

## International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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Vol. 9, Issue 3, March 2020

# Data Analysis and Implementation of Voice Recognition for Visually Impaired People

Papithasri.K<sup>1</sup>, Nivetha S<sup>2</sup>, Sarathkumar K<sup>3</sup>, Santhosh A.R<sup>4</sup>

Assistant Professor, Department of CSE, Muthayammal Engineering College, Rasipuram, Namakkal, India<sup>1</sup>

U.G. Scholar, Department of CSE, Muthayammal Engineering College, Rasipuram, Namakkal, India<sup>2,3,4</sup>

**ABSTRACT:** Blindness or visual debilitation is one of the huge problems in the civilization that influences many individuals around the world. Voice Recognition (VR) helps visually impaired people to access e-mail and other multimedia functions of portable devices. Nowadays, the development made in computer technology open platforms for visually impaired people across the globe. The rapid growth of AI and Mobile Computation (MC) brings more suitable life to the visually impaired people. This paper analysis the data of previous versions of mobile models and implemented the paper by using Natural language understanding (NLU), Voice Recognition (VR) and Synthesis Voice Recognition (SVR) for blind people to communicate each and every information from the mobile device. Also, this paper focused on designing and implementing an assistive system for visually impaired people while using Android smart phones. The system, Voice Recognition (VR), integrates open sources and also enhances many functions. Furthermore, it provides the Navigation Reader for riding and walking, which is based on Google Maps and supports more detailed voice guidance for the distance to a destination and directions of moving. Other than that, we can implement the new features by changing the pattern voice recognition for blind people

**KEYWORDS:** Artificial Intelligence, Natural Language Understanding, OCR Reader, Text to speech, Voice recognition, Voice commands.

### I. INTRODUCTION

In this globe, innovation is increasing so far not for visually impaired persons. Visually impaired persons are the ones who are partially or completely sightless. According to an estimate made by the WHO (World Health Organization) 285 million of the population endure from visual impairment and 39 people were blind and approximately 3% of all the ages in a state are visually impaired peoples. The leading causes of blindness are trachoma, glaucoma, cataract and moreover deficiency like onchocerciasis, leprosy and Vitamin A. citizens who are visually impaired endure a lot and then face great challenges in their day to day life for instance finding their technique and instructions and also to places which they do not visit frequently. Visual aids such as spectacles cannot be a cure for blindness. Although medicines fail to restore the sight of the visually impaired, an assistive technology assists them to carry on with their everyday life and also improves their quality of life. With the help Artificial Intelligence and Machine Learning, we have aimed to improve the facilities for visually impaired people.

The overwhelming raise of the number of mobile devices as well as their availability all over the place provides us with the chance to use them to assist the blind peoples. The initiative is to use standard mobiles, with specialized user interfaces to assist the blind in their daily operation. Blind Helper depends on the cloud for performing heavy computation, such as speech synthesis and voice recognition. It combines this with a perceptive user interface which fits the requirements of a blind User. In order to support blind or visually impaired people's mobility indoor and outdoor, the proposed work a simple GPS system which is efficient and configurable. The proposed guidance system is able to determine the Navigation Reader for riding and walking. Moreover, Voice Guidance (VG) for the distance to a destination and directions of moving based on Google maps. Moreover, neither cane nor other marked tool is needed to

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be carried by the user. Like other systems, the proposed system can be reliable and there are no credentials to make it easy.

The Voice Guidance system is broadly categorized in two ways:

## 1. Speaker Identification

Identifying a voice of a given language from the group of given speakers is known as speaker identification. In this method, training phase is used for Input signal speech and testing phase is used for Speaker's identity.

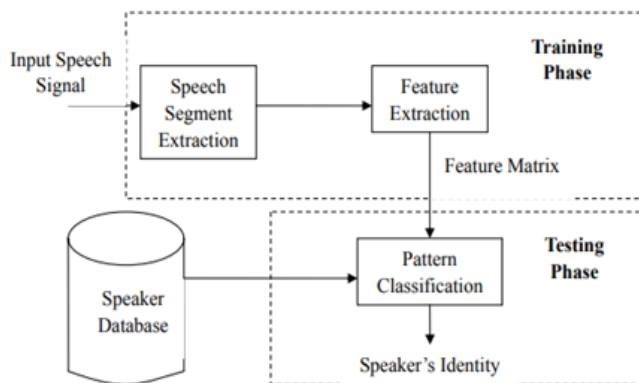


Fig.1.Speaker Identification System

## 2. Speaker Verification

Accepting or rejecting the identity claim of a speaker is known as Speaker Verification. This method is used for the verification of the person claiming for confirmation.

