



Voice Based Email for Blind People Using Speech Recognition through Artificial Intelligence

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ABSTRACT

In today's world, communication has become very easy due to integration of communication technologies with internet. However, the visually challenged people find it very difficult to utilize this technology because of the fact that using it requires visual perception. Even though much advancement has been implemented to help them use computers efficiently, no user who is visually challenged can use this technology as efficiently as a normal user since they require some practice for using the available technologies. Developing an email system that will help even a naïve, visually impaired person to use the services for communication without previous training. The system does not require the use of keyboard. Instead it will work only on mouse move and speech. This system can also be used by any normal person, for instance, by someone who is unable to read.

Keywords: Text-To- Speech, Automatic Speech Recognition

INTRODUCTION

Internet is considered as the most important means of information and has become de facto methods used in communication. Email is one of the most common form of communication. However, it is completely useless for visually impaired and illiterate people. Currently available systems like screen readers TTS (Text-To- Speech) and ASR (Automatic Speech Recognition) does not provide full efficiency to the blind people to use internet. As nearly 285 million people worldwide are visually impaired so it is necessary to make internet facilities for communication usable for them.

Therefore, developing a voice- based email system which will aid the visually impaired people who are naive to computer systems to use email facilities with ease. All the functions are based on simple mouse click operations making it very easy for any type of user to use this system. Also, the user need not worry about remembering which mouse click operation he/she needs to perform in order to avail a given service as the system itself will be prompting them as to which click will provide them with what operations.

Overview

When the user runs the application, welcome page will be displayed. The welcome page is where the user will have to provide his username and password for authentication. Upon successful login, the Home page is displayed containing several options. The voice engine will keep prompting the user as to what operation is to be performed based on hover action. The user just has to traverse across the screen and upon hearing the prompt for the action he wishes to perform; he should click the mouse button. Once the user is done with the particular module, he can return to the Home page by clicking the "Return to Home page".

METHODOLOGY

The complete system is based on voice prompts and move events. When using this system, the computer will be prompting the user to perform specific operations to avail respective services and if the user needs to access the respective services then he/she needs to perform that operation. One of the major advantages of this system is that, in most of the part user won't require to use the keyboard. All operations will be based on mouse click events. Now the question that arises is that how will the blind users find location of the mouse pointer. As particular location cannot be tracked by the blind user, therefore the user has to traverse the mouse throughout the screen from top to bottom and then left to right. This system will be perfectly accessible to all types of users as it is just based on simple mouse clicks and there is no need to remember keyboard shortcuts. Also because of this facility those who cannot read need not worry as they can listen to the prompting done by the system and perform respective actions.

SYSTEM DESIGN

The system design is the process of defining the architecture, components, modules, interfaces and data for a system to satisfy requirements. Systems design could be seen as the application of systems theory to product development. The design is broadly classified into two levels according to software engineering. They are high level design and low-level design.

