Screen Reading with Bangla & English Audio Assistance Bi-Lingual Supported Software 'Mongol Dip' for Visually Impaired People

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Abstract—**In the modern science and information technology everyone wants to attach with latest technology and services. Although visually impaired people do not get proper light from the benefits of technology revolution due to lack of scope. Mongol Dip will give visually impaired population a great opportunity to connect with and contribute to the digital world. In this paper we present software named 'Mongol Dip' that helps people with visual impairments to operate windows operating system for computational tasks. In this software we have tracked user activity by using core windows DLL (Dynamic-link Library) hooking and used text to speech technology to echo every operation done by the user. Mongol Dip provides the easiest interface that helps the visually impaired people to read out the contents of the document in both the Bengali and English language by using Microsoft TTS and Bengali Text to Speech application "Subachan". Hence the main goal is to assist the people with visual impairments to work with the computers like a normal human being by our software Mongol Dip.**

Index Terms— Mongol Dip, Microsoft TTS, Visual impairments, Subachan

I. INTRODUCTION

According to the statistics of World Health Organization (WHO) and the International Agency for the Prevention of Blindness (IAPB) [1] in World Sight Day-2011 Survey – the number of visually impaired people in our country is 7, 50,000. Among those people some are literate and very few of them use computer with the help of screen reading software. If these visually impaired people can use computers like other normal human being then it will open a new opportunity for their education and self improvement. To fulfill this objective, we visited the IER department of the University of Dhaka, Bangladesh. In the IER Department at the University of Dhaka, Bangladesh, visually impaired students and teachers operate computers using JAWS [2], a screen reading software in English language only.

According to them, JAWS is not user friendly for the people with visual impairments since it reads out the contents of the screen to the people only in English and lacks in quick shortcuts. They pointed out that JAWS is not capable to read Bangla text document at a time. So we decided to develop Mongol Dip to use the computers easily with minimal amount of operations and also give bi-lingual support so that they can read Bangla text.

The most challenging part of this development task is to understand how visually impaired people can easily access Windows operating system and operate various files. This challenge has been resolved by continuous user feedback on each developed module and corresponding modifications. Bangladesh Visually Impaired People's Society (BVIPS) members always give feedbacks of each module and corresponding modifications. In the development phase, we decided to provide couple of very important functionalities in our software which are mostly used by a normal person, such as audio assisted accessibility to any file and folder from the hard disk drive using customized browser, working with documents (using MS-Word, MS-Excel, MS-PowerPoint, Notepad, PDF etc), listening music (using Media Player), installing or removing any kind of software, and sending or receiving email using customized client. To provide the functionalities successfully, we have developed our own customized browser using which user can locate programs and files easily and can work with them.

"Mongol Dip: Light for the People with Visual Impairment" is developed for the visual impaired people of Bangladesh and the project is sponsored by "Ministry of Science and Information Technology", Bangladesh. We have already developed first release version of Mongol Dip which contains Bangla text to Speech API "Subachan". The first version of this software has been released on 6th October, 2012 in Dhaka. The second version of the software has been released on 16th July, 2013. Visual impaired people are currently using the released version.

The remaining sections of this paper are organized as follows: section 2 describes related works; section 3 describes system requirement. Section 4 describes system architecture of Mongol Dip, section 5 shows performance measure &

feedbacks of Mongol Dip software, Section 6 presents comparison of Mongol Dip with other software and Section 7 presents Limitation of Mongol Dip. We conclude in Section 8 and at the end references are added.

II. RELATED WORKS

There is several software such as JAWS [2], NVDA [3], SuperNova [4] for visually impaired people to operate computer. Most of the software mainly uses screen reading technique and none of them support any Bangla text reading. Among them JAWS is most popular which is used mainly for working with documents. In general, a screen reader [5] software application reads aloud information displayed on a computer monitor screen. It reads aloud text within a document, information within dialog boxes and error messages. It also reads aloud menu selections, text with the graphical icons on the desktop. In Mongol Dip, we provide a customize browser and customize mailing application which is absent in other screen reading application with short-cut key features using which anyone can operate computer easily. We achieved significant difference with other software in terms of computer accessibility for the visually impaired people by providing Bi-lingual support that can read (without switching the reading mode) and write in both the English and Bangla text with the help of Microsoft TTS and Bengali Text to Speech application "Subachan"

We have used Microsoft Windows Accessibility API core windows DLL (Dynamic-link Library) hooking to detect user key-stroke event and get user activity focused text and then echo every operation done by user. We also provide a customize browser with short-cut key features using which anyone can operate computer easily and this feature can be considered unique comparative to other software. In the development phase at first we used Microsoft Text to Speech API to read out the contents of English text but its performance varies in different operating system platform. For Windows XP the voice quality is poor although for Windows 7 it is good. We integrate Bengali Text to Speech application "Subachan" with Mongol Dip Software to read out the contents of English text.

III. SYSTEM REQUIREMENTS

This software is designed to operate Windows 2007 and Windows XP.

