

Hands Free Web Browser

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Abstract— The role of the Internet in the life of everyone is becoming more and more important. People who usually use the Internet are normal people with no physical disabilities. Unfortunately, members of society who are physically handicapped are isolated from accessing the Internet. Hence, to help the physically handicapped people and in general to enhance the speed and security of the browser, a special browser has been developed with a new approach in the technology world called as Hands Free Web Browser – A Voice Browser. Unlike conventional browser, the proposed system responds to voice commands. It is characterized as an economical and humanitarian approach because it is handicap-friendly and is especially helpful to those who cannot use their hands. The proposed browser is an android computer application that browses the Internet and displays information on the screen with a better and faster Internet experience securely. hence, the main focus of proposed system is to surf the Internet fast by smart caching through voice commands, to enable multitasking i.e, user can browse the Internet and at the same time we can navigate the browser, this is achieved because of voice commands and access control and it is secure, since it provides an option called incognito mode to surf the Internet privately in which no browsing history and passwords are stored. It also provides simple user interface and it supports for different files like pdf, media etc. In the implementation, proposed browser is compared with traditional browsers and results shows that voice browser is more active since it has to issue voice commands and normal browser are more passive due to the persistence of visual information. The proposed system is faster than the normal browsers because of its pre-fetching ability. The proposed system provides more reliable access control to the user than the normal browser. Therefore, Hands Free Web Browser is a voice command driven browser for the disabled. It's a new and advanced smart web browser developed to enhance speed and security.

Index Terms— WEB, Browser, Smart Cache, Voice Recognize

I. INTRODUCTION

Internet is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide [1]. HANDS FREE WEB BROWSER is android application which uses Google voice API as an interface to accept browser command from the user through voice. This browser focus only on easy of use and performance. The browser comes with a simplistic design with no ads and viruses. This browser is not like any other browser existing in the market. A browser job is to browse the web page this slogan motivated us to create this application with some added tweaks. A Browser should browse web page as fast as possible. This fast browsing mechanism is achieved through smart caching mechanism. Voice Browsing refers to using speech to navigate an application. These applications are written using parts of the Speech Interface Framework. In much the same way that Web applications are written in HTML and are rendered in a Web browser, speech applications are written in VoiceXML and are rendered via a Voice Browser. This application comes with several features such as login mechanism, smart caching, display only images, incognito mode, support to view pdf and other files. These are the primary features of this browser and new features will be available in future application updates.

HANDS FREE WEB BROWSER - The handicapped person is a person who has a special condition that markedly restricts his ability to function physically, mentally or socially [3]. The application tries to combine these three terms (Internet, web browsing and handicapped) to work all together and become a reality. There are several different web browsers available in the Internet world. The several types of browsers could be used by normal people who can use their hands. Internet usage has become a part of the daily life in a society that contains different types of people such as children, adults, and handicapped, each with their different abilities. Unfortunately, the handicapped faces difficulties in using the different general browsers. There is a need to create a special browser to target these people. The change in the routine style of browsers is a state-of-art design which provides a multifunction process through combining voice. This has worked out to combine the voice with the Internet browsing, which would help the handicapped to use the Internet in an easy and direct way. Assuming that the computers operating system is running on and that the program is in the startup programs, the focus would be on browsing the WWW through voice commands. This application is designed for humans and to restore humanity. Situations like writing a paper and need to search some information or download an important file both at the same time. Basically when you are stuck with multiple tasks in hands and you have no time to surf the web, this application comes into picture. There are 10 times as many phones in the world as connected PCs. Phones will become the major portal to the Web. Voice browser is not yet widely associated with the visual Web, but this will change as devices continue to shrink and make keyboards impractical, and as cell phones become more prevalent in regions with low literacy rates. This application will get new amazing updates in future like it will include a text to speech converter that will read the content of the web page when you don't have time to look at it and many things.

