IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, June 2022
Impact Factor: 6.252

An Assistive Reading System for Visually Impaired and Blinds using OCR and TTS Techniques on Lab View

Beemamol Shaji[1] and Remya R[2]
Student, Computer Science, Santhigiri College of Computer Sciences, Thodupuzha, India[1]
Assistant Professor, Computer Science, Santhigiri College of Computer Sciences, Thodupuzha, India[2]

Abstract: *Gaining of knowledge by simply listening to sounds is a peculiar feature. Though text is a medium of communication but speech is more powerful means of communication than text. Optical character recognition has becomeone of the most successful technologies in the field of pattern recognition and artificial intelligence. In order to improve theability to access textual information, a help system was used that reads text from a handwritten and scanned document andconverts the textual information into speech. The generated speech signals can be saved and reproduced for later use. Themain objective of this paper is to develop a cost effective and user-friendly optical character recognition-based speechsynthesis. This paper integrates the text and speech synthesizer which is performed using Laboratory virtual instrumentsengineeringworkbench(LabVIEW2017version).*

Keywords: Optical CharacterRecognition,TexttoSpeech, ImageAcquisition, LabVIEW, etc.

I. INTRODUCTION

In our daily lives, text is everywhere, be it in the form of documents or in the form of natural scenes that a normal person can read. The exact resemblance of the machine to the activities of mankind or to the activities of reading and writing is a dream of antiquity, and this dream has come true these days. Unfortunately, blind and visually impaired people find it difficult to read certain information because their vision problems limit their movement in an uncontrolled environment.Optical character recognition (OCR) technology identifies the character automatically through an optical mechanism. OCR technology converts typed or printed text into machine-encoded text in scanned document, newspaper, and magazine. Over time, several approaches have been put forward to address OCR-based speech synchronization. The OCR method is introduced using OCR technology, Windows Phone and a high-quality camera. Interpreting text from real world images is a challenging task due to changes in environmental factors, making it easy to use even with the best open-sourceOCRengine [1].

The orange pie process ensures that the text in the image is read to help blind people, while the system made of orange pie gives the OCR output to the orange pie, which detects the contents of the image and output it in the form of an audio signal [2].An assistive system has been suggested for the blind and blind; it looks at textual information or paper details and generates corresponding voice output using OCR and text-to-speech (tts) synthesizers[3]. Improved text detection aimed at developing a camera-based text reading system for people with reading difficulties; they developed a working model with panilt-zoom functionality and evaluated a new text-detection method for the image area containing smaller characters [4]. Text Site detection [5] from landscape imagery suggests a text reading system that interacts with landscapes, aims to support visually impaired people, and makes camera-based document learning a real possibility with greater resolution and higher performance of digital camera.

This particular system uses OCR technology, one of the families of technologies that perform automatic recognition and text out speech (TTS) synthesizer. OCR-based speech synthesis artificially produces human speech. Synthesizing is the most effective construction of speech wave forms using text-to-speech conversion in

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, June 2022
Impact Factor: 6.252

LabVIEW, which creates a more powerful medium of communication than text because blinds can also respond to sounds. The proposed methodology aims to develop efficient, cost effective and user-friendly application so that people with blindness can also interact with their environment as that of a sighted person.

II. LITERATURE REVIEW

The history of OCR research, like that of speech recognition, is comparatively old in the field of pattern recognition. History shows many methods of character recognition have been proposed and evolved in three ages. With the development of computers, the Russian scientist Trying attempted to give the first character recognition to the blind in the mid-1940s. In the early nineties, image processing and pattern recognition technologies were combined with artificial intelligence to help the visually impaired.[2]. Almost everyone took the subject of OCR in the early days of pattern recognition research and against what was the expectation of many people, after some initial easy progress, great difficulty in solving this problem surfaced.

III. METHODOLOGY

The significant function of any assistive reading system is text information extraction and it is a foremost part of OCR. The methodology suggested in this paper is to use a help system that reads texts from scanned documents, and its text information is converted into speech.

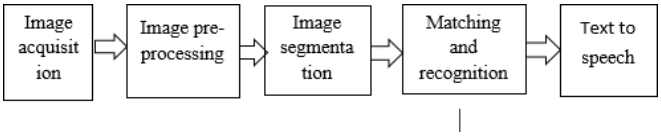


Figure 1: Conversion of text to speech process

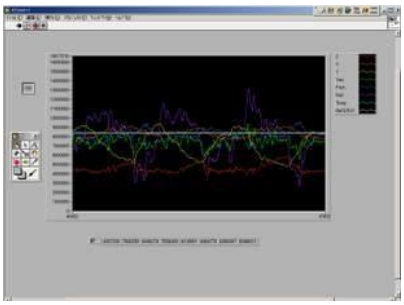
A. *Optical Character Recognition*

OCR is an acronym for Optical Character Recognition, a technology that automatically identifies characters through an optical mechanism. The scanner converts the captured, printed or typed text into machine-editable text. An OCR based system involves the following processes.

- Image Acquisition
- Image Pre-processing (Binarization)
- Image Segmentation
- Matching and Recognition

1. Image Acquisition

Image acquisition is the process of capturing an image of text that can be read with a USB camera. The camera flap is open during the acquisition process to obtain a uniform white background. The image is retrieved using the code generated in LabVIEW.

