Voice Based E-Mail System For Blind People Using Speech Recognition Technology

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Abstract – *The Internet has evolved one of the basic comforts for day-to-day living. Every human being is widely accessing details and knowledge through the internet. However, visionless and disabled individuals encounter complications in accessing these text materials. The improvement in computer-based available systems has spread up many routes for the visually impaired across the world in a wide way. An Audio feedback-based virtual surroundings like the screen readers has allowed Visionless people to access internet applications greatly. We describe the Voicemail system architecture that can be used by a Visionless person to send e-Mails easily and efficiently. The contribution made by this study has allowed Blind people to send voice-based e-Mail transmissions with the aid of a computer.*

Key Words: **Speech Recognition Technology, Python, Flask, HTML5.**

1. INTRODUCTION

In today's world Internet is considered a major storehouse of information. Without it no single work is possible. It is even considered one of the de facto methods that are used in communication. In the business world, especially email is one of the most common forms of communication out of all methods. But all people can not use the internet. The reason is you would need to know what is written on the screen to access the internet. If you are not able to see it or is not visible it is of no use. So this is making the internet a completely not used technology for the people who are visually impaired and illiterate. Some systems that are available currently, for example, the screen readers TTS and ASR do not provide full efficiency to the people who are visually impaired to use the internet technology. As nearly 285 million people throughout the world are estimated visually impaired it become necessary to make technical facilities for communication useful for them also.
Hence, we have reached up with this project in which we will be creating a voice-based email system that will help visually damaged individuals who are inexperienced to computer systems to use email facilities in a hassle-free manner. The users of this system would not require having any fundamental knowledge about keyboard shortcuts or where the keys are located. All operations are based on easy mouse click functions creating it very comfortable for any kind of user to utilize this technique. Also, the user need not bother about recognizing which mouse click operation he/she

needs to perform to avail of a provided benefit as the system itself will be prompting them as to which click will deliver them with what processes.

1.1 Problem Statement

Internet has made The Internet has made the life of people easy by providing access to information, contact with others, expand a business. To communicate over the internet E-mail is supposed to be the most reliable way for sending or receiving some important information. There is a special standard for humans to access the Internet and the standard is you must be capable to see. But there are some visually challenged people or blind people who cannot see things and thus cannot get the use of technology. So, for the betterment of community and giving equal status to such specially-abled people we have come up with this project idea.

1.2 Existing System

Usually, email is sent by seeing the screen and typing the message and other necessary details or by entering details on a smartphone. The existing systems do not support any voice commands or audio facilities therefore it is not suitable for visually challenged people. Also, there is various existing search engine that takes request in form of text from the user and retrieves the relevant documents from a server to respond by displaying them in the form of text which is not possible for visually challenged people.

1.3 Proposed System

To develop a system that can listen to and understand the voice of the user which will enable him/her to send emails just via his voice. An interactive Website will be made with Voice Assistant Accessibility which will enable a visually damaged individual to send and read emails.

2. IMPLEMENTATION

This system is currently being created by us. The subsequent modules are the ones that are already created. Their creation is as follows:

A.Login:

This module will question the user to deliver the username and password. This will be agreed in speech. Speech

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translation will be done to text and the user will be told to validate whether the attributes are entered accurately or not. Once the access is done accurately database will be checked for access. If the user is authorized it will be referred to the homepage.

B. Home Page:

The user is pivoted to this page once the log is done successfully. From this page now the user can execute functions that the user desires to complete. The options available are:

1.Inbox
2.Compose
3.Sent mail
4.Trash

Pressing will provide the mouse click function that requires to be performed for the necessary benefit. The doubled right-click event is precisely dedicated to log out of the system at any time the user desires to. This will be specified by the prompt right at the starting after login.

All these procedures have been implemented. The modules have given below are to be contained in the system and will be implemented as a part of the offered system. The entire walkthrough of this system is given as follows.

C. Compose mail:

This is one of the most important choices supplied by mail services. The functionality of writing (Composing) mail choice would not check the already living mail system. Since the system is for visually challenged individuals and keyboard functions are avoided, composing mail would only be accomplished on voice input and mouse functions. Typed input will not be required. Users can directly record a statement that needs to be cultivated and can send it. This voice message will go as an attachment. The receiver can listen to the recording and get the message user wanted to mail. The user would not need to attach the file. Record choice will be provided in the compose window itself. Once recorded it will verify whether the recording is ideal or not by allowing the user to listen to it and if the user confirms it will be automatically connected to the correspondence.