The proposed application is user friendly, there is no need of any experience to operate this application, we believe in simplicity. Starting from Android 2.2+ this browser is supported. Its very light weight not like other application whose size varies from 10 to 40 MB. The application comes jam packed with support for new Internet protocols. So development of this application will provide a new browsing experience for user who are stuck in old browsers and help people also and provide facility to access the web. A voice browser obtains information using speech recognition and keypad entry. From an end-users perspective, the impetus is to provide a service similar to what graphical browsers of HTML and related technologies do today, but on devices that are not equipped with full-browsers or even the screens to support them. The proposed voice browser developed to help the handicappers to browse the Internet easily. This objective was achieved through a combination of voice commands with Internet browsing. Hands free web browser is more faster than the existing system because of its pre-fetching ability. This proposed system aims to develop an Internet browser with a new approach in the technology world.

Further the paper is organized as follows : section II focuses on Literature Survey, Section III focuses on Propose Work, Section IV reveals the implementation details, Section V reveals Execution Results followed with Conclusion section.

II. LITERATURE SURVEY

The first web browser was invented in 1990 by Tim Berners-Lee. Berners-Lee is the director of the world wide web consortium (w3c), which oversees the webs continued development, and is also the founder of the world wide web foundation. This browser was called world wide web and later renamed nexus [5], although browsers are primarily intended to use the world wide web, they can also be used to access information provided by web servers in private networks.

The major web browsers are firefox, internet explorer/microsoft edge[2][3][4], google chrome, opera, and safari. The first commonly available web browser with a graphical user interface was erwise. The development of erwise was initiated by robert cailliau. In 1993, browser software was further innovated by marc andreessen with the release of mosaic- the worlds first popular browser [6], which made the world wide web system easy to use and more accessible to the average person. The introduction of mosaic in 1993 is one of the first graphical web browsers that led to an explosion in web use. Andreessen, the leader of the mosaic team at National Center for Supercomputing Applications (NCSA), soon started his own company, named netscape, and released the mosaic-influenced netscape navigator in 1994, which quickly became the worlds most popular browser, accounting for 90 percent of all web use at its peak .

Microsoft responded with its internet explorer in 1995, also heavily influenced by mosaic, initiating the industry's first browser war. Bundled with windows, internet explorer gained dominance in the web browser market; internet explorer usage share peaked at over 95 percent by 2002 [7].

Opera debuted in 1996; it has never achieved widespread use, having less than 2 percent browser usage share as of february 2012 according to net applications. [9] opera - mini version has an additive share, in april 2011 amounting to 1.1 percent of overall browser use, but focused on the fast-growing mobile phone web browser market, being preinstalled on over 40 million phones. It is also available on several other embedded systems, including nintendos wii video game console.

In 1998, netscape launched what was to become the mozilla foundation in an attempt to produce a competitive browser using the open source software model. That browser would eventually evolve into firefox, which developed a respectable following while still in the beta stage of development; shortly after the release of firefox 1.0 in late 2004, firefox (all versions) accounted for 7 percent of browser use [7] as of august 2011, firefox has a 28 percent usage share [9].

Apples safari had its first beta release in january 2003; as of april 2011, it had a dominant share of apple-based web browsing, accounting for just over 7 percent of the entire browser market [9].

The most recent major entrant to the browser market is chrome, first released in september 2008. Chromes take-up has increased significantly year by year, by doubling its usage share from 8 percent to 16 percent by august 2011. This increase seems largely to be at the expense of internet explorer, whose share has tended to decrease from month to month in december 2011 [10], chrome overtook internet explorer as the most widely used web browser but still had lower usage than all versions of internet explorer combined chromes user-base continued to grow and in may 2012 [11], chromes usage passed the usage of all versions of internet explorer combined by april 2014, chromes usage had hit 45 percent .

Internet explorer was deprecated in windows 10, with microsoft edge replacing it as the default web browser [8].

III. PROPOSED WORK

To develop an smart , fast and highly reliable web browser. Hands free web browser needs to interact with user by accepting voice commands and provide necessary functions. User can opt for the type of browsing and can manage his account. The major part of this project is the voice recognition, this is handled by the reliable Google voice API. Browser uses smart caching mechanism to speed up the surfing and an beautiful simple UI is provided for front end.

