LIBRARY ACCESS FOR VISUALLY IMPAIRED STUDENTS

Project Reference No.: *45S_BE_3967*

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Keywords:

Visually Impaired, Assistive Technology, Blind, Dictate, Sign Language.

Introduction:

In regards with UGC guideline D.O.No.2-31 2022 (CPP-ll), published on 20th January 2022, which states that "It is advised that all universities should develop/adopt suitable educational resources assertive devices which better meet the needs of visual impairments for equitable access to the curriculum".

It is known that visually impaired individuals have the same information needs as sighted ones. Just as sighted people might read a newspaper, listen to a CD or download electronic information from the Internet; visually impaired people also want access to relevant information in their chosen accessible format. Developing an efficient library service for print-disabled people is extremely important, because there are significantly fewer books available commercially in accessible formats compared to what is published in print for the public. Libraries have a moral obligation to make information available to all categories of users regardless of their gender, age, race, political affiliation, or disability. Till now library services for these persons were not adequate but the importance of making information accessible for visually impaired people is now realized by different sections.

Libraries play a fundamental role in society. The resources and services they offer create opportunities for learning, support literacy and education, and help shape the new ideas and perspectives that are central to a creative and innovative society. Libraries represent different things to different people – from a place where mothers can take toddlers to read their first stories and students can study, to a service allowing anyone to borrow a book, access the Internet or do research. Quite simply, libraries offer a means by which we can gain access to knowledge.

Objectives:

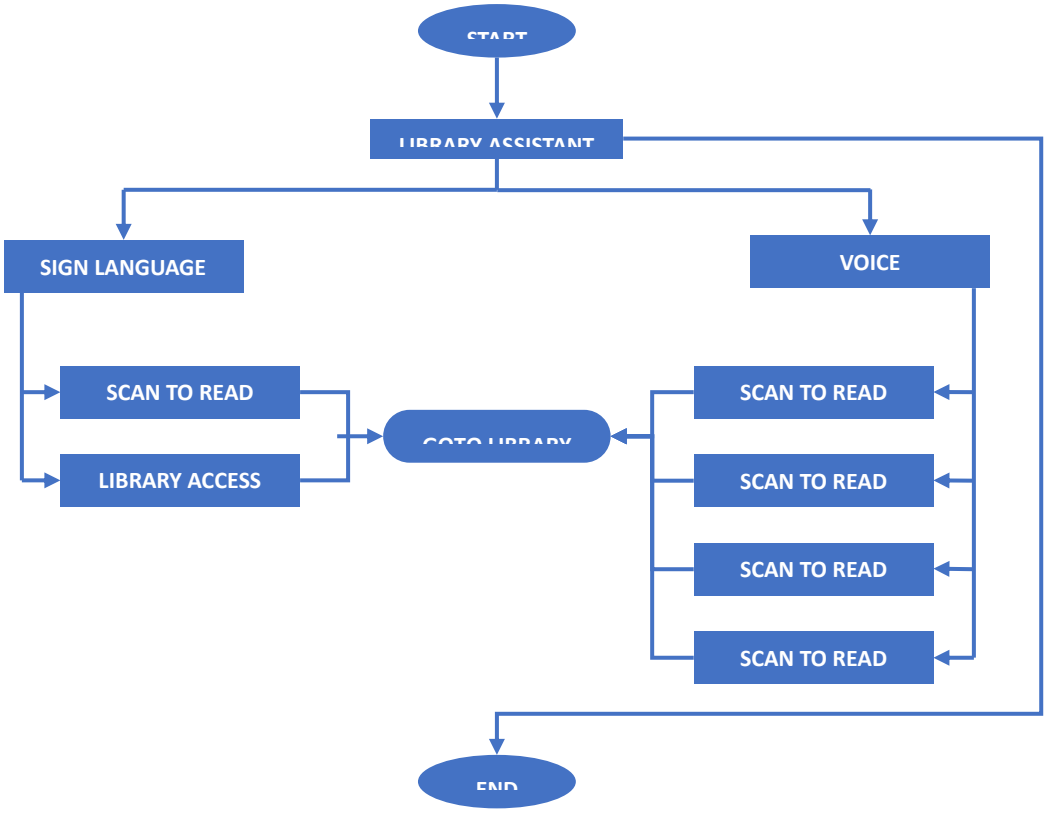
Objectives of this project is to deliver a system capable of:

- Providing an interface between impaired and computer system through an assistive technology.
- A software system capable of converting physical text into digital text and then into speech.

- Providing a facility for impaired to search for video lectures online and search definitions and meanings through voice commands.
- Converting speech into document, so that visually impaired can make notes of what they have learned, and later get braille print from nearest store.
- Students can access books in audio format from Library assistant directory structure.

Methodology:

We have used Waterfall methodology in our software development. Our work went in a sequential manner and was requirements focused. A crystal-clear idea of what the project demands was already set before proceeding further. The flow diagram is represented as follows:



The system modules are:

- **Library Assistant:** A Virtual assistant is being implemented which serves as an interface between the user and the system. Initially, on system start-up the assistant greets the user and pounces the protocols to operate the system. User can also start general converse with the assistant to make our system as an educational as well as a medium of entertainment.
- **Library Access:** The user can give commands to the library assistant and route to desired subject then to desired book then to desired chapter, the assistant will read out the selected chapter to the user. User can access pdf format of books available locally in directory structured database of our software.
- **Book Reader:** Proposed system includes a subsystem which converts printed physical text to into speech. This removes barriers between visually impaired individuals and physical text which are currently unavailable in form of audiobooks.

- **Speech to Search:** User also has a facility to search definitions and video lectures from internet with the help of voice commands.
- **Speech To Document:** Proposed system includes a subsystem which converts speech into a text document. If the individual commands to enter a heading, the font will be larger, or, else if he commands to enter a paragraph, a smaller font is used. This helps visually impaired students make notes at same time, which they can later get braille print format from nearest store.
- **Sign Language Commands:** Proposed system also provides an additional functionality for verbally as well as visually impaired individuals. User can use scan to speech and library access modules with the help of numeric sign language commands.

Result and Conclusion

The resultant system can interact with visually impaired users using speech commands. It provides the user with the functionalities such as reading the physical text, creating notes in form of word documents with the help of speech, searching a specific video as well as audio from the web and display it to the user. Further the system uses the camera to capture the image and converts the text in the image into a speech using OCR (Optical Character Recognition) model. The functionalities of “Scan to Read” and “Library Access” can be enabled with the help of numeric sign commands given to the system with the help of camera as an input source. Accessing library would be very difficult hence with the help of our system the visually impaired users would be able to access the library with ease without facing any problems. Hence, we conclude that these are various ways through which we can contribute the visually impaired users to overcome their challenges and compete with the outside world.

Scope for future work

The following extensions can be made into existing project in future:

- Adding on a functionality of enabling the user to even print out the text, obtained from speech or from OCR, into braille format, with the help of a braille printer.
- We can print out the self-notes made by user using speech to document module, in braille format.
- The proposed system is restricted only towards English language. Hence in future work we can add other regional languages through which the non-English speakers will also be able to access the functionalities of the software.
- By providing the features to operate through different languages we can implement some other functionalities like learning a new language through online tutorials, converting the document obtained through the OCR into the desired translated language which will help them understand the concept better.
- We can also add a functionality which would help the user to compose an email.
- If user wants to address with an official through email or any communication platform, but the student is not familiar with English, then the student can create a document in his regional language and the proposed model can translate it into English which would help the user in communication.