

Voice Assistant for Visually Impaired

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Abstract- Voice Assistant for Visually Impaired (VAVI) is a universal voice control solution for nonvisual access to the Android operating system. Voice Assistant for Visually Impaired offers two contributions as compared to existing systems. First, it enables system wide Voice Control on Android that can accommodate any application. Voice Assistant for Visually Impaired constructs the set of available voice commands based on application context; these commands are directly synthesized from on-screen labels and accessibility metadata, and require no further intervention from the application developer. Second, it provides more efficient and natural interaction with support of multiple voice commands in the same utterance. We present the system design of Voice Assistant for Visually Impaired and describe its utility in significantly improving experience of graphic interface interaction for blind and motion impaired users. The reader, which transforms digital information to text and then to voice by TTS (Text-To-Speech), is widely used to help visually impaired persons to operate devices. The system, integrates open sources and also enhances many functions of them. It includes the message reader, text file reader, OCR reader, voice dialer. In addition, it provides the Navigation Reader for walking and riding, which is based on Google Maps and supports more detailed voice guidance for the distance to a destination and directions of moving.

Index Terms- Voice command, android, TTS, client-server, Voice Assistant

I. INTRODUCTION

Smartphone and Internet are considered as a major storehouse of information in today's world. Not a single work can be done without it. It has even become one of the actual and real methods used in communication. And out of all methods available calling and messaging is one of the most common forms of communication especially in the business world. However not all people can use the internet. In order to access the INTERNET, you would need to

know what is written on the screen. If that is not visible it is of no use. Due to this problem internet a completely useless technology for the visually impaired and illiterate people. Even after systems that are available currently like the screen readers TTS and ASR do not provide full efficiency to the blind people so as to use the internet. As nearly 200 million people worldwide are estimated visually impaired it become necessary to make internet facilities for communication usable for them also.

It has been observed that nearly about 40% of total blind population across the world is present in INDIA. As our society farther expands, there have been many supports for second-class citizens, disabled. One of many supports that are urgent is the guarantee of mobility for blind people. There have been many efforts but even now, it is not easy for blind people to independently use the Smartphone.

Therefore, we have come up with this project in which we will be developing a assistant for visually impaired which will aid the visually impaired people who are naive to computer systems to use smartphone facilities in a hassle-free manner. The users of this system don't need to have any basic information regarding UI buttons.

II. PROPOSED ALGORITHM

The proposed system model for our system is given in (Fig. 1). The various components of our system are as follows:

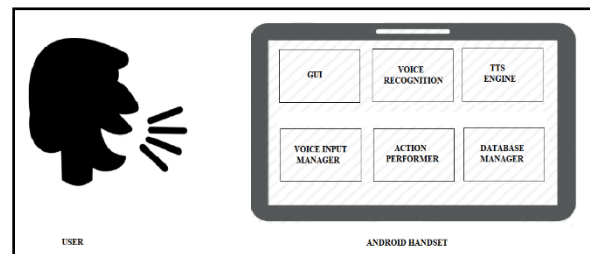


Fig. 1 Proposed System

GUI: Graphical User Interface is used to interact with the users. It describes how the application will look. Since our application is mainly for blind peoples, it does not depend much on appearance but on the working and functionalities.

Voice Recognition: In this process the speech of the user is recorded and analysed which is then converted into a set of words and then the tasks corresponding to those words are performed. The accuracy of the voice recognition differs in modality of speech, confusability, vocabulary size, language constraints and tasks.

TTS Engine: Since the blind people cannot see what is on the screen, hence the Text to speech system is used to recite everything on the screen. TTS system is used to convert the normal text into speech. Synthesized speech is created using the concatenating pieces of recorded speech in the database.

Voice Input Manager: It is used to manage the command given by the user to the system. It sends the input given by the user to the Database Manager.

Database Manager: It matches the Input given the Voice Input Manager with the vocabulary of words in the database. It then sends the output to the action performer.

Action Performer: It takes the input from the database manager and then decides which action to be performed. The various actions are as follow: -

A. Text message: Users will be able to send SMS to a person in the phonebook as well as by inputting the phone number and the speaking the message. The message should be sent to the destination immediately

B. Calling service: The application should allow the users to make a call to the person in the contacts or by saying mobile number of the person to whom user wants to call. By giving a correct command with the calling request to a stored person, the Android phone should successfully direct to the number of the person requested.

C. Music player: User will be able to listen to the music or audio files on device. They just need to speak the command for the music player and then they can listen to the music. They can then control the music player through gestures, through which

they can play next or previous song or change volume.

D. Notes: User can keep the notes of important things on the device. They need to speak the command for opening notes, then they can either read the notes or enter new note. To enter new note, they just need to speak the note. And to read the notes, the device will speak the notes through it text to speech feature.

E. Alarm: The application allows the user to set the alarm as per there need just by speaking the necessary command. They will be then able to set the time for alarm. To stop the alarm, they can use the gestures needed.

Use case diagram

This diagram consists of Actors. Our system consists of only 1 Actor. Following functionalities are handled by application: Alarm, Notes, Call, Message, Music Player.

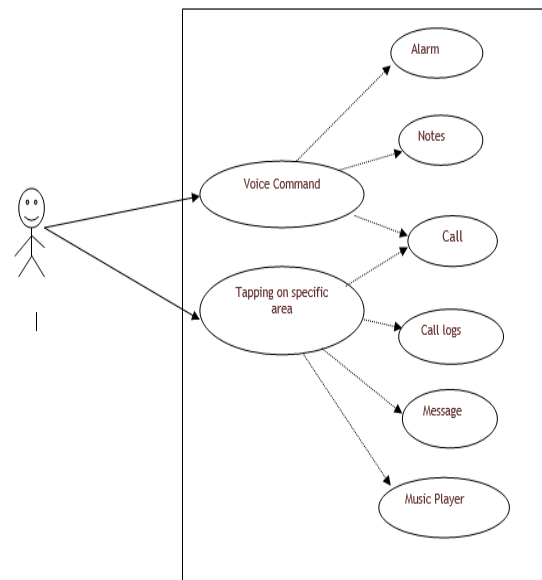


Fig. 2 Use Case Diagram

Data Flow Diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated.