D. Inbox:

These alternative aids the user consider all the emails that have been received to his/her account. The user can hear emails he/she wants to by executing the click function specified by the prompt. To guide through different emails prompt will specify which functions to execute. Every time the mail is selected the user will be prompted as to whom the sender is and what is the subject of that respective mail. Accordingly, the user can select whether the mail requires to be read or not, or it should be deleted. Deleted emails will be saved in the trash area.

E. Sent mail:

This choice will keep a track of all the emails sent by the user. If the user likes to access these emails, this choice will supply them with their requirements. To access the transmitted mails' user will require to achieve the actions delivered by the prompt to guide between emails. When the control lands on a specific mail user will be prompted as to who the receiver was and what is the subject of the mail. This will help the user efficiently understand and extract the required mail. Trash: This choice will keep a track of all the emails deleted by the user. Deleted emails could be the ones from inbox or transmitted mail. If at any time the user requires to regain a mail that was deleted it can be done from this option.

3. DESIGN

3.1 Software Design Method

Software design is the procedure of conceptualizing the software needs of software execution. Software design takes user needs as a problem and pursues to encounter the best answer. Once the software is conceptualized, a plan is created to discover the finest technique to implement the desired solution. There are several variations in software design. Let us take a quick look at them.

3.2 Structured Design

Structured design conceptualizes the crisis into several well-organized key components. It is something close to the essential answers of design. The benefit of the structured design is that you can nicely understand what are resolved and the crisis. With the structured design, the designer creates it effortless to further concentrate on the crisis.

3.3 Function-oriented Design

In a function-oriented design, a design consists of numerous short subsystems named operations. These components permit you to accomplish important jobs on your system. The system is displayed as a top view of all characteristics. Function-oriented design inherits some features of structured design using the divide-and-conquer method. In a function-oriented design, a design consists of numerous short subsystems named operations. These components permit you to accomplish significant jobs on your system. The system is displayed as a top view of all characteristics. Function-oriented design inherits some features of structured design using the divide-and-conquer method.

3.4 Object-oriented Design

The object-oriented design bypasses commodities and their properties sooner than the qualities included in the software system. This design process concentrates on the commodity

and its effects. The overall idea of a software solution twists around the units implicated.

4. SOFTWARE DESIGN APPROACH

Two common approaches to software design are:

- **Top-down design**

It is known that the system consists of numerous subsystems and includes multiple features. In addition, these subsystems and members have their own set of subsystems and elements, letting you make a hierarchical design in your approach. The top-down design carries the entire software system as a unit and disperses it to get numerous subsystems or elements based on some features. Each subsystem or element is then ministered as a system and additionally subdivided. This process persists until you get the most down system level in the top-down ranking. The top-down design begins with a generalized design model and describes its more distinctive parts. Putting all the components jointly develops the entire system. The top-down design is convenient when you require designing a software solution from blemish, and you do not know the characteristic details.
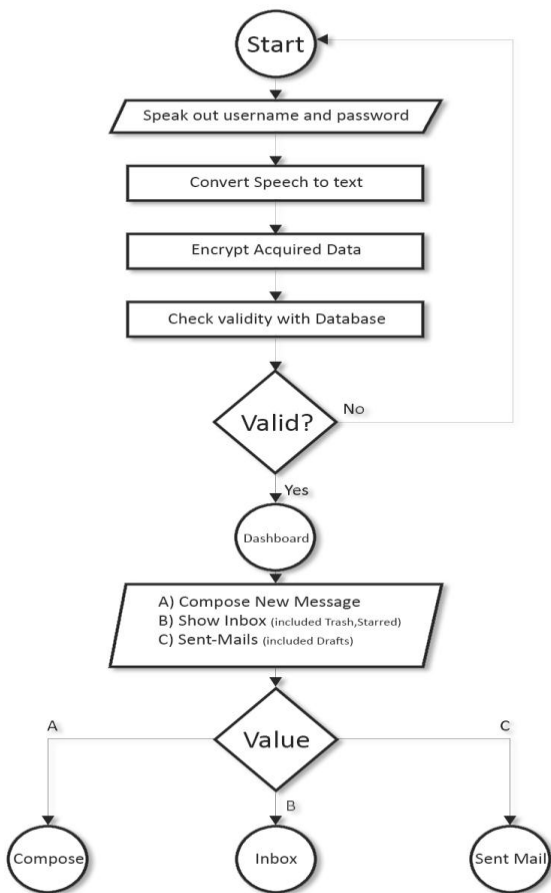

