

# Design of a browser for people with low vision

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**Abstract**— Internet has become a major source of exchanging information across the globe. It is the fastest as well as easiest way of accessing information. Browsing through internet minimises effort and maximises result. However, the internet has to be useful to even the visually impaired people. They require a special type of browser for this purpose. Our main objective is to design browser with three modules namely Input module, Text reorganisation module and Output module. Here we make use of Text-to-Speech engine for conversion of text into speech format depending upon the requirement of the visually impaired user.

**Keywords**— special browser, input module, text reorganisation module, output module, Text-to-speech engine.

## I. INTRODUCTION

Modern information-technology features are often not suitable for blind and visually impaired people. For them, Braille code is a common aid. This type of coding requires special editions of written corpora or special additional hardware components when used with computers. The solution is relatively costly and requires special skills from the user.

Over the past ten years a considerable advance has been made in the development of automatic Text-to-speech and speech recognition systems. Such systems offer a more natural and user friendly way of communication for the blind and visually impaired persons. The communication goal can be achieved faster and they offer access to large text corpora via modern technical equipment and have relatively lower price. By considering all these we are providing a browser which gives the user a best way to browse the net which satisfying all the users need. With our browser, one can browse the sites without the help of an external person. Some may be in need of a special site, that is not needed by another one. There can be situation in which the user need an entirely different site.

All the existing systems the websites specially designed for the visually impaired persons can be accessed through various channels. They all provides the same type of purposes. But there is no such existing browser which consider all types of user's need and allow the user's to browse different sites according to their choice. This is actually to make benefit from this persons for marketing purpose. Hence there is a need to develop special type of browser intended for visually impaired people.

The proposed system i.e., the browser for the visually impaired people has the following features like,

- There is no need for the specially designed system. Ordinary browsing can be done with this browser.
- An efficient Text-to-speech mechanism and speech synthesizer is used.
- It will be offering a very good and simple user interface than the existing one.
- It will minimises the interface of externals while browsing.

## II. MOTIVATION

With the existing browsers having features only for the ordinary people, blind people need a special type of browser that has the features that make the browsing easier. Some browsers have already been developed for the visually impaired people like the IBM Home page reader and Webbie and other browsers. But they are lagging in some or the other important features that are required for the blind or visually impaired people access the web.

The objective is to concentrate on all areas and add new valuable features for the visually impaired persons. Also to increase the user interface. The accessing of database should be easier and faster. The windows application must be required for the user interface of the browser.

## III. MODULES OF THE SYSTEM

The proposed system i.e., the browser for the visually impaired consists of three modules:

1. Input Module.
2. Text re-organisation Module.
3. Output Module.

### A. Input module

This module will help the blind users to interact with the system. It shows an option for the user to enter a category and divisions under the categories and the url of corresponding categories.

When the url is selected corresponding url will be passed to the browser and it will fetch the page and pass it to the user. Each url will be given a unique number and basing on that number the url can be accessed.

### B. Text re-organisation module

This is the most important module because it fetch the data and links separately from the web page contents that is fetched by the input module. There will be many links in a web page. So sorting out of data and links separately from the web page is difficult. Here we first analyse the web page whether it is inside paragraph tags or body tags etc. and then the corresponding data is fetched and handed over to Text-to-speech mechanism. In the same manner all the data included in href tags can be considered as links and that also will be taken over. The steps involved in this module are

1) *Passing the web page selected to the parser:* The web page is sent for parsing using the parser.

2) *Extract the data and the links:* The web page is extracted and the links are observed and the unnecessary links are removed.

3) *Display and read it to users:* After reorganising the content of the web page, it is presented to the user in a hierarchical manner.

**C. Output module**

Here we need to convert text to speech and present it to the user. Synthesized speech can be created by concatenating pieces of recorded speech that are stored in a database. The quality of a speech synthesizer is judged by its similarity to the human voice and by its ability to be understood. An intelligible text-to-speech program allows people with visual impairments to listen to the speech output.

A text-to-speech (TTS) system as shown in Fig.1 converts normal language text into speech; other systems render symbolic linguistic representations like phonetic transcriptions into speech. Synthesised speech can be created by concatenating pieces of recorded speech that are stored in a database. Systems differ in the size of stored speech units a system that stores phones or diphones provides the largest output range, but may lack clarity. For specific usage domains, the storage of entire words or sentences allows for high quality output. Alternatively, synthesizer can incorporate a model of the vocal tract and other human voice characteristics to create a completely “synthetic” voice output.

A text-to-speech system is composed of two parts a front-end and a back-end. The front-end has two major tasks. First, it converts raw text containing symbols like numbers and abbreviations into equivalent of written-out words. This process is called tokenization. The front-end then assigns phonetic transcriptions and is called text-to-phoneme conversion. The back-end is called synthesizer converts symbolic linguistic representation into sound. The quality of a speech synthesizer is judged by its similarity to the human voice and by its ability to be understood.