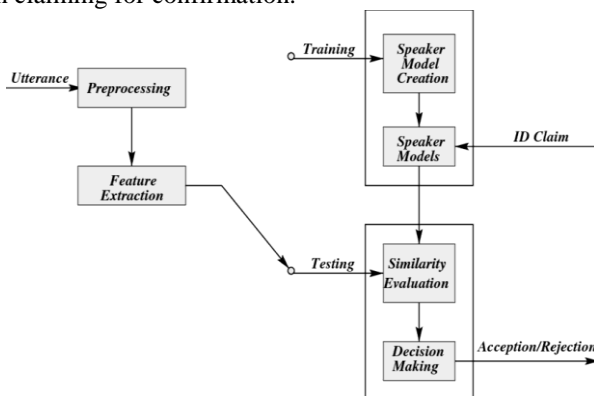


Fig. 2. Block diagram for Speaker Verification System

## II.RELATED WORK

The journey of mobile communication began with 1G followed by 2G,3G,4Gand beneathinvestigatefuture generations 5G. To provide an overview of evolution of mobile generations by comparing the data rates, capacity, standards, primary service, challenges and features.

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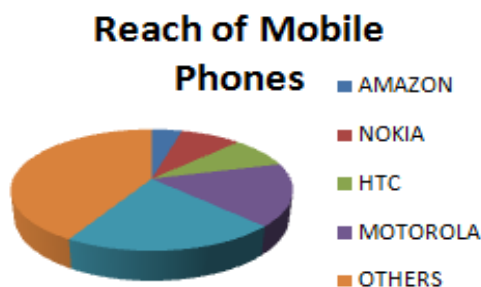


Fig.3. Reach of mobile Phones

In this chapter, a brief description of different papers about the voice commands and data collections. In modern years, a number of studies have discussed the problems of voice recognition techniques to discover the efficient path of the mobile phones, Speech synthesis can be described as artificial creation of human language and TTS(Text-to-speech synthesizer) is the technology that lets computer talk to you. The TTS synthesis process consists of two major phases, first is text analysis, wherever the input text is transcribed into a some other linguistic representation or phonetic and the second one is the generation of speech waveforms [1].

The blind user has to select a file and then the selected file be supposed to be in either .doc or .ppt file format. The file is converted into pdf file format while it is selected and the text present in the file format is reconstructed as a group of words[2].

Recent paper explained the Navigation to different places, sending SMS messages and placing voice calls, books and signs reading, and social networking. The entire functionalities are performed using standard mobiles. The heavy weight computation is delegated to the cloud through the Microsoft Project Hawaii framework [3].

Several researchers deal with this challenge in both indoor and outdoor surroundings. Although most of these approaches have restrictions, while this challenge involves many issues SUCH AS accuracy, coverage, usability and interoperability which are not easy to deal with the current technology [4][5][6][7][8][9]. For blind people, this system can be used for indoor navigation system. This system consists of the following functional mechanism: assistance for determining the user's location in a construction, a comprehensive inner map of the construction [10].

### III. EXISTING SYSTEM

Blind person arrive across a number of challenges in everyday life from reading a book to walk on the street. When the blind or visually impaired discover themselves in an area they are not well-known with, they feel lost and their safety is at great hazard. Modern systems do not function in GPS-denied indoor environment and do identification for only particular landmarks encountered by the person. Numerous tools are available to gather the challenges faced by them, however they are not enough. Visually challenged people require an assistant to bring on work on daily origin.

#### DISADVANTAGES

- Difficult mapping technology through a variety of devices.
- Blindness makes the person depend on another person for all their works and daily responsibilities.
- Online method only supported for blind people.

### IV.HARDWARE DESCRIPTION

#### A. Voice Recognition

This is an easy to use Voice Recognition Module which communicates over UART protocol with the processor/controller board. Voice commands can be stored in the memory of this voice recognition module and it will detect the voice whenever the same sound is captured by the microphone. The module is easy to operate with any microcontroller board like Arduino , 8051, AVR, Raspberry-Pi, Beagle board etc.

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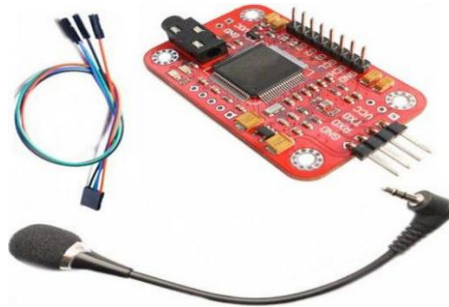


Fig.4.Voice Recognition board

## B. ASR METHODOLOGIES

Speech recognition research has been ongoing for more than 70 years. Over the period, there have been at least four generations of approaches and a forecast of fifth generation that is being formulated based on current research themes.