The main objectives of the proposed system are:

- **Surfing Web pages using voice as input** : To investigate the possibility of using the Voice Recognition Technology, which is a special technique needed to achieve success and use special components such as the programming language and specific grammar to match the key words.
- **To achieve multitasking** : To help workers multi task. If a worker needs to type, explore or navigate the Internet all at one time, the voice would help achieve this simultaneously.
- **Implementation of smart caching** : To feel fast Internet surfing, this system prefetches the data form the Internet and displays appropriate data on the screen.
- **Account access control** : To provide personal browsing to the user. This system enable to browse personally by authenticating the user, in which his/her browsing history is hidden from others.
- **Simple UI** : Simple English grammar is used as voice input command that allows the handicapped to interact and navigate the web.
- **Enhanced Private Browsing** - Provides secure browsing with a special access mode called incognito mode, in which no browsing history and passwords are stored.
- **Support for media and file view** : As general browsers this browser also support for different files like text, media etc.

Architectural Design :

An system architecture is ideally produced early in the development lifecycle and serves as the starting point for the development. All the major functionalities and components of the system is described in the below Figure 1.

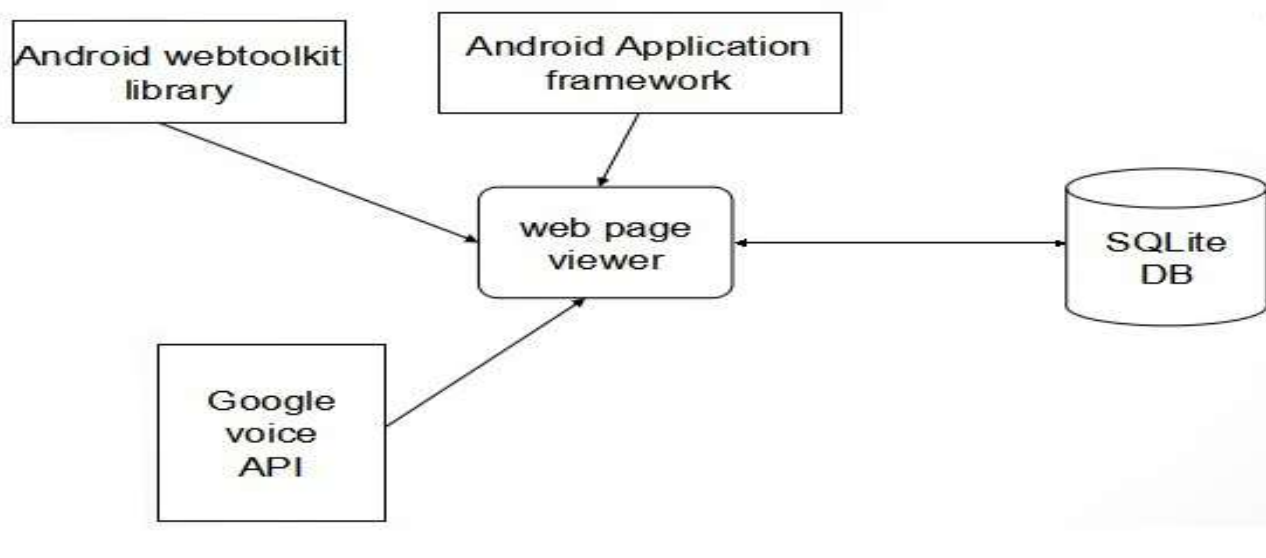


Figure 1: System Components

Android/Google web tool kit : This is the library module used by the browser to render the web pages to display on the screen. This module also has web engine module which is helpful in surfing the web.

Android Application framework : This is main library module which provide a framework or front end UI for android application. This module is used to develop a front end of the web browser.

Google voice API : This module helps in recognition of speech and synthesis module is a core part of Google. This module will be running as background service in the browser application to recognize user voice commands.

SQLite : This inbuilt feature of android is used to store user account information in our browser application, information like history, cache, user account etc will be stored in this.

Web Viewer : This module represents the main activity of the application ,which consists of Web view(Web tool kit) to display web pages and a URL bar to show the page url information.

Overview of the Proposed System :

The overview of a voice web browser with general browser options including voice recognition is as shown in the below Figure 2.