Level 0 :-

User gives the input into the form of voice, this voice command is recognized by the application. Then

action is performed as per the command given. Command given is compared with the database.

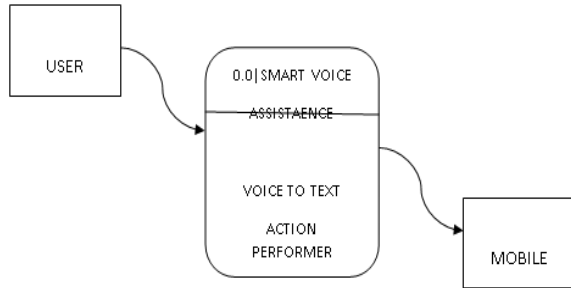


Fig. 3 DFD Level 0

Level 1:-

Input is given by user in the form of voice. Using microphone, voice is converted in binary. GoogleVoice API will convert this voice data in text form and then the action is performed according to the command given by the user by comparing with the database.

Flow Chart

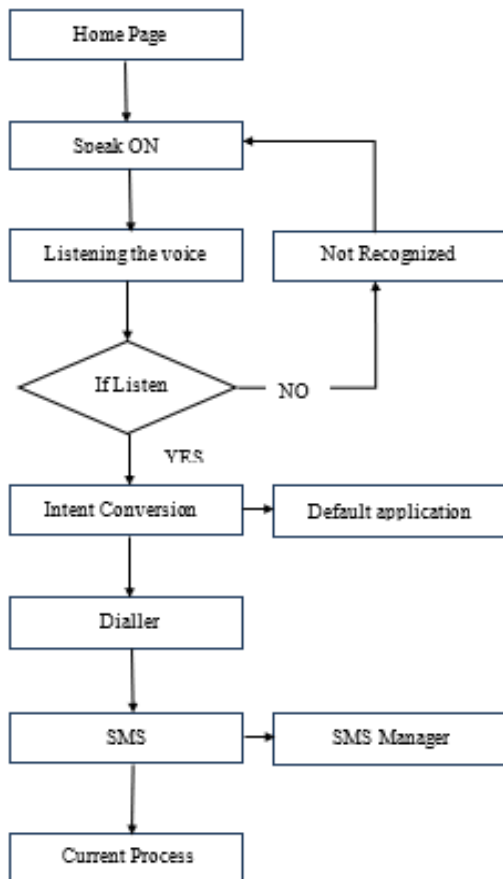


Fig. 5 Flow Chart

E-R Diagram

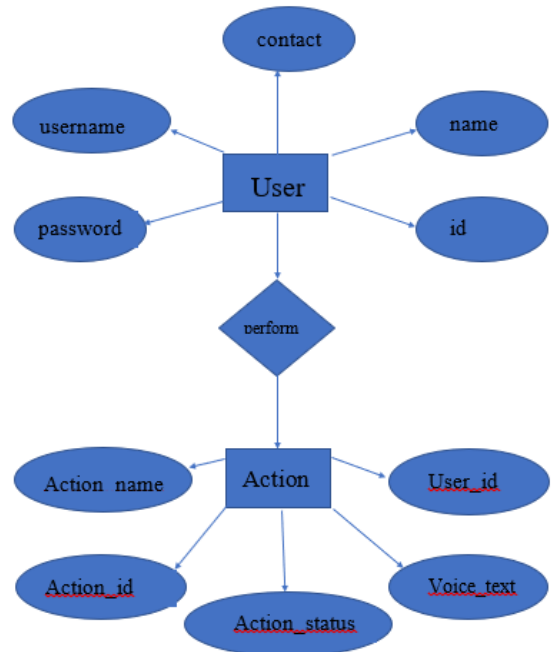


Fig. 6 E-R Diagram

State Diagram

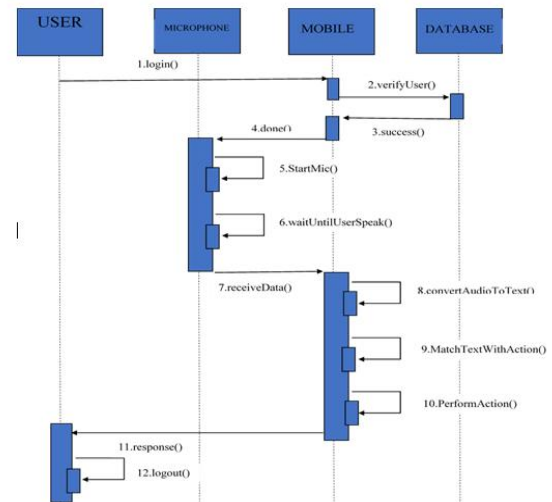


Fig. 7 State Diagram

III. CONCLUSION

In this report, we have presented the system designs and use cases of Voice Assistant for Blind, a voice control assistant on Android operating system. The voice assistant is a very useful software for the blind people as it can help them to perform basic tasks on mobile phone very easily just by speaking the commands. With the help of this application people

can make a call, send message, play music, keep notes, set alarm. This application is made with the thought of making the life of blind people easy by providing them with the necessary functionalities of an android device. The TTS helps to read the text in screen so that blind people can EASILY know what is on their mobile screen. The system is very easy to use as the users just have to speak the command to perform an action.

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