

An Interactive Mobile Application for the Visually Impaired to Have Access to Listening Audio Books with Handy Books Portal

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Abstract—Mobile phones are used in almost all aspects of life by people. But in the case of visually impaired, they are still a step behind in using smart phones for various purposes. Having interactive android OS, navigation and travel aiding apps using sensors and voice user interfaces (VUI) or the voice response systems, we are still a step lagging in giving them an application for educational purposes. This paper proposes a complete new idea of having a portal where they can store audio books aided with interactive system so that they can use them whenever needed.

Index Terms—visually impaired; educational; audio books; portal; VUI;

I. INTRODUCTION

Usage of mobile is relatively high with respect to the advancements in technology. But the blind people are a step backward in using the mobile applications. For them, they're limited to use mobile for communicating to each other in basic model. Here with the advancements in mobile computing, there are advancements in educational institutions. Blind are usually away from learning portals because of their disabilities.

This paper uses the voice user interface to interact with the blind. Handheld devices can be of great use when it comes to educational purposes. With this app installed, the blind can login to the portal; they will have listed books available which will be read out by the voice in the app. They can choose which ever book they want and they can listen to it, ultimately reducing the waiting time for scribes. They can learn efficiently about course related and other leisurely books.

II. RELATED WORKS

A. Mobile Reader For Visually Disabled.

The voice user interface by proposed model Tyflo^[1] recognizes specific commands. When user speaks, it maps the word from the command database, works accordingly and brings out the desired output on to the screen. For example, "Read Article" command from the user reads the article. "Move Paper Up" changes to next successive page.

B. Mobile gaming for Visually Challenged Children.

An affordable, learning centered mobile application for visually impaired is proposed through this paper. Graphics for visually impaired is still a major headache for they will not be experiencing them completely without vibrations. This model contains three inputs: Stimuli getting, re-

sponse determining and output giving. Using psychomotor activities^[2] and sensors, the intellectual use of their brain is enabled. This allows them to play games with auditory control.

C. Audio reality mobile application that helps to navigate.

This application utilizes GPS, Wi-Fi and 3G data services which enables the user to use Google map to navigate. With the help of Smart Robot (SR)^[3] and sensory devices installed, when the user meets the obstacles in their path, the application senses it and shows warning. The visually challenged person also gets information about the nearby places and ways to navigate/reach to it with this application.

D. Display for visually impaired people in mobile phones.

Background consists of color, size and location. Foreground consists of text. Auditory display is used for the foreground display. Auditory and tactile modality^[4] is used for the background display. Blindfolded users performed operations very quickly when these services were offered. Foreground display becomes the dominant suggests that of representing data through auditory and tactile modalities like TTS and Braille display.

E. Hands free navigation system for Visually Challenged people.

With the help of this voice enabled system, which is already proposed and available, one can search queries from the search engines through related keywords. It proves to be a hands-free navigation system to the visually challenged people. The voice enabled system^[5] is having five different phases: parameter extraction, partitioning, sound clarification, sentence analysis and word determination, and word recognition. The major leap in developing apps for visually impaired pioneered here from this application development.

III. PROPOSAL AND IMPLEMENTATION IDEA:

With the help of interactive OS idea proposed by Tyflo which recognizes specific commands and the voiced enabled system for android, with reference to the above related works, it is possible to design an application which will be used by the blind users to read books and know information.

It is not possible for the blind users to get access to various information that are available all through the limited

scribes and readers. With the evolution of hand-held devices, we should enable an application that enhances the reading needs of the blind people. We hereby propose an application, which will contain course materials and related books as well as books for leisure time which includes contemporary and classical novels.

This application will have a backup database, which will run once the application is turned ON. The application will automatically generate the audio response to notify that the application is ON. It asks the user to choose between the available domains. Once the user chooses "COURSE MATERIALS", the educational & course related audio book list is read out by the voice user interface (VUI).

If the user chooses the other available category, "Leisure books", all the other books from various domains are read out again to the auditory of the user by the Voice User Interface (VUI) again.

After it reads out, there is a pause for user to give out response. The user should specify the filename or the keyword related to the book; the application will search the database and will call for the next possible command. If the book is not available, it notifies that too. When the user asks the application to read the book, the response & voice output modules works accordingly to start the playing of the specified audio book.