GENERAL DESIGN ARCHITECTURE

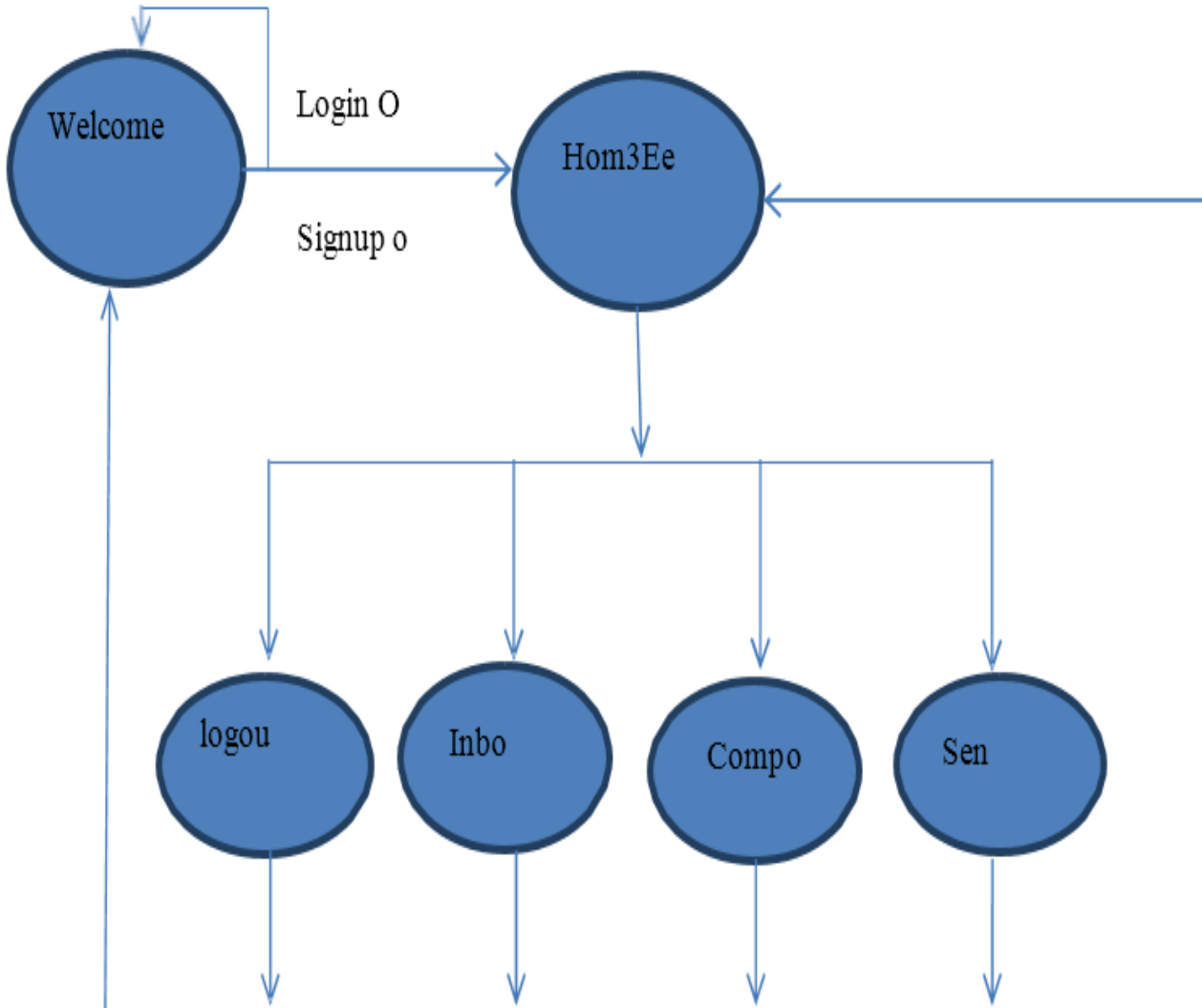


Figure. 1: General design architecture

Sequence Diagram

A sequence diagram is a kind of interaction diagram that shows how process operates with one another and in what order. It is a construct of a Message Sequence Chart. A sequence diagram shows object interactions arranged in time sequence as shown in figures below.

Scenario 1

Once the application is up and running, the user has two options – to sign up (for new user) or to log in (for registered users). If the user wishes to sign up, they will be directed to the Registration Page where they have to enter their name, password and re-enter the password. On clicking the Register button, the two passwords are checked and if there is a mismatch, an error message is displayed. On the other hand, if there is a match, the user’s Home Page will be displayed. If the user wishes to log in to their account, they have to enter the name and the password and on proper authentication, they are directed to the respective Home Page. In case of mismatch, again, error message will be displayed. On clicking the Logout button, the user is signed out of the account and the Welcome Page is displayed.

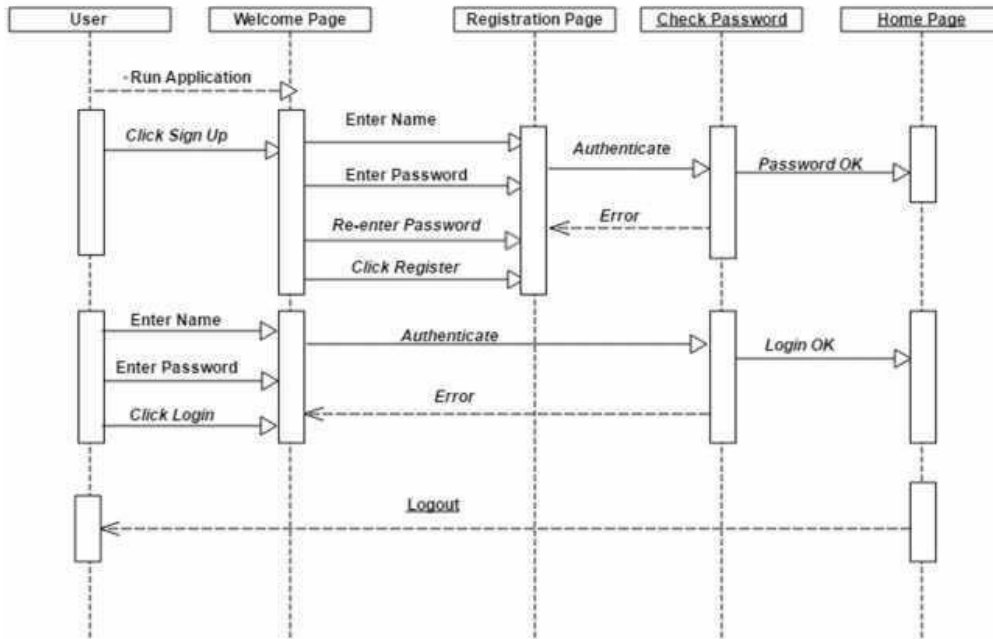


Figure. 2: Sequence diagram for Scenario1

Scenario 2

Once the user is on the Home Page, they have 4 options namely, Inbox, Compose, sent mail, Log out. If the user wishes to check the received mails, the Inbox button is to be clicked. This page has several buttons, each corresponding to one received mail. Based on the mail they wish to read, click on the respective button. Once the user is done with the inbox, Return to Homepage button is to be clicked to go back to the Home Page. If a mail is to be composed, compose option is to be clicked. Within this module, the user has 3 options – record a message, listen to the recorded message, send the message. On clicking on Record, the voice input from the user is recorded for a definite period of time. This recorded message can be played by the user to check if he is satisfied with it. For this, the Listen button is to be clicked upon. On hitting Send, the mail is then sent and the user is directed back to the Home Page. Another option available to the user in the Home Page is the Sent mail viewing option. Here, the user can replay the message that had just been recorded and sent. Once this is done, the user can return to the Home Page by clicking the button for the same. On clicking Logout, the user is signed out of his account and redirected to the Welcome Page of the application.