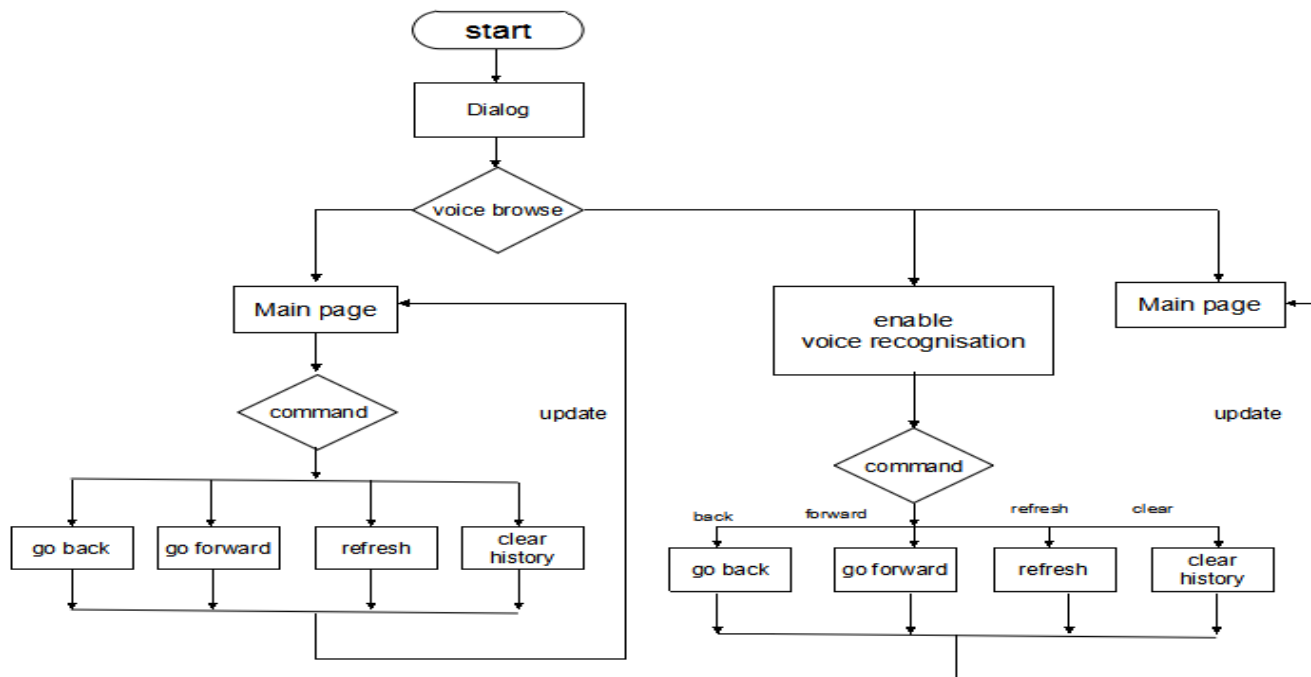


Figure 2 : Overview of the Proposed System

The browser has two modes of operation one is based on touch as input and other is based on voice, when the application starts it presents an dialog consisting of normal browsing and voice based browsing options. User needs to select one of these options. If user selects normal browsing, all the browser operations are done using touch interaction. If user selects the other options he/she needs to interact with browser through voice. Browser operations are performed by issuing commands through voice. User has a provision to touch interact with the browser. After issue of commands if it is valid then it is performed on the main page of the browser is updated accordingly.

The different modules of the proposed system are :

Viewing web page :

This module helps to view the web pages presented online or offline. The web view tool kit library serves as basis for rendering web pages to android devices. The module renders the web pages provided by the web engine to the browser main activity.

Smart Caching :

This module enhances speed of web surfing by using caching algorithm. This caches the contents of the web page links present in current web pages and then stores in the memory. Later when the user clicks on a particular link, it loads the data from the memory. This is also called as pre-fetching of web pages. The algorithm for smart caching is as given below :

```

STEP 1:  Wait for browser to start main activity
        Intent fast activity = new Intent(set.this,fast.class);
        startActivity(i);
        This will start main activity of fast browsing activity.

STEP 2 : Check whether the Internet connection is working or not
        ConnectivityManager conMgr = (ConnectivityManager)
        getSystemService (Context.CONNECTIVITY SERVICE);
        if ( conMgr.getNetworkInfo(0).getState() == NetworkInfo.State.CONNECTED ||
            jjconMgr.getNetworkInfo(1).getState() == NetworkInfo.State.CONNECTING )
        {
            // notify user you are online
        }
        else if ( conMgr.getNetworkInfo(0).getState() ==
        NetworkInfo.State.DISCONNECTED || jjconMgr.getNetworkInfo(1).getState() == NetworkInfo.State.DISCONNECTED)
        {
            // notify user you are not online
        }

STEP 3 : check space is available in storage public static oat megabytesAvailable(File f)
        {
            StatFs stat = new StatFs(f.getPath());
            long bytesAvailable = (long)stat.getBlockSizeLong() * (long)stat.getAvailableBlocksLong();
  