A. Software Requirement

- ❖ Java platform (Run Time Environment)
- ❖ .Net framework 3.5
- ❖ Microsoft office 2007
- ❖ Subachan Bangla TTS

B. API & Packages

We have used system32.dll, user32.dll, Kernel32 etc to handle various types of applications for customized input. Mongol Dip echoes the corresponding audio instruction to assist user to complete the desired task for every operation. In case of reading MS office application we have used MS office object library and for pdf we have used PDFBox library to get text from these files. For sending/receiving mail we have built an application by which a user can send/receive mail without going to Internet browser. For sending mail we have used SMTP [6] protocol and for getting mail IMAP [7] protocol. Users can also use internet by using a normal internet browser and during browsing they can get sound output of the text at the position of their pointer. Different types of packages, APIs and libraries we have used in Mongol Dip are described below:

- **Microsoft TTS:** Microsoft TTS [8] is a speech synthesizer that read English text as spoken English word. Microsoft TTS engine recognizes the text and using a synthesized voice to speak the written text.
- **Bangla TTS (Subachan):** Subachan [9] is a Bangla TTS software developed in SUST to read Bangla text as spoken Bangla word. We integrated Subachan with Mongol Dip software. Thus Mongol Dip gives Bi-lingual (English and Bangla Language) audio assistance support.
- **MS office object library:** This library is used to handle the Microsoft office properly [10].
- **Windows media player package:** It is from Microsoft.Net to handle the windows media player.
- **Global hook:** We have used this module for getting low level keyboard and mouse I/O and monitoring keyboard and mouse operations from everywhere in the system [11].
- **System dll files:** System dll files [12] are used to get menu text, window title, button text etc from different types of window, as well as to get system resolution, screen image, global keyboard and mouse hook.
- **SMTP & IMAP protocol:** For sending mail we have used SMTP [6] protocol and for getting mail IMAP [7] protocol.
- **Microsoft Accessibility API:** To access windows all the windows functionality from Mongol Dip, we have used Microsoft Accessibility API [13].

IV. SYSTEM- ARCHITECTURE

System-Architecture is the basic structure of the system that defines the essential core design features. By using flow chart, here we show Mongol Dip System-Architecture.

A. System Architecture of Mongol Dip Browser

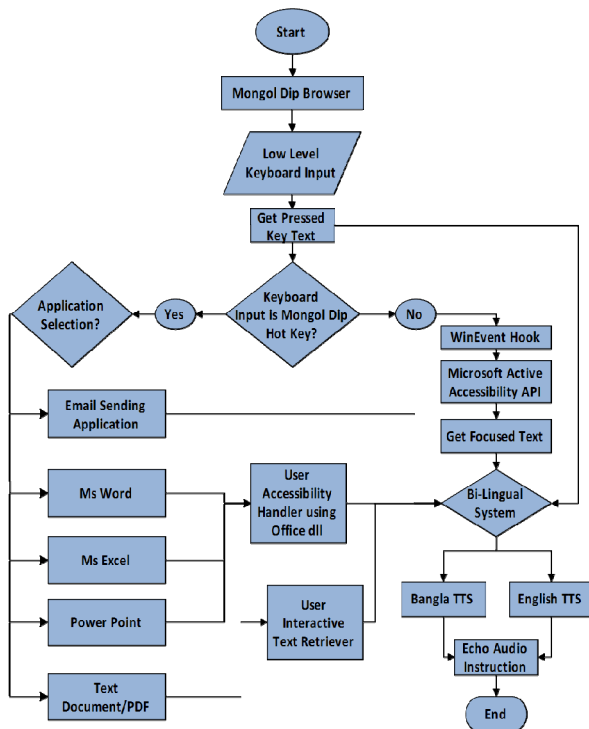In the flowchart, at the end of every operation users always return to the Mongol Dip Browser.

Fig.1. Overall flow-chart of our system

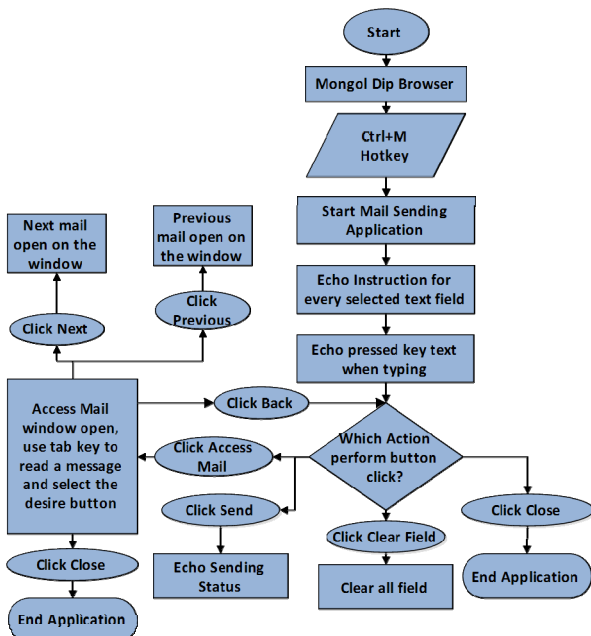*B. System Architecture of Sending/Receiving E-mail*

Fig.2. Flow-Chart of Sending & Receiving E-mail

By using Mongol Dip Software to send or receive E-mail, user has to press hot key Ctrl+3 to run the interface of E-mail application. Users need to login at first and then by selecting send button they can send mail, can read mail by selecting access mail button, and close button for exiting E-mail sending window application.

