP protocol. Android mobile through wifi can send control signals to the PC serial port, and then PC through the serial port send the signal to the control equipment.

II. RELATED WORK

Prerana Das, Kakali Acharjee, Pranab Das and Vijay Prasad in the year 2015 had discussed that speech to text is a software that lets the user control computer functions and dictates text by voice. The system consists of two components , first component is for processing acoustic signal which is captured by a microphone and second component is to interpret the processed signal, then mapping of the signal to words. Model for each letter will be built using Hidden Markov Model(HMM). Feature extraction will be done using Mel Frequency Cepstral Coefficients(MFCC). Feature training of the dataset will be done using vector quantization and Feature testing of the dataset will be done using viterbi algorithm. Home automation will be completely based on voice recognition system.[6]

Prachi Khilari and Prof. Bhope V. P in the year 2015 had represented that Speech is the first important primary need,

and the most convenient means of communication between people. The communication among human computer interaction is called human computer interface. This paper basically gives an overview of major technological perspective and appreciation of the fundamental progress of speech to text conversion. This paper concludes with the decision on future direction for developing technique in human computer interface system in different mother tongue and it also discusses the various techniques used in each step of a speech recognition process and attempts to analyze an approach for designing an efficient system for speech recognition. However, with modern processes, algorithms, and methods we can process speech signals easily and recognize the text. The objective of this paper is to recapitulate and match up to different speech recognition systems as well as approaches for the speech to text conversion.[7]

Shubham Bidya, Nikhil Sonawane, Nandkishor Shegokar, Prashank Bhosale, Anisaara Nadaph in the year 2014 had discussed that with the help of an mobile application user can connect to any computer. It is basically an Android based mobile application for communicating with a PC. We can use this application to share files between target PC and Android mobile, start and shutdown the PC, allowing accessing the installed applications of PC. Also this application allows IT Administrators to remotely access their own database of the PC, is utilized by doing the operations on PC like sending video files .By connecting to the web server the android mobile can access the information in certain amount of time interval. Various operations can be controlled by the android mobile device of PC. The whole process is based on VNC server of our computer which is connected to the Wi-Fi- network.[8]

III. DESIGN OF PROPOSED SYSTEM

The main objective of this project is to implementation of the Remote Accessing concept by the android application it will help.

This can be split into four smaller objectives, which are:

- Primary Objective is to pair the Server and Client by wifi.
- Second objective is to start the Server application in the computer that is to be remotely accessed, and also implement the remote client application in the client device and connect the client and server.
- Now make a voice command to client application and pass the command to server.
- Now Server will execute the command.

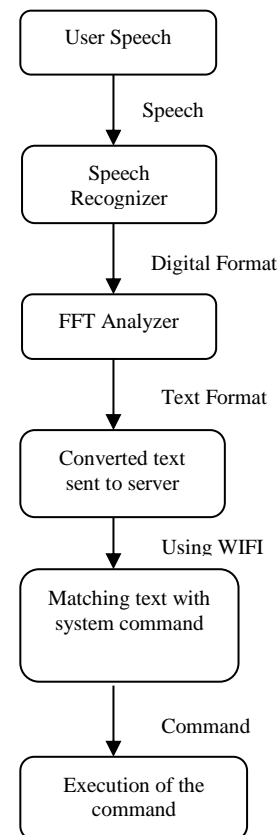


Fig 1. System Flow Diagram

IV. IMPLEMENTATION DETAILS

The proposed system is developed by using these modules

- Pairing Devices
- Speech Recognition Algorithm
- Speech to Text Conversion
- Command Execution

Pairing Devices

Besides enabling communication with the cloud, Android's wireless APIs also enable communication with other devices on the same local network, and even devices which are not on a network, but are physically nearby. The addition of Network Service Discovery (NSD) takes this further by allowing an application to seek out a nearby device running services with which it can communicate. Integrating this functionality into your application helps you provide a wide range of features, such as playing games with users in the same room, pulling images from a networked NSD-enabled webcam, or remotely logging into other machines on the same network.

This class describes the key APIs for finding and connecting to other devices from your application. Specifically,

it describes the NSD API for discovering available services and the Wi-Fi Peer-to-Peer (P2P) API for doing peer-to-peer wireless connections. This class also shows you how to use NSD and Wi-Fi P2P in combination to detect the services offered by a device and connect to the device when neither device is connected to a network.

Network service discovery (NSD) gives your app access to services that other devices provide on a local network. Devices that support NSD include printers, webcams, HTTPS servers, and other mobile devices.