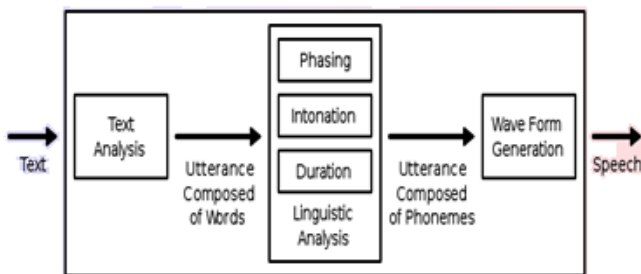


Fig.1 Text to speech conversion process

**IV. EXPERIMENTAL RESULTS**

In order to develop such browser, we have used the java frames and the database has been connected to these frames. The user has to enter his options and then browse the web basing on the search results obtained. The sample screen shots are as follows:

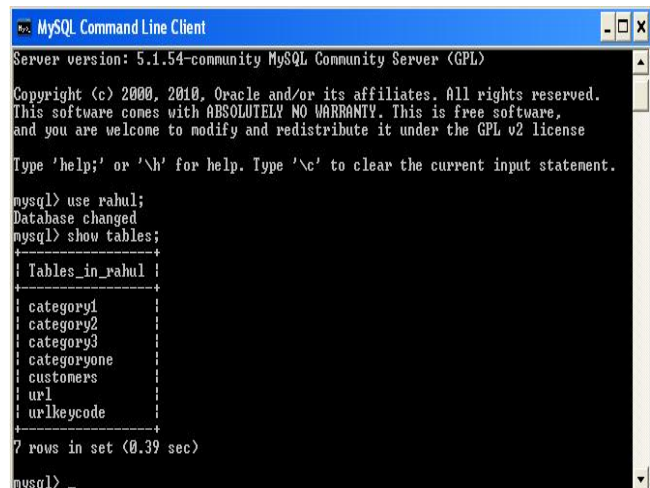


Fig 1 Connection using database



Fig. 2 Browser home page

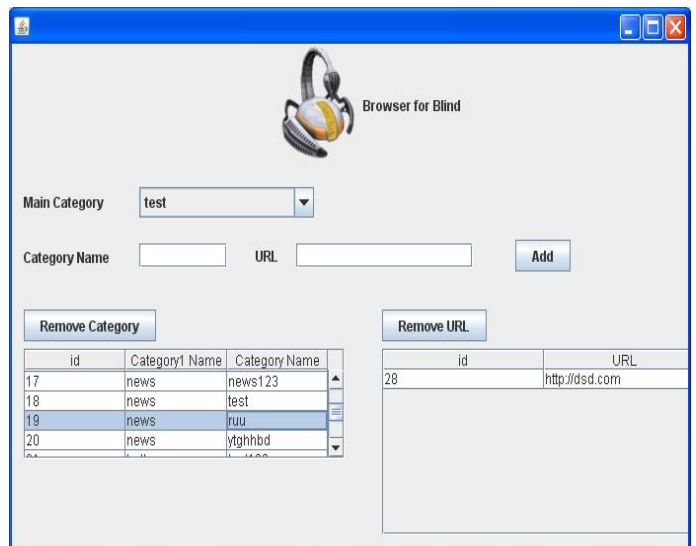


Fig 3 Entering the categories by the user

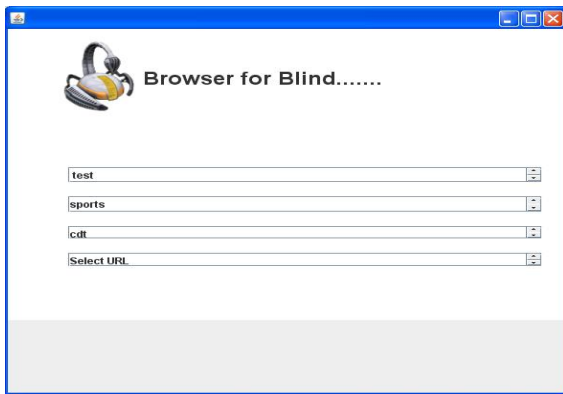


Fig 4. Selecting from categories and url for browsing

## V. CONCLUSION

The proposed browser achieves the goal and solves the problem by using logical concept. Here the external interface is limited and the user interface is easy. However we can add new features like adding more categories and implementing effective searching and also we can make the commands as responses and we can traverse through the webs.

Being open source, future developments can be accepted and performed very easily. Fast information retrieval and access methods must be implemented. The blind or visually impaired people should find themselves less dependent on the bystanders that help them in giving the necessary input. The browser is also expected to be more user-friendly by accepting further changes and hopefully reducing the gap of information availability between sighted and visually impaired people and make the people with low vision browse like the ordinary people.

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