C. System Architecture of Microsoft Office Operation

To launch MS word new document users have to press hotkey Ctrl + W. For editing a document they need to know the key combinations for working on the document. The various operations for working with ms document are shown in the following two flowcharts.
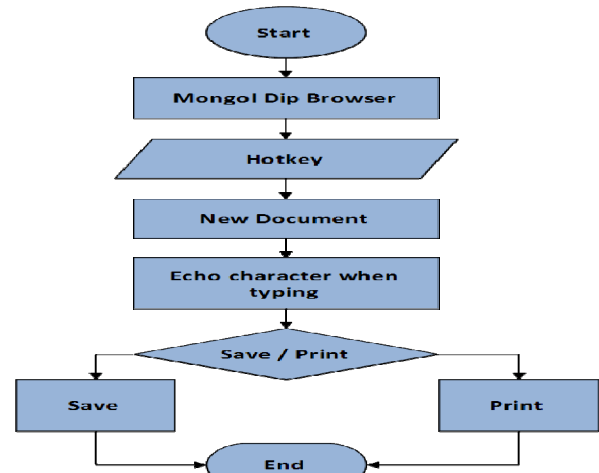

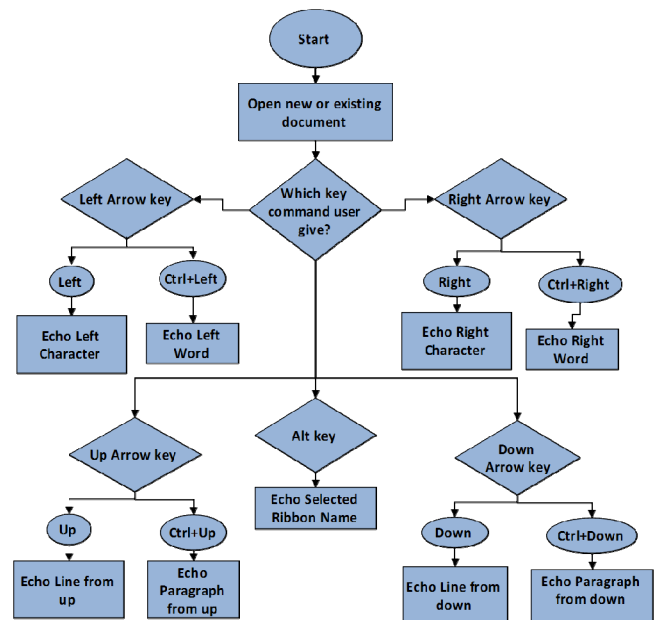Fig.3. Flow-chart for MS Edit Operation

Fig. 4. Flow-chart for MS Edit operation
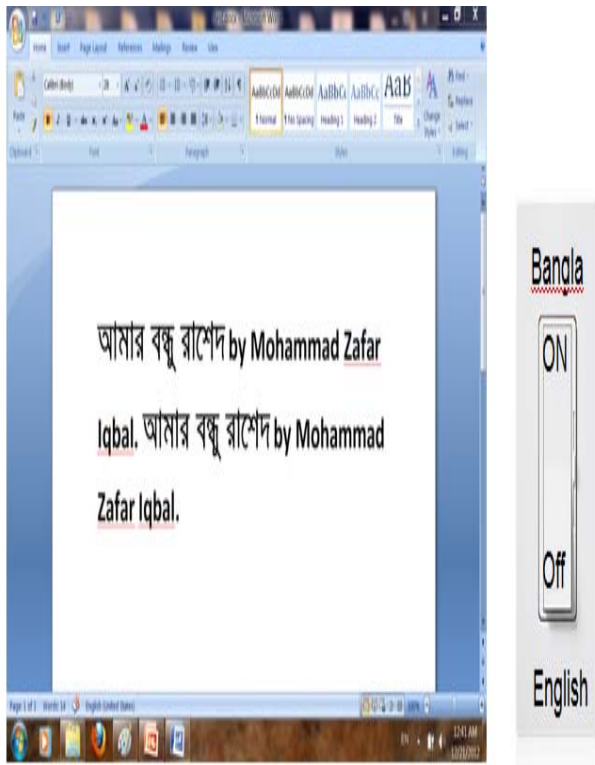
D. B-Lingual System

Fig. 5. Bi-lingual System

Bi-lingual means support more than one language in a system. Existing software the visually impaired people used such as JAWS, NVDA don't support Bangla text document when these software get any Bangla text just create beep sound. So they can't read Bangla text by using this software. In Bi-Lingual system normally work for one language. To read out the content of other language user needs to switch on/off to active/deactivate other language text reading. But the main problem for visually impaired people is that how they know when to switch. But in Mongol Dip user can read and write English and Bangla text simultaneously without switching which is a unique property of the software with other existing software.

E. Bi-lingual System Pseudo Code & Flow Chart

Here 'Text' contained Bangla English mixed text.
BiLanguageSystem(Text):

(1) Initialize a character array name charArray and string array name stringArray
(2) Initialize c=0, englishText="", and banglaText=""
(3) Text= Text+' '+"Null"
(4) stringArray=Text.split(' ')

(5) for every word in stringArray repeat :
  (i) if(word!=""):
    (i.1) if(word!="Null"):
      (a) charArray= convertToCharacterArray(word)

      (b) if(charArray[0]>=0 and charArray[0]<=127):
        (b.1) englishText=englishText+word+' '
        (b.2) if(banglaText!=""):
          (b.2.i) speak(banglaText)
          (b.2.ii) while(True):
          if(banglaText speaking is complete):
            break
          (b.2.iii) banglaText= Null
        (b.3) c=1

      (c)else if(unicode(charArray[0])>=2432 and
        (unicode(charArray[0])<=2559)):
      (c.1) banglaText=banglaText+ word +' '
      (c.2) if(englishText!=""):
        (c.2.i) speak(englishText)
        (c.2.ii) while(True):
        if(englishText speaking is complete):
          break
        (c.2.iii) englishText = Null
      (c.3) c=2