Socket is a kind of communication mechanism based on TCP/IP protocol in computer network communication. The application sends and receives data through a socket, like open a file handle for the application, to read and write data to stable storage. By socket applications can be added to the network, and communicates with the other applications which are in the same network. The information written by the client program on one computer to the socket is capable of being read by service application on another computer, whereas still. Depending on the underlying protocol implementation, socket can be divided into two kinds: the one is based on TCP and the other is based on UDP. Android is a mobile system based on Java platform, full support socket communication mechanisms based on TCP and UDP for JDK environments. Because .NET platform not only with advantages in serial port communications not available in the Java platform, but also with powerful features on the socket communication mechanism. We choose Android as a socket client, and .NET platform as a socket server to establish communication between the Android mobile and the PC, achieving Android mobile to send control signals to PC serial port.

Smart phone now has increasingly become the preferred communication tool, in addition to phone calls and text messages for daily function, its biggest advantage is it can run a variety of games and applications as PC, added a endless pleasure to people's lives. Android mobile system is a kind of open source platforms, anyone can download the free Android SDK tools to develop applications based on Android mobiles, while the Android mobile has operation simple, portable, mobile Internet advantages not available in the PC. Believe that in the near future, application research in realizing serial port communication based on Android mobiles will play an important role in the area of the coming industrial automation and control, Internet of things, smart home, intelligent robot.

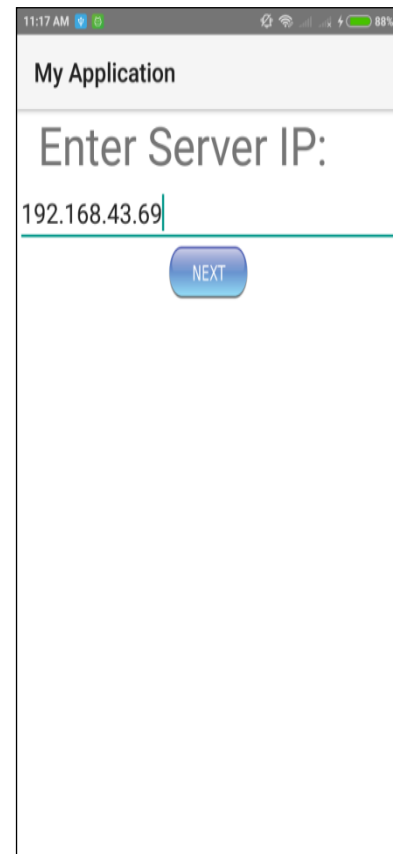


Fig 2. Pairing Devices using Server IP address

Speech Recognition Algorithm

Speech recognition is the process by which computer maps an acoustic speech signal to some form of abstract meaning of the speech. This process is highly difficult since sound has to be matched with stored sound bites on which further analysis has to be done because sound bites do not match with pre-existing sound pieces. Various feature extraction methods and pattern matching techniques are used to make better quality speech recognition systems. Feature extraction technique and pattern matching techniques plays important role in speech recognition system to maximize the rate of speech recognition of various persons. There are two main phases in a speech recognition system training phase and testing phase for recognition. During the training phase, first off all features are extracted from the all speech signals using various feature extraction techniques such as MFCC, LPC, LDA and RASTA etc. These features are in the form of vector. In this way a training vector is generated from the speech signal of each word spoken by the user. The training vector has the spectral features which distinguishes different words based on its class. These extracted features are the main component of whole speech recognition system. Each training vector can serve as a template for a single word or a word class. This training vector is used in the next phase of recognition.

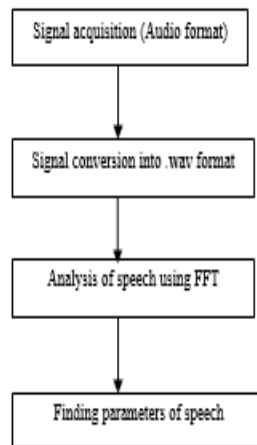


Fig.3 Flow diagram of parametric analysis of speech

During the recognition phase, the user speaks any word for which the system was trained. A test pattern is generated for that word. That test pattern means extracted features of that word used for the testing. In this way the test pattern is tested against the training vector by using various classifiers such as SVM, KNN, HMM and ANN etc. This classifier classifies the pattern. If the testing word pattern matches with the training pattern class then it means that particular pattern is recognized from training phase and that corresponding pattern is displayed as the output.