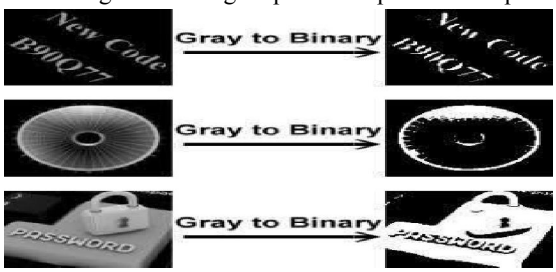


2)Image Binarization

The method of binarization is also called image pre-processing. Binarization is a method used to convert a grey scale image from 0 to 255 into a binary image in the range 0 or 1. When the acquisition is complete, a temporary

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, June 2022
Impact Factor: 6.252

memory location is created for an image that contains 8 bits of typed or handwritten character per pixel value.It then takes session input, which is a unique reference about the camera received from the theme open camera, and then takes the reference to the image as an image input that captures the captured pixel data as output.



3) Image Segmentation

Image segmentation is the process of dividing a given image into multiple segments.This process aims to make the image representation easier to analyze. This process reads the text of the image and identifies all the objects in the image based on the set properties and then compares each object to all the characters in the character set file.

4)Matching and Recognition

Matching and identification is a process in which the correlation between the stored templates and the segmented character is obtained.Matching and identification is a process by which stored templates interact with the segmented character. It uses the Substitution character property to specify the Substitution character. Here the image acquisition IMAQ OCR read is used to match and read the characters in the read string indicator.

B. Text to Speech

Extracted text from Optical Character Recognition can be read automatically by a text-to-speech synthesizer.
The computer system used to create artificial human speech is called a speech synthesizer. Converts a standard language text into speech through the TTS system. LabVIEW has a property called .NET object, where we create an example called constructor node, which contains the initialization parameters used to enter the system speech synthesizer. The output of the constructor node is given to the invoke node, which converts the text in string format into speech.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, June 2022
Impact Factor: 6.252

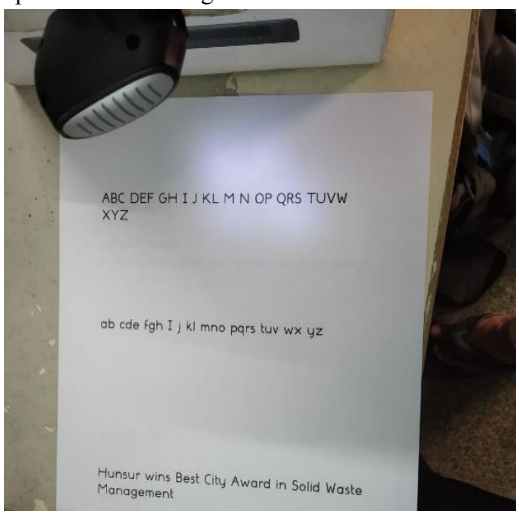
IV.RESULTS

The specific system is developed using LabVIEW 2017 Edition, which reads the text and converts the given text into speech. The level of accuracy is high because we use a database approach.
This process involves two steps

- OCR
- Conversion of text to speech

i. OCR

At this stage the image is given as input as shown in Figure 2, where the image acquisition takes place, the obtained image is binaries and split as shown in Figure 3.



ii. Conversion of Text to Speech

At this point, the textbook is converted to speech, as shown in Figure 4, which matches the train characters stored in the textbook database obtained prior to conversion.

V. CONCLUSION

At this point, the textbook is converted into dialogue, as shown in Figure 4, which matches the train characters stored in the textbook database obtained prior to conversion.This methodology is implemented using two processes, OCR and speech synthesis, respectively. In OCR, character documents printed or written using LabVIEW's IMAQ view are scanned and imaged, and then the acquired characters are subdivided and matched with LabVIEW's template methods.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, June 2022
Impact Factor: 6.252

Then the output in the form of text is converted into speech. This system has limited capabilities for interpreting textbooks, and is limited to recognizing handwritten characters stored only in the database. The method thus developed is user friendly and cost effective. This system has the flexibility to approach certain upgrades when needed.

ACKNOWLEDGMENT

I have taken efforts in this paper. However, it would not have been possible without the kind support and help of many individuals. I would like to extend my sincere thanks to all of them. I am highly indebted to Ms.Remya R for their guidance and constant supervision as well as for providing necessary information regarding the paper & also for their support in completing the seminar. I would like to express my gratitude towards my parents & friends for their kind cooperation and encouragement which help me in completion of this paper.

REFERENCES

[1] Kanchana V and Abdul Shabeer H, "OCR Based Speech Synthesis System Using LabVIEW", Volume 5: PG Scholar/VLSI Design, Department of Electronics and Communication Engineering, Salem,(2014).

[2] Akshay A, Amrrith N P, Dwishanth P and Rekha V, "A Survey on Text to Speech Conversion", Volume 5: Department of Computer Science and Engineering, Easwari Engineering College, Chennai, (2018) Mar- Apr.

[3] Akshay Sharma, Abhishek Srivastava, AdharVashishth, "An Assistive Reading System for Visually Impaired Using OCR and TTS", PEC University of Technology, Chandigarh, (2014) June.

[4] Mauritius Seeger and Christopher Dance, "Binarizing Camera Images for OCR", (2001) 13 September.

[5] K. karthik EL, Ramkumar, I.S. Nivethitha, D.Vaishnavi, "Tools Identification System with Audio Indication Using OCR in Labview" IJSRD-vol.3, Issue 01