```

```

        return bytesAvailable / (1024.f * 1024.f);
    }

```

STEP 4: wait for user input

User input the text in Url or perform an search
 String url=EditText.getText();

STEP 5 : Load URL

STEP 6 : Load the url to the webview using webview function.

```

    Webview.load(URL);

```

STEP 7: if new links are found then store them in the storage.

```

    try {
        doc = Jsoup.connect("https://www.google.co.in/q=san").get();
        Elements links = doc.select("a[href]");
        for(Element link:links) {
            System.out.println("LINK:"+link.attr("href"));
        }
    }

```

To download html _les of the parsed links .

```

String html = "";
String url = URL;
HttpClient client = new DefaultHttpClient();
HttpGet request = new HttpGet(url);
HttpResponse response = null;
response = client.execute(request);
InputStream in = null;
in = response.getEntity().getContent();
BufferedReader reader = new Bu_eredReader(new InputStreamReader(in));
StringBuilder str = new StringBuilder();
String line = null;
try {
    while((line = reader.readLine()) != null)
    {
        str.append(line);
    }
    html = str.toString();
}

```

html variable will store the html page of the url links.

STEP 8: when ever user clicks on the links the corresponding webpage is fetched and loaded into web view by
 w.loadDataWithBaseUrl(null, html, "text/html", "UTF-8", null);

Voice Browsing :

This module uses Google voice API to recognize user voice input and fed into command recognizer, which interpret the commands and issue instructions to browser to perform necessary operation. The algorithm for smart caching is as given below :

STEP 1 : wait for user input

```

Intent i = new Intent(RecognizerIntent.ACTION RECOGNIZE SPEECH);
i.putExtra(RecognizerIntent.EXTRA LANGUAGE MODEL,
    RecognizerIntent.LANGUAGE MODEL FREE FORM);
for language

```

```

i.putExtra(RecognizerIntent.EXTRA PROMPT, "speak now");

```

This intent will prompt for speech and wait till get the user input ,else it will ask to re-enter input if the voice input not recognized.

STEP 2 : Single out the _rst item in the list provided by Google voice API

```

startActivityForResult(i,check);

```

This will start activity for results.

```

protected void onActivityResult(int requestCode, int resultCode, Intent data)

```

```

{
    // TODO Auto-generated method stub if(requestCode == check && resultCode==RESULT OK)
    {
        ArrayList<String> msg = data.getStringArrayListExtra(RecognizerIntent.EXTRA RESULTS);
        //lv.setAdapter(new ArrayAdapter<String>(this, android.R.layout.simple list item 1,msg));
        String text = msg.get(0).toString();
    }
}

```

In this code snippet msg contains list of related search results for user input voice. In text variable the first

element of the msg is stored.

STEP 3 : The text variable is compared with the available commands, if there is a match then the command is executed.

```
if(text.equals("Back")||text.equals("back"))
{
    if(com.example.testme.MainActivity.w.canGoBack())
    {
        com.example.testme.MainActivity.w.goBack();
    }
}
```

STEP 4 : Go to STEP 1

Viewing media and Documents :

This module uses android library classes to display document files such as pdf etc., and media files such as mp4 , mp3 etc. This module also has capability to view image files. This also involve some parsing mechanism to view images only in the web page.

IV IMPLEMENTATION

The “Hands free web browser” an android application provides a new interaction interface to the user. The major part of the browser is voice/speech recognition and caching. The web browser uses a android web view toolkit library and web engine to provide web services and google voice API is used to recognize voice . When an user open this application it provides a dialog box asking whether user wants to browse web using this application using voice interactions or the normal touch interactions. When the user selects the normal touch interaction the web browser operations like go back, refresh can accomplished using the touch screen only, whenever the user selects the voice based browsing options , browsers operations are performed through voice commands.