  (i.2) else:
      (a) if (c==1 and englishText!=""):
        speak(englishText)
      (b) if (c==2 and banglaText!=""):
        speak(banglaText)

(6) Exit

Note:
(1) If we find Bangla word at first add this in banglaText variable until we will find English word.
(2) If we find English word at first add this in englishText variable until we will find Bangla word.
(3) When find English word then speak previous banglaText.
(4) When find Bangla word then speak previous englishText.
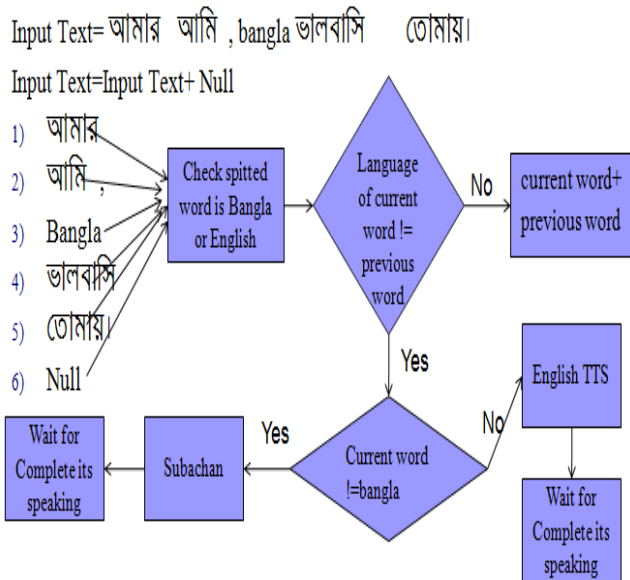(5) If word == "Null" then speak remaining banglaText or englishText.

Input Text= আমার আমি , bangla ভালবাসি   তোমায়।
Input Text=Input Text+ Null

1) আমার
2) আমি ,
3) Bangla
4) ভালবাসি
5) তোমায়।
6) Null

Fig. 6.   Example of Bi-Lingual system

F.   Integrate Microsoft Accessibility API with Mongol Dip Pseudo Code

```
When Mongol Dip Start SetWinEventHook for call back every
focus event
(a) Initialize IntPtr name handler and object name ChildId
(b) #region APIs:
[DllImport("oleacc.dll")]
public static extern uint
WindowFromAccessibleObject(IAccessible pacc, ref IntPtr
phwnd);
[DllImport("oleacc.dll")]
private static extern IntPtr AccessibleObjectFromEvent(IntPtr
hwnd, uint dwObjectID, uint dwChildID, out IAccessible ppacc,
[MarshalAs(UnmanagedType.Struct)] out object pvarChild);
 #endregion
(c) SetWinEventHook(
                Initialise system event
                IntPtr.Zero,
                CallBackFunction,
                (uint)0,
                (uint)0,
                WINEVENT_OUTOFCONTEXT
                )
(d) CallBackFunction(IntPtr hWinEventHook, uint eventType,
IntPtr hWnd, uint idObject, uint idChild, uint dwEventThread,
uint dwmsEventTime)
        (1)     handler=AccessibleObjectFromEvent(hWnd,
idObject, idChild, out iAccessible, out ChildId)
        (2)     WindowFromAccessibleObject(iAccessible,   ref
handler)
        (3)   if (iAccessible != null && ChildId != null):

    Speak(iAccessible.get_accName(ChildId).toString())
(e) Exit
```

Note:
(1) Set WinEvent hook, which call back the function for every windows event
(2) In call back function do the following:
   (a) Call AccessibleObjectFromEvent to retrieve an IAccessible object
   (b) Call WindowFromAccessibleObject
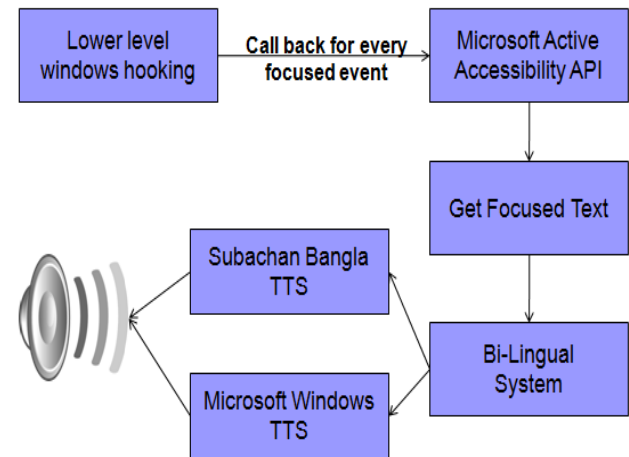   (c) Retrieve focus text using get_accName method of IAccessible object
(3) Exit.