The application will contain different modules which forms the building block of it to illustrate how it works:

1. Recognizing Module.
2. Response Module
3. Voice Output Module (When searched book is available).

All these modules are coordinated accordingly by the application when the user calls for the book. The coordination between them is depicted as follows, as depicted in the figure:

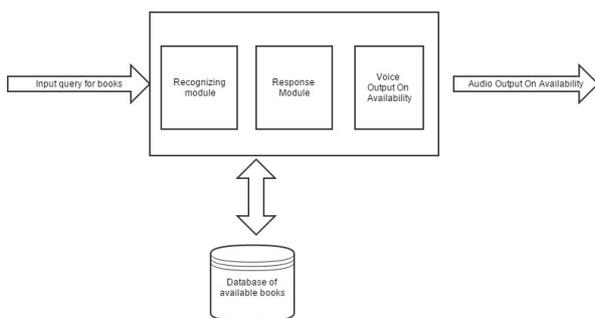


Figure 1. Proposal Model

The Recognizing module consists of already implemented voice enabled system which makes use of the five parameters for its active working. The Response model will work based on Tyflo which recognizes basic commands and works accordingly to match the words with keywords. For instance, if the user says the word "artificial" to the with the application ON, the application will immediately search for the books that are related to "artificial", say if artificial intelligence book is saved in the database, it is retrieved.

IV. ILLUSTRATIVE ALGORITHM ON HOW IT WORKS

Install the app in the mobile.

```

If (AppIsON)
Switch ()
Case 1: Course Books;
Break;
Case 2:LeisureBooks;
Break;
If(CourseBooks)
{
Read out the entire list of course books;
Get the voice input from user;
If available, retrieve it;
else VoiceOutput : No files found;
}
If(LeisureBooks)
{
Read out the list of non-course books/ author name;
Get the voice input from the user;
If Available retrieve it;
Else VoiceOut: No files found;
}
    
```

i. To Save A Book To Database:

```

If(AppIsON)
{
KeyWordBook();
//Usually user should specify the name of the book for
easy retrieval
SaveBook();
//The book will be saved to the database
}
    
```

ii. To Remove A Book From Database:

```

If(AppIsOn)
{
CallForKeyword();
Deletebook();
//It removes the book from the database permanently.
}
    
```

Other than these operations the following operations will be available to use the application. When the user voices out these following simple commands, the application will work accordingly for the usage of books.

Table I shows the operations that are defined as simple commands to the user-end:

TABLE I. OPERATIONS

COMMAND	USAGE
ReadBook()	It opens the audio book.
CloseBook()	It stops the audio book.
TurnPageUp()	Goes to next successive page.
TurnPageDown()	Goes to previous page.
Pause()	Stops temporarily.
DeleteBook()	Deletes the book permanently
SaveBook()	Saves book to database.

V. UML SEQUENCE DIAGRAM ON HOW IT WORKS

"This sequence shows how operations are carried out in the application with passage and reception of messages. [6]". As the definition suggests, now a sequence diagram on how the application works is depicted. Using the commands, the interaction between the user, application with VUI and the books database takes place. Each request and response is timed.

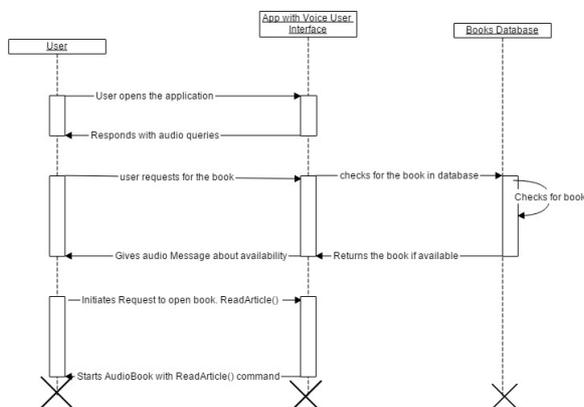


Figure 2. UML sequence diagram that shows the working.

As mentioned earlier, the user opens the application, requests for the book from the domains available. The application retrieves the book from the database if it is available. The user then initiates to perform operation of reading or any other operation for that instance as desired. This is the working of this application in the mobile.

VI. CONCLUSION

Mobile phones with android are quintessential thing in today's world. It is pretty tough for the blind people to get scribes and readers in the busy arena. They can make use of this application to update themselves in various domains with reading books. Blind people are limited to using mobile phones to calling. With the development of Virtual OS and the Voice User Interface (VUI) they can develop their knowledge with this application installed

since it is an portal for storing audio books aided with interactive system which involves less manual power or scribes for the blind.

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