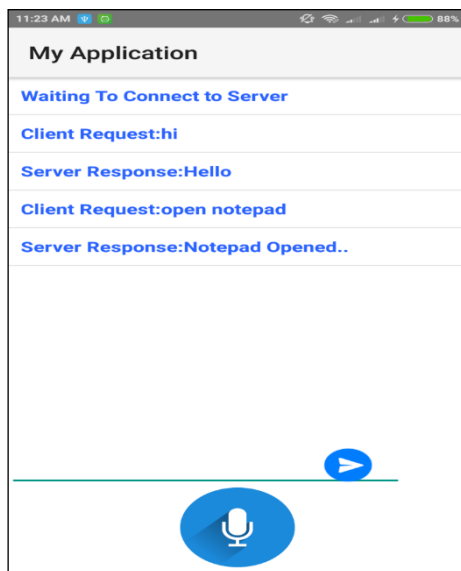


Fig 4. Speech recognition system

Speech to text conversion

Speech to text conversion is the process of converting spoken words into written texts. This process is also often called speech recognition. Although these terms are almost synonymous, Speech recognition is sometimes used to describe

the wider process of extracting meaning from speech, i.e. speech understanding.

All speech-to-text systems rely on at least two models: an acoustic model and a language model. In addition large vocabulary systems use a pronunciation model. It is important to understand that there is no such thing as a universal speech recognizer. To get the best transcription quality, all of these models can be specialized for a given language, dialect, application domain, type of speech, and communication channel.

Like any other pattern recognition technology, speech recognition cannot be error free. The speech transcript accuracy is highly dependent on the speaker, the style of speech and the environmental conditions. Speech recognition is a harder process than what people commonly think, even for a human being. Humans are used to understanding speech, not to transcribing it, and only speech that is well formulated can be transcribed without ambiguity.

Speech is an exceptionally attractive modality for human computer interaction: it is “hands free”; it requires only modest hardware for acquisition (a high-quality microphone or microphones); and it arrives at a very modest bit rate. Recognizing human speech, especially continuous speech, without burdensome training for a vocabulary of sufficient complexity (60,000 words) is very hard. However, with modern processes, flow diagram, algorithms, and methods we can process speech signals easily and recognize the text which is talking by the talker. In this system, we are going to develop an on-line speech to-text engine. The system acquires speech at run time through a microphone and processes the sampled speech to identify the uttered text. The recognized text can be stored in a file. It can supplement other larger systems, giving users a different choice for data entry.

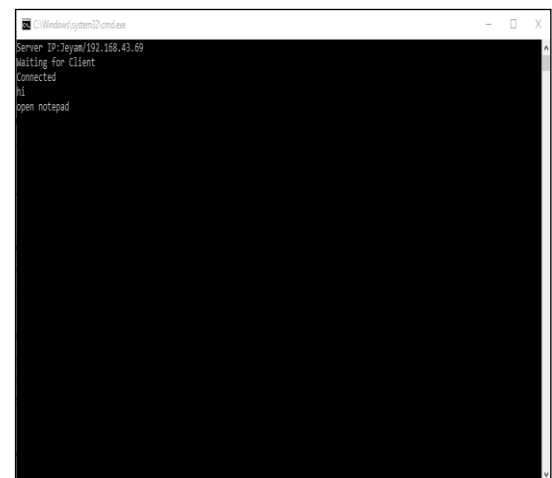


Fig 5. Speech converted to text format

Command Execution

In a conditional statement you make a test. The result of the test is a Boolean - either True or False. If the result of the test is true you take a certain course of action and if the result of the test is False you take another course of action.

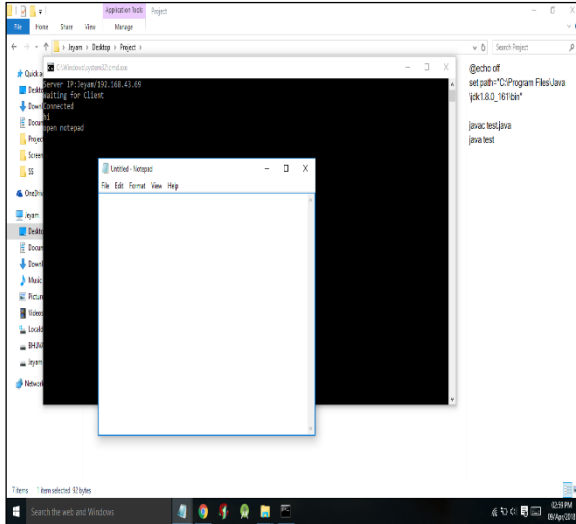


Fig 6. Command Execution on PC

V. CONCLUSION

The speech to text conversion may seem effective and efficient to its users if it produces natural speech and by making several modifications to it. From our proposed system the desktop can be control through voice using smart phones and even connecting desktop and phone through Wi-Fi network and this system is going to be useful for social people such as physical disable and normal people. In future we will implement our system by connecting desktop and phone through internet and we will try to implement this system for android watch.

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