Fig. 7.   Flow-chart for Bi-linguality of our system

G.   Application Access Bridge

In our software we integrated several application access bridge to exposes accessibility information about the application. One of the access bridge is Java Access Bridge (JAB) [17] which accessibility information about the java components to screen readers.
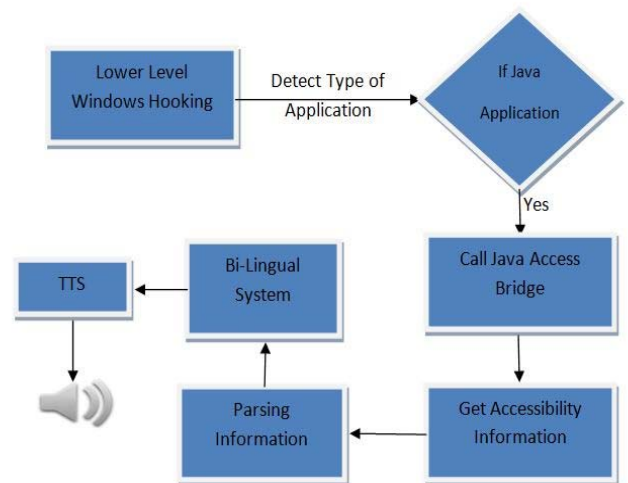

Fig. 8.   Flow-chart for getting info from Access Bridge

V. PERFORMANCE MEASURE & FEEDBACK

We started our research and development of the software in a sequential process. Mongol Dip is an Audio assistance supported screen reading software which actually helps visually impaired people to operate computer. This software is for visually impaired people so it was also a challenge to know how they operate computer. When we went to the IER dept. after developing demo version of our software, the visually impaired student appreciated this idea very much. To get real user feedbacks we went to Bangladesh Visually Impaired People's Society (BVIPS) [14] and Green Disabled Foundation (GDF) [15]. Bangladesh Visually Impaired People's Society (BVIPS) is a self-help voluntary organization of the visually impaired people. Bangladesh Visually Impaired People's Society (BVIPS) members always co-operated with us for the development of this software. We elicit requirement several times via meeting with visually impaired people. The meeting dates are given below.

TABLE I. MEETING DATES FOR REQUIREMENT COLLECTION

Meeting Date	Meeting Place
24th November, 2011	Shahjalal University of Science & Technology, Sylhet.
2nd December, 2011	eAsia Conference, Dhaka.
28th January, 2012	Bangladesh Visual Impaired People's Society (BVIPS), Middle Badda, Dhaka-1212
15th September, 2012	Shahjalal University of Science & Technology, Sylhet.
2nd October, 2012	Bangladesh Visual Impaired People's Society (BVIPS), Middle Badda, Dhaka-1212

Using computer with minimum number of operations will be a great achievement for the visually impaired people. So our target is to support them by providing maximum usability with minimal operations. We also want to ensure that one will be able to access the computer using this software without any prior knowledge. For this reason we are controlling applications by hot key combinations. They can start using the software by pressing "F1" that provide audio directions for using different key combinations to launch different programs. Again for each application same key combination (F1) provides the audio directions for different operations attached to that application.

In the following sections we are providing the details of using some important applications through Mongol Dip along with the user's feedback that we have collected from the teachers and students of IER Dept. of Dhaka University, Bangladesh Visually Impaired People's Society (BVIPS) [14] and Green Disabled Foundation [15]. The number of users who provided their valuable opinion for this software is as follows:

TABLE II. NUMBER OF VISUAL IMPAIRED PEOPLE WHO GAVE THEIR VALUABLE OPINION ABOUT MONGOL DIP

Name	Attendance(Person)
IER Dept, Dhaka University	30
BVIPS	40
GDF	20

A. Hotkey Executed Programs

All the application that can be used through Mongol Dip can be launched and executed by using hotkeys. The process of how these applications are launched and executed is shown in the following simple figure.
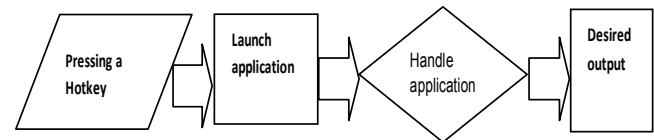

Fig. 9. Way to handle hotkey executed application

B. Mongol Dip Customize Browser

In Mongol Dip we also provide a customize browser which is unique comparative to other software by which user can locate any file and folder from the hard disk drive easily. Also visually impaired people can work with documents (using MS-Word, MS-Excel, MS-PowerPoint, Notepad, PDF etc), listening music (using Media Player), installing or removing any kind of software, and sending or receiving email using the browser. Because of using software like JAWS, NVDA for a long time it might be a bit difficult for visually impaired people to maintain Mongol Dip browser. But in the long run it would be beneficial for its extended capability. This is because we have added various short cut key for accessing the windows files and program via Mongol Dip Browser.

TABLE III. FEEDBACK FROM IER DEPT. & BVIPS ABOUT MONGOL DIP BROWSER

Operation	Scope	Feedback	Satisfaction (%)
Windows Browse	When Mongol Dip starts then open the Browser	Very much Useful	90%
Short-cut key features	Provide short-cut keys to do work easily. Ex. to open MS-Word, MS-Excel just press Ctrl +W(Word)/E(Excel)	Faster & easy.	80%

C. MS Office Support

Our software can process MS word 97-2007, MS excel, MS PowerPoint, Notepad, WordPad and many other text editors. For example: One can launch Ms Word, MS Excel, MS PowerPoint or Text editor by pressing "Ctrl+W" or "Ctrl+E" or "Ctrl+P" or "Ctrl+T" respectively, where one can type anything in Bengali/English. Mongol Dip makes echo of each character at the time of typing and also reads out the complete word after the completion of typing a single word to help composing.

A person can have audio assistance for each character, or for a complete word, or for a complete line, or for a complete paragraph, or from the start to end of a document using different key combinations. For example if I want to have audio output of a line above my current position then I have to press "Ctrl+ Up" arrow.

