

Survey on Android Applications for Visually impaired or Blind people

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Abstract— It is estimated that 285 million people globally are visually impaired with 39 million blind and 246 million with low vision [1]. The large number of blind and visually impaired individuals in the society has motivated research groups to search for smart solutions that use vision-based technologies to improve their quality of life. The mobile phones have become an essential element of any communication media. In the past few years, many standard mobile devices have started to include screen reading software that allows blind people to use them. For instance, Google's Android platform and the Apple iPhone (starting with the 3GS) now include free screen readers. The iPhone has proven particularly popular among blind users, which is why they developed VizWiz Social for it. With the availability of an accessible platform, a number of applications has been developed for blind people, including GPS navigation applications, OCR readers, and color recognizers etc. In this paper, a study on various methodologies has been done along with survey on papers related to Android applications for Blind or visually impaired.

Keywords: *Blind, Android Application, Visually impaired, Speech recognition, GPS, Navigation, location.*

I. INTRODUCTION

Till now many applications have been developed for visually impaired and blind to help them in their social life and allow them to live like normal people. There are many people who make use of Smart Phones and Android phone. The numbers of handicapped people especially visually impaired people are increasing day by day. There are many android applications which will help blind people to Travel from one place to another. This paper mainly aims to show a proper route to blunt persons. Advances in wearable computing, voice recognition, wireless communication, GIS and GPS have made possible to address the visually impaired and disabled navigation problem [8]. This paper represents a survey on various methodologies like Speech recognition, GPS based location access and emphasize on work related to android application for visually impaired or blind people.

II. EXISTING METHODOLOGIES

SPEECH RECOGNITION

“Speech recognition for application is done on Google server, using the HMM algorithm. HMM algorithm is briefly described in this part. Process involves the

conversion of acoustic speech into a set of words and is performed by software component. Accuracy of speech recognition systems differ in vocabulary size and confusability, speaker dependence vs. independence, modality of speech (isolated, discontinuous, or continuous speech, read or spontaneous speech), task and language constraints”.

Speech recognition system can be divided into several blocks: feature extraction, acoustic models database which is built based on the training dataset, dictionary, language model and the speech recognition algorithm. Analog speech signal must first be sampled on time and amplitude axes, or digitized. Samples of speech signal are analyzed in even intervals. This period is usually 20 ms because signal in this interval is considered stationary. Speech feature extraction involves the formation of equally spaced discrete vectors of speech characteristics. Feature vectors from training database are used to estimate the parameters of acoustic models. Acoustic model describes properties of the basic elements that can be recognized. The basic element can be a phoneme for continuous speech or word for isolated words recognition. Dictionary is used to connect acoustic models with vocabulary words. Language model reduces the

number of acceptable word combinations based on the rules of language and statistical information from different texts. Speech recognition systems, based on hidden Markov models are today most widely applied in modern technologies. They use the word or phoneme as a unit for modeling.

The model output is hidden probabilistic functions of state and can't be deterministically specified. State sequence through model is not exactly known. Speech recognition systems generally assume that the speech signal is a realization of some message encoded as a sequence of one or more symbols [2].

A. SPEECH SYNTHESIS

Speech synthesis is the computer-generated simulation of human speech [9]. Speech synthesis is a speech generated by a computer for people with physical disabilities or visually impaired or the people facing difficulties in reading small sized text. Speech synthesis is also referred to as text-to-speech (TTS). In Speech Synthesis process first the text is analyzed by using natural language rules. Analysis of text is done character by character to determine the grammatical details and parts of speech. For example, where the sentences begin and end, tense of sentence, which words are proper noun, pronoun, number and so on. Clearly understanding how a word or a phrase is being used is a critical aspects of speech synthesis. Some non-trivial analysis is used to generate the appropriate sound for the text.

B. GPS

GPS is a radio navigation system using satellites and it is developed by USA Department of Defense for military use navigation but it can be used by citizens with a limited range. It predicts radio coverage from satellites to a receiver, then it shows the exact 3D location, speed and time. This system can be universally used for 24 hours, and many people can use it. This GPS system can be divided into 3 different segments; SS (Space Segment), CS (Control Segment), and US (User Segment). SS (Space Segment) represents the location of 24 satellites that rotate around the Earth every 12 hours. As of April, 2007, there is a total of 36 GPS satellites with 30 of them are active and 6 of them are

preparatory satellites in case of malfunction. CS (Control Segment) represents a general observation post that manages and tracks GPS satellites. US (User Segment) represents GPS users and GPS receiver [3].

III. LITERATURE SURVEY

This section presents the survey on Android applications for blind or visually impaired people.

In this paper [4] Siddhesh R Baravkar, Mohith R Bord and Mahendra K Nivangune developed Android Text Messaging Application. The messaging can be completely voice based. The proposed application is a messaging system which is voice enabled. The application listens to your messages and then responds with voice commands by talking. The application converts your text into voice and voice into text. For android it is voice to text technology to listen to what you send and gets you connected with people.

Limitation: This application always run in the background and hence drains a lot of battery.

In paper [5] Poornima.P, V.Sriteja Reddy proposed ARM7 based Smart bus Passenger-Alert System using GSM with GPS based Location Identification. In which they have presented an intelligent real time alarming system which senses the destination location which is taken as input from the passenger. This system also includes android mobile alert application. After the passenger reached the destination, bus system alert the passenger through SMS with android application in passenger mobile and also assisted with alarming system in case of excessive amount of temperature in case of smoke identification which leads to the fire accidents.

Limitation: In this system development, tools like IR sensor and gas sensor has been used for navigation, making the application expensive which are not required in our application for navigation.

In paper [6] Renu Tarneja, Huma Khan, Prof. R. A. Agrawal, Prof. Dinesh. D. Patil proposed to develop interactive application which can run on the tablet or any android based phone. The application helps the user to open

any application as well as call any contact through voice. Users can command a mobile device to do something via speech. These commands are then immediately executed.

Limitation: This proposed application needs to run always in a background; hence it drains a lot of battery power.

In paper [7] G. Lavanya M E et. al. projected Passenger Bus Alert System for Easy Navigation. In this project they proposed a bus system using wireless sensor networks. The blind people in the bus station are provided with the ZIGBEE unit which is recognized by the ZIGBEE in the bus and indication is made in the bus that the blind is present in the station so that bus stops at particular station.

Limitation: Passenger Bus Alert System requires ZIGBEE unit presence with blind people at the bus station and in the bus too. Hence it increases the implementation cost .

IV. CONCLUSION

A comparative analysis of different Android Applications for Visually impaired or Blind people discussed in this paper has been presented below. Table 1 compares the four applications based on different parameters as shown:

Applications/ Systems Developed	Requirement to run in background	Extra hardware requirement	Cost	Limitations
Android text messaging application for visually impaired	YES	NO	LOW	It may not work properly Or may not be able to recognize proper command in noise
ARM7 based Smart bus Passenger-Alert System	NO	YES	HIGH	Different sensors are required which increases the complexity as well as cost.
Voice commands control recognition android apps	YES	NO	LOW	Runs always in background.Hence battey drainage is more

Passenger	NO	YES	HIGH	Zigbee provides a
Bus Alert System For Easy Navigation Of Blind				limited coverage and sometimes a congestion may also occur.

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