Fig 4.1 Top-down approach software design

- **Bottom-up design**

The bottom-up design model begins with the most distinctive and basic features. Persist in gathering high-level features with basic or low-level features. Persist to create higher-level elements until the wanted system is developed as a single component. The more heightened the level, the more incredible the set of generalizations. The bottom-up strategy is appropriate when you require creating a design from a current system that can utilize fundamental primitives. Both top-down and bottom-up procedures are not separately observed. Rather, the proper mixture of both is used.
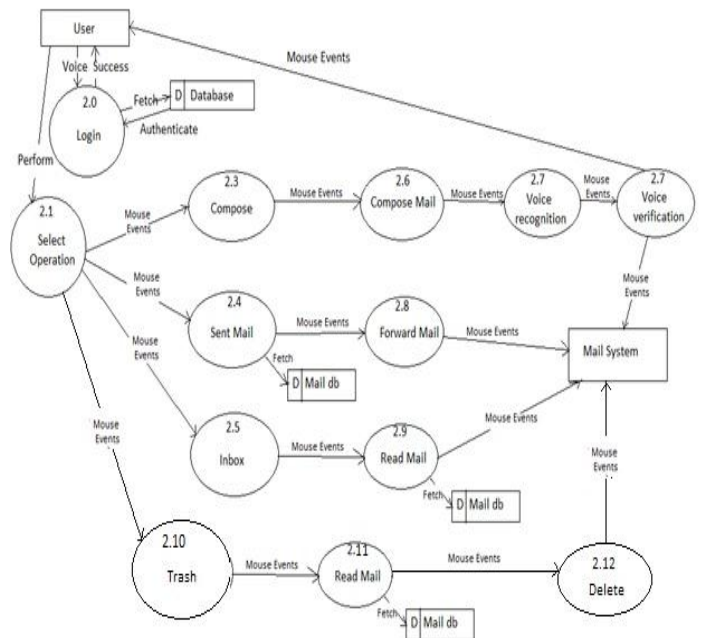
5. FLOW DIAGRAM

Fig 5.1 The final architecture of the proposed system

6. ALGORITHMS AND MODULES

6.1 Speech recognition

Library for achieving speech recognition, with backing for a lot of engines and APIs, online and offline.

Speech recognition engine/API support:

CMU Sphinx (jobs offline)
Google Speech Recognition
Google Cloud Speech API
Wit.ai
Microsoft Bing Voice Recognition
Houndify API
IBM Speech to Text
Snowboy Hotword Detection (works offline)

7. EXPERIMENTAL SETUP

7.1 Tools

The following tools are used in the execution of the presented system.

7.1.1 Flask

Flask is a weightless WSGI net application framework. It is designed to create getting created fast and comfortable, with the capacity to scale up to complicated applications. It started as an easy wrapper around Werkzeug and Jinja and has become one of the most popular Python web application frameworks.

7.1.2 Python

Python is a popular programming language available for most modern computer operating systems. Python IDLE is an environment for writing, editing, debugging and running Python programs. It is included when you install the standard set of Python tools.

7.1.3 HTML5

HTML5 is a markup language utilized for structuring and offering scope on the World Wide Web. It is the fifth and final significant HTML version that is a World Wide Web Consortium (W3C) suggestion. The existing specification is learned as the HTML Living Standard. It is maintained by a consortium of the main browser vendors like Apple, Google, Mozilla, and Microsoft and the Web Hypertext Application Technology Working Group (WHATWG).

8. CONCLUSION

To develop a system which can listen and understand the voice of user which will enable him/her to send emails just through his voice. An interactive Website will be made with Voice Assistant Accessibility which will enable a visually impaired person or even physically impaired person to send and read emails.

9. FUTURE SCOPE

There is wide coming area of this system many enhancements can be done in the design such as having different languages because this system can be made available to all regional people who are not educated enough. Furthermore, sign language systems can also be integrated with the system to create the system more scalable and powerful.

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