Below we are giving a table showing the users feedback in case of using MS-Office.

TABLE IV. FEEDBACK FROM IER DEPT. & BVIPS ABOUT MS OFFICE

Operation	Scope	Feedback	Satisfaction (%)
Launching new document	Press Ctrl +W(Word)/E(Excel)/P(PowerPoint)/ T(Text Editor) Key	Useful feature	Above 70%
Typing, editing	Same as JAWS with diff. hotkey	Need to learn the combination	50%
Audio output	We used Microsoft TTS & Subachan Bengali TTS	Little bit speedy, and Bengali voice is not clear	60%

D. Sending and Receiving Mail

Users will be able to run the program for sending mail and reading all unread mail using "Ctrl+M". Firstly, one has to login using the login form, then for sending mail s/he has to fill up the field To, Subject, Attachment, Body then press send key. By pressing receive button, one can get his all unread messages info (such as: sender name, delivery date, no of attachment and the message). When one goes to the desired field using tab key our software provide audio output of the field contents. Suppose when user will go to the Body field of a compose mail our software will echo, "Type your message body here". Below we are providing the feedback in case of using customized mailing application of Mongol Dip.

TABLE V. FEEDBACK FROM IER DEPT. & BVIPS ABOUT MAILING

Operation	Scope	Feedback	Satisfaction (%)
Launching	Hotkey Ctrl + M	Very user friendly	Satisfied (90%)
Selecting new, inbox	Just to use tab key	Also appreciated	70%
Audio output	Same as MS-Word	Same as MS-Word	Same as MS-Word

1) Comparisons between requires time to send mail from this software and send mail using browser

Case Study	Net Speed	Visual Impaired User	Normal user
1	15KB/S	10 minute	3 minute
2	15KB/S	8 minute	4 minute
3	15KB/S	5 minute	2.5 minute

2) Comparisons between require time to read mail message using this software and read mail message using browser

Case Study	Net Speed	Visual Impaired User	Normal user
1	15KB/S	5 minute	2 minute
2	15KB/S	3 minute	2 minute
3	15KB/S	2 minute	3 minute

E. Media Files:

By accessing a folder using the customized browser of Mongol Dip, when a user selects a file s/he hears the name of the file and its artist. When one presses an enter key then our software launch the Windows Media Player and start to play. One can use "n" key for the next media file, "p" for the previous file, "<space>" for pause and resume, "+" and "–" for increasing and decreasing volume, and left and right arrow for backward and forward.

TABLE VI. FEEDBACK FROM IER DEPT. & BVIPS ABOUT HANDLING MEDIA FILE

Operation	Scope	Feedback	Satisfaction (%)
Launching	Just to select media file and press Enter key	Good	90%
Controlling	Some shortcut key for handling media files	Easy to handle	70%

VI. COMPARISON

To operate windows operating system is easier for visually enabled people but not for visually impaired people. So we tried to build a system which is easier to use in their perspective. JAWS [2] is a screen reading software that is used by visually disabled people. But it only gives audio output of every operation and the texts wherever user's mouse pointer resides. It has no customized options which can help the visually disabled people to use Windows. In a sense it is similar to the Microsoft narrator program. From this perspective, Mongol Dip has some very attractive and innovative features which are very important for visually impaired people. In the following table we have shown comparisons between JAWS and Mongol Dip.

TABLE VII. COMPARISON BETWEEN JAWS AND MONGOL DIP

SL.	Criteria	JAWS	Mongol Dip
1	Language	Only for English	Bi-Lingual for Bengali & English
2	Mail	Sending & receiving is complicated, need to go to web browser	No need to go to web browser
3	Launching application	No hotkeys to launch	Hotkey for each application
4	Customize Browser	No Customize browser	Provide customize browser to access computer easily.

VII. Limitation of Mongol Dip

Limitation of Mongol Dip: In our first version of Mongol Dip [16] software we try to handle accessibility of different software separately but we realize that it is not possible to handle all software accessibility separately. We introduce application 'Access Bridge' to solve this accessibility problem. Using java 'Access Bridge' we improve general accessibility of all java application. In our software we describe the overall accessibility of windows operating system; we don't have opportunity to make accessibility for every type of application running on windows. So in comparison between other 'Screen Reader' the accessibility of Mongol Dip is not so high but we introduce new accessibility technique and new Bi-Lingual idea which is quite impressive.

VIII. CONCLUSION

The motivation of developing Mongol Dip is to full fill essential need of visually impaired people. Visual impaired people are deprived from taking the taste of that source of knowledge and information. In this modern age, everyone wants to use the latest technology. But the visually impaired people did not have much scope to get the benefits of technology revolution. . Mongol Dip helps the visually impaired people to use Windows operating system to complete official tasks easily like a normal human being. In future Mongol Dip will assist visually impaired people to browse internet and will enable them to listen both English and Bangla content from the website. Our future goal is to enable the visually impaired people working with the computers like a normal human being by our software Mongol Dip. The Mongol Dip screenshots and operation details are given in annex1 and annex2.