Basically this application use Google Voice API which is running in background as a service and waits for user input. It interpret all the voice input given by the user and check with the command text which are available, For example refresh, whenever the user says refresh the command is recognized by the browser and the respective refresh command is executed.

The browser comes with several features. Firstly, smart caching- This allows to download all the website info from the links available in the current web page and stores them in the cache, whenever the user clicks on one of the link the cached web page is displayed. The second feature is Document View- This option will allow to view different formats of files within browser itself. The third feature is Voice Recognition - This option recognize the voice commands from the user to navigate the browser.

The implementation of Hands free web browser is done by integrating two modules. During the initial stage the web browser is developed by using UI components present in android library that consisting of a webview page and Url bar which is developed using EditText class. The functionality for the webview and URL bar is given in next stage i.e User can load a web page by providing URL (www.sit.ac.in) in URL bar. The URL bar appends http:// before the URL input. This string is given as input to webView when the user clicks go provided in keyboard. This keyboard functionality automatically detects the user giving input to the URL bar. Additional web browser options are provided such as back, next, refresh, clear History and settings option is provided to access the additional settings i.e history, downloads, bookmarks etc.

Voice options is provided in settings to view available voice commands for the browser. In the later stage, progress in voice command recognizer implementation is achieved. In this Google voice API recognize the user input activated whenever user touches the microphone icon. User is asked to input voice. This module produces an string representing the user input voice commands, which is compared with the existing set of commands, if there is a match then the specified operations is performed. The microphone icon is added next to URL Bar. Finally, smart caching feature is added, this is an main feature of the Hands free web browser. In this, the web page is pre fetched in to phone storage and whenever user clicks on a link, the pre fetched contents is displayed. The jsoup parser is used to parse the links present in current page and the webpage(html) is saved. When the user clicks on a link then the saved copy of the web page is shown. By combining the voice utility provided by Google and the Web view tool kit Hands free web browser is implemented.

V EXECUTION RESULTS

The output result of the proposed system can be discussed with reference to the output result of the various modules present in the proposed system. Starting with the interface of the voice browser, the proposed system interface is well designed to work with the application. The browser elements are provided in the bottom of the browser window. Voice service responses to the user different voice commands. The voice browser responses to the general browser operations commands like back, forward, clear history etc. And it also well responses to the search operation. The proposed system supports for different type of documents. It enables to view different type of document within the browser without any additional softwares. The main feature of the proposed system smart caching to increase the accessing speed of the web pages is achieved. Voice browser pre-fetches the contents of the browser window links and stores in the memory. Whenever user clicks on a particular link it loads the stored contents from the memory. The proposed system result to the various functions is successfully achieved.

COMPARISION :

The following figure 3 and figure 4 shows the comparison between normal browsing mode and the proposed smart cache browsing mode. The proposed application performs accurately in a quiet environment. The response time for recognizing a word takes less than 2 seconds. The probability of mis recognition should be less than 30 to 40 percentage. But , the normal browser takes more time to perform the same operation as shown in the figure 3 and figure 4. Hence, the Voice Browser works fastly, reliably without causing any exceptions compared to normal browsers. It does not restrict the size of the download file, thus downloaded size is unlimited. Memory space for installation is less than 5MB.



Figure 3 : Normal Browsing Mode



Figure 4 : Smart Cache Browsing Mode

V CONCLUSION

These days, Internet is playing a major role all over the world. The main gate to access the Internet is browsing. As browsing was designed to cater to only normal people with no physical disabilities, the physically handicapped were isolated from accessing the Internet. Hands Free Web Browser is developed to help the handicapped to browse the Internet easily. This objective is achieved through a combination of voice commands with Internet browsing; voice browser is a voice command driven browser for the disabled. The access speed of web pages is increased. This objective is achieved by pre-fetching contents of web pages of a browser window.

It should be recognized that working using voice commands would give us opportunities to find ideas that could be developed in the future. Some of these ideas can be the diversity and difference of the pronounced accent while searching, text to voice

conversion and the work of the application by recognizing the eyes of the user (the vision method) as long as the user is browsing the Internet.

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