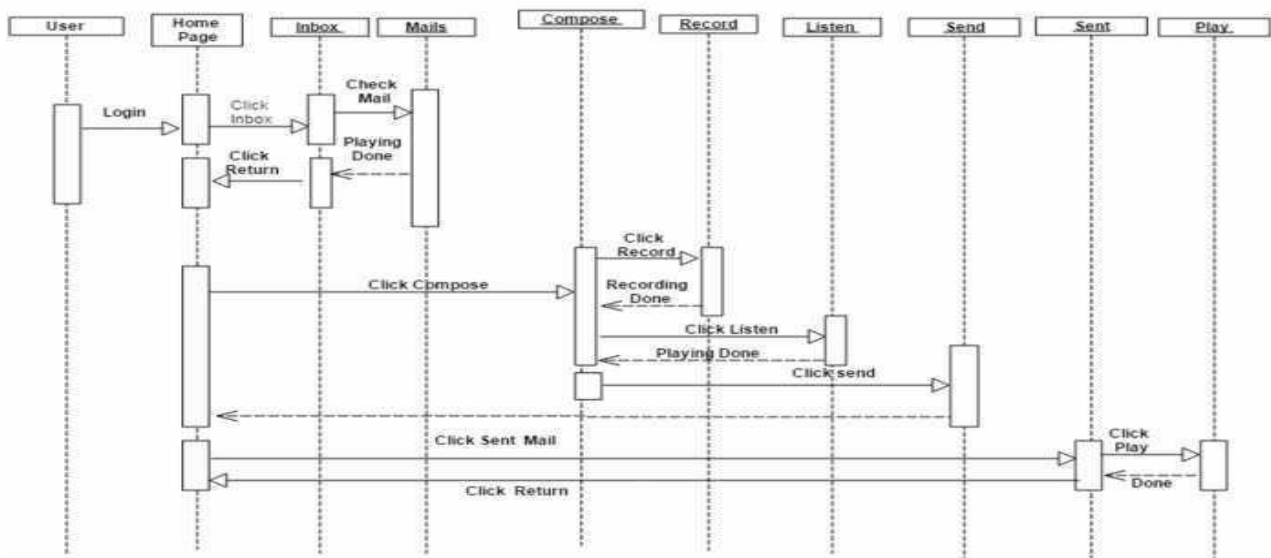
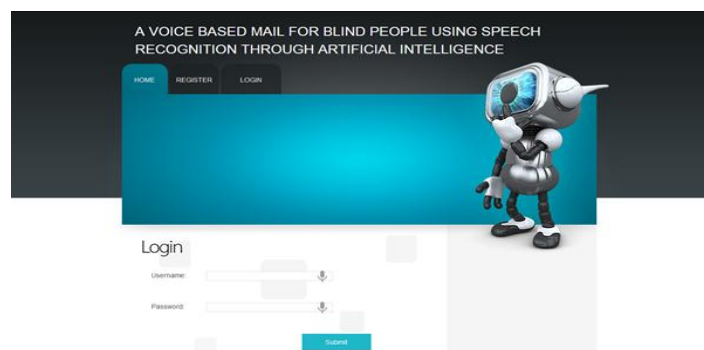
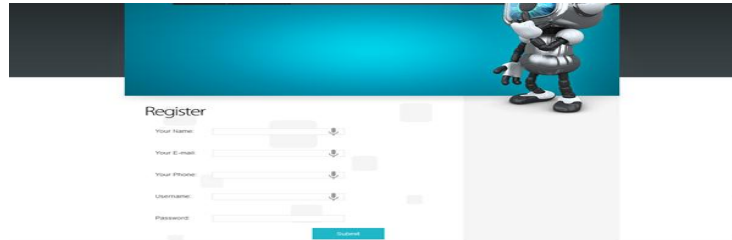


Figure. 3: Sequence diagram for Scenario2

System Testing and executing

Testing is an important stage in the System development life cycle. Careful planning is needed to get the most out of testing and to control testing cost. Test planning is concerned with setting out standard for the testing process rather than describing the product test. System testing is an important element of software quantity assurance and ultimate review of specifications.



CONCLUSION

We have eliminated the concept of using keyboard shortcuts along with screen readers. It will help reducing the cognitive load of remembering keyboard shortcuts. The user only needs to follow the instructions given by the IVR and use mouse clicks accordingly to get the respective services offered. Other than this the user might need to feed in information through voice inputs when specified.

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