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[17] http://en.wikipedia.org/wiki/Java_Access_Bridge

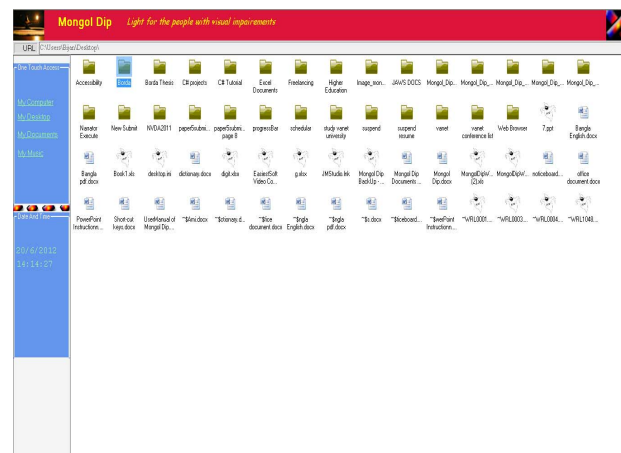ANNEX1: SCREENSHOTS OF MONGOL DIP

Fig. 10. Screen Shot of Mongol Dip Browser

By using the customize browser [Figure 8] user can locate files easily and can work with them. Because of Microsoft Windows Accessibility API user can access anything from computer.
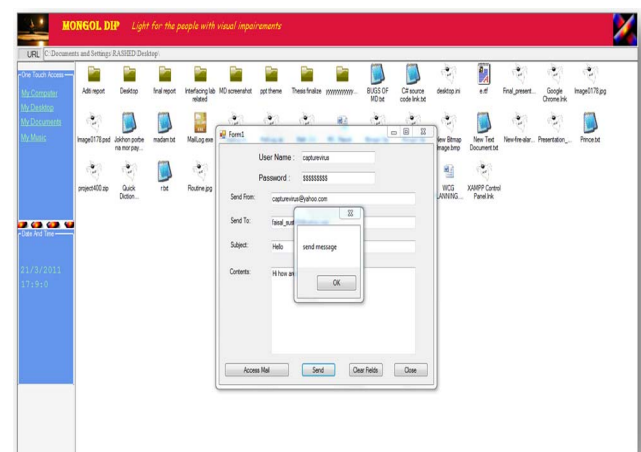

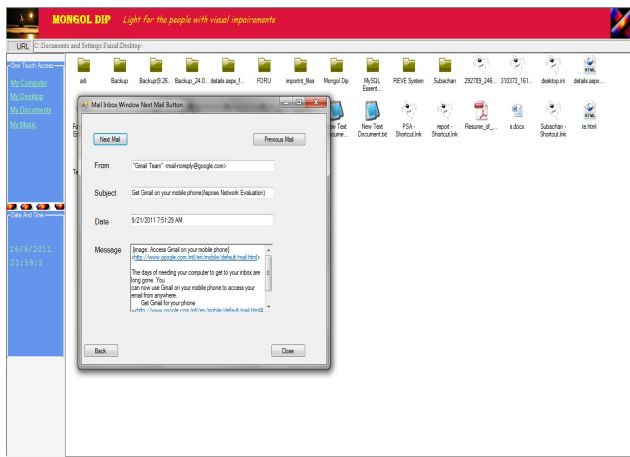Fig. 11. Screen shot of sending mail window
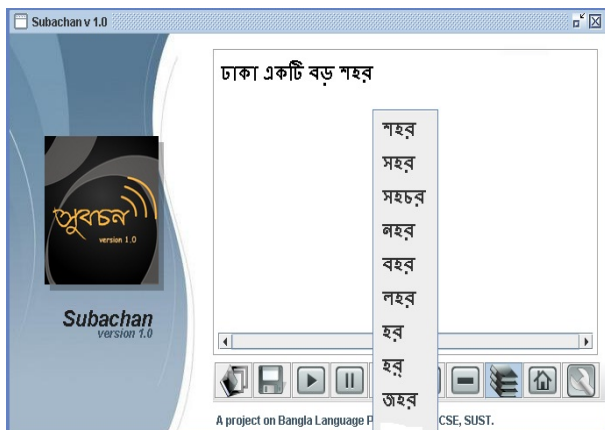
Fig. 12.   Screen shot of receiving mail window

Fig. 13.   Subachan Bangla Spell Checker

ANNEX2: OPERATION DETAILS OF MONGOL DIP

A.   Mongol Dip Browser

Events	Short-cut Keys
To know any keyboard key name	Press the desire key
Instruction of how to operate Mongol Dip Browser	F1
To Select File/Folder from current link	Press Right/left /up/down key
To Open/Execute/Enter current selected File/Folder	Press Enter
To Browse link such as My computer, My document, Desktop, Music	Press Tab
To Terminate Any Opening Application	Press Altr + F4
To Hear Today's Date & Time	Press Insert + F12
To Shut-Down Computer	Press Insert + F4
To Open New Microsoft Word Document	Press Ctrl + W
To Open New Text Editor Document	Press Ctrl + T
To Open New Excel Document	Press Ctrl + E
To Open New PowerPoint Document	Press Ctrl + P
To Open E-mail Sending & Receiving Window	Press Ctrl + M
Copy File/Folder	Press Ctrl + C
Paste File/Folder	Press Ctrl+ V
Edit File Folder Name From Mongol Dip Browser	Press F2

Delete File/Folder	Press Delete
To Increase Speaker Volume	Press Ctrl + D9 or Press +
To Decrease Speaker Volume	Press Ctrl + D8 or Press -
To Increase Speech Speed	Press Ctrl + D7 or Press *
To Decrease Speech Speed	Press Ctrl + D6 or Press /
To Add a new Folder	Press Ctrl + F
To on-off Speaker Sound	Press Space key