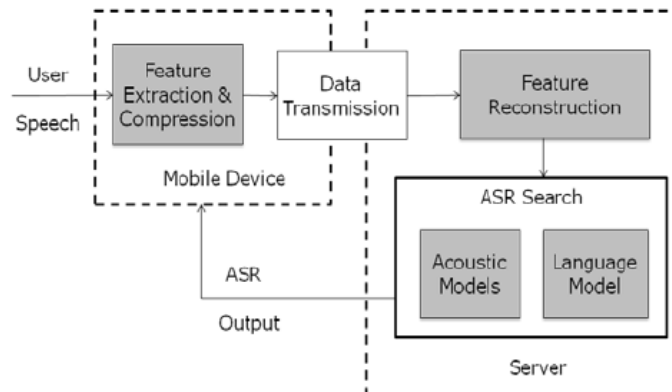


Fig.5.Architecture for voice command

## V. PROPOSED SYSTEM

The main goal of this paper is to provide information regarding the handling of mobile phone through a voice by providing continuous audio feedback in his/her understandable language. Speech Recognition Service makes the blind input needs and gets the voice through whole application process in mobile phones. Text to Speech Service this is used to enable the device to give voice feedback to the blind person. It can be used to handle processing of information which means that it needs to be connected to the internet for any kind of feedback or responses.

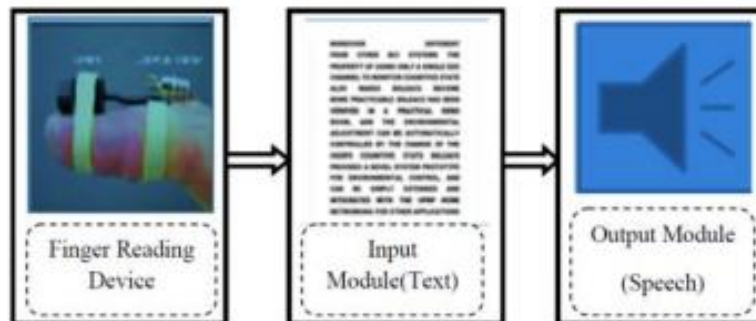


Fig.6. Architecture diagram

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## VI. MODULE DESCRIPTION

### 1. Connecting to GPS

In general, Bluetooth is used to connect GPS receivers to mobile phones. We use Compact Flash and SD GPS receivers. These devices insert into normal and standard slots on devices and also built in GPS receivers require no link. USB GPS receivers frequently come with a USB cable always attached and then connect to normal USB ports on mobile phones.

### 2. Finger reader modules

This module was originally established for reading text formats. It can be a finger-based form causes with small rings. The camera is attached to an modifiable Velcro ring with the camera inserted on the center of the ring and also the quivering sensor which at the corner of the ring for finger movement then control in our present pattern. use a wrist-mounted Arduino board with an attached Bluetooth module that controls the haptic feedback cues is used for processing.

### 3. Optical Character Recognition(OCR)

Optical character recognition module is the electrical or mechanical translation of images of printed, handwritten, or typed text into machine-encoded text. It is a mutual process of digitizing printed text so that it can be used in machine process such as text-to-speech.

### 4. Text to Speech Module (TTS)

A text-to-speech system converts normal text into speech other systems render symbolic linguistic representations like phonetic transcription into speech. It is composed of two parts: a front-end and a back-end. These system processes following by the applications.

- i) **Splash Screen and speech-to-Text:** After unlocking the phone the system will launch Splash Screen application. In Speech-to-text user will enter keywords such as "call", "message", "battery", "date", "Bluetooth" for launching specific application.
- ii) **Call:** The user will enter number through voice to make call. When user will get an incoming call the system will identify the number and inform it to user through voice.
- iii) **Contact:** With this Application user can add delete contact. The user will enter contact number and name through voice.
- iv) **Message:** User will enter number and message through voice and when user will get an incoming message the system will identify the number and message and inform it to user through voice.
- v) **Date and Battery:** Application will identify current date & time and for battery the application will check status of remaining battery and inform it to user through voice.
- vi) **Bluetooth and Internet Connectivity:** User has to click on the screen to know Bluetooth and internet connectivity status.

## VII. PERFORMANCE ANALYSIS

The evaluation of features among various research papers according to the correctness of features are displayed in "table 1". From the comparison table we can conclude that the proposed system acquires more features than the existing system. The table 1 shows Where M 1- (Proposed) Personal AI Assistant for Visually Impaired ; M 2- Visual-Pa: A Mobile App for Object Recognition for the blind people; M 3- Image Recognition for Blind People by Sound, M 4- Character Detection and Recognition System for blind people.

The comparison is done between the following features

1. Object recognition
2. Landmark detection
3. Textual analysis
4. Interactive
5. Voice input
6. Response and
7. Multilingual properties.

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Features	M 1	M 2	M 3	M 4
Object Recognition	✓	✓	✓	✗
Landmark Detection	✓	✗	✗	✗
Textual Analysis	✓	✗	✗	✓
Interactive	✓	✗	✗	✓
Voice Input & Response	✓	✗	✓	✗
Multilingual	✗	✗	✗	✗

Table 1: Comparison of features

## VIII. CONCLUSION

In this paper, implementation is based on offline process which helps in navigating the path step by step through voice command. The system helps blind and visually impaired people to be highly self-dependent by assisting their mobility regardless of where they are; outdoor or indoor. The main goal was concluded by cost effective system and easier to handle for a visually impaired persons. The application based system was developed to detect the blind person to avoid obstacles. This system will helpful for the blind people to come out of their blackness with the help of technology they can attain their own field of curiosity.

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