B.   Notepad & PDF Document

Events	Short-cut Keys
Instruction of how to operate Notepad & PDF Document	Press Ctrl + Numpad 0 or Ctrl + D0
To Listen One Character From Left	Press Left Arrow
To Listen One Character From Right	Press Right Arrow
To Listen One Word From left	Press Ctrl + Right Arrow
To Listen One Word From Right	Press Ctrl + Left Arrow
To Listen Full Text	Press Ctrl + End
To Save document	Press Altr + F4

C.   Microsoft Word Document

Events	Short-cut Keys
Instruction of how to operate Word Document	Press Ctrl + Numpad 0 or Ctrl + D7
To Listen One Character From Left	Press Left Arrow
To Listen One Character From Right	Press Right Arrow
To Listen One Word From left	Press Ctrl + Right Arrow
To Listen One Word From Right	Press Ctrl + Left Arrow
To Listen One Up Paragraph	Press Ctrl + Up Arrow
To Listen One Down Paragraph	Press Ctrl + Down Arrow
To Detect Table Cell Position	Press Tab/Up.
Line Number of Document	Press Up or Down Key
To Read previous sentence	Alt + Up
To Read next sentence	Alt + Down
Echo selected text	Shift + Right/Left Key
Echo selected text	Shift + Up/Down Key
Select previous cell of table	Alt + Ctrl + Left key
Select next cell of table	Alt + Ctrl + Right key
Select first cell of table	Alt + Ctrl + Home
Select last cell of table	Alt + Ctrl + End
To Know column title of table	Alt + D1
To Know row title of table	Alt + D7
Say font instruction of current text document	Insert + F
Say Page Layout	Insert + F1
Say Color Instruction	Insert + D5
Insert+ T then echo current working word document title	Insert + T
Keep a short cut key to know current table cell position. In JAWS they use Insert+ C	Insert+ C
Say current line	Insert +up arrow
say window prompt and text	Insert +tab
say top line of window	Insert +end
say selected text	Insert +Down arrow
say system time and date	Insert+ F12
To create new office Document	Press Ctrl + n / N
To Save Currently Working Word document	Ctrl + S
To Save Current working Word document and close	Alt + F4

D. Microsoft Excel Document

Events	Short-cut Keys
Detect current selected cell position & it's text	Using Up, Down, Right, Left, Tab keys
To select current selected all rows	Shift + Space key
To select current selected all columns	Ctrl + Space key
Sheet Instruction	Ctrl + Shift + PageUp / PageDown key
To Know Current Cell Top Header	Press Ctrl + E key
Current cell 1st to 4th row text	Press Ctrl + D6 key
Current cell 1st to 4th column text	Press Ctrl + D7 key
Today's Date Entry in current cell	Press Ctrl+ Semicolon
Today's Time Entry in current cell	Ctrl+Shift+ Semicolon
To update cell text	Press F2 edit mode active then press right/left key to read and type to write
To know Current Cell Position & Text again	Press Ctrl+ M key
To know current excel file name	Press Insert+F9
Current Cell location and text	Press Ctrl + M
Read From left 1st position to current cursor cell	Press Ctrl + J
Read From current cursor cell to Right end of cell text	Press Ctrl +Q
To Save Currently Working Excel document	Press Ctrl + S
To Save Currently Working Excel document and exit	Press Altr + F4

E. Microsoft PowerPoint Document

Events	Short-cut Keys
To Listen One Character From Left in Text Edit Mode	Press Left Arrow
To Listen One Character From Right in Text Edit Mode	Press Right Arrow
To Listen One Word From Left in Text Edit Mode	Press Ctrl + Left Arrow
To Listen One Word From Right in Text Edit Mode	Press Ctrl + Right Arrow
To Listen Paragraph From Up to Down	Press Ctrl + Down Arrow
To Listen Paragraph From Down to Up	Press Ctrl + Up Arrow
To go next slide	Press Down Arrow
To go previous slide	Press Up Arrow
To select Text area/Shape from slide document	Press tab
Edit operation when make slide	Press F2 or Enter
To deselect anything	Press Escape key
Slide show start and stop	Press F5 key
Go prior slide when slideshow running	Press PageUp / BackSpace/ P key
Go next slide when slideshow running	Press PageDown / Space/ N key
To read text of slide when slideshow running	Press Up / Down / Right / Left Arrow key
To create new presentation	Press Ctrl + n / N
To create new slide	Press Ctrl + m / M
To Save Currently Working PowerPoint document	Press Ctrl + S
To Save Current working PowerPoint document & close	Press Altr + F4
To go top most slide	Press Ctrl + Home
To go last slide	Press Ctrl + End
To read prior character in Text Edit Mode	Insert+ F8
To read prior word in Text Edit Mode	Insert+ F9
To read prior paragraph in Text edit mode	Insert+ F11

Delete a character and echo the next character	Press Delete Key
Create new slide and echo the new slide number	Press Control + M
To know current working PowerPoint file name	Insert + T
Slide number when slide show running	Insert +P

F. Media Player

Events	Short-cut Keys
Instruction of how to operate Notepad & PDF Document	Press Ctrl + Numpad 0 or Ctrl + D0
To Listen One Character From Left	Press Left Arrow
To Listen One Character From Right	Press Right Arrow
To Listen One Word From left	Press Ctrl + Right Arrow
To Listen One Word From Right	Press Ctrl + Left Arrow
To Listen Full Text	Press Ctrl + End
To Save document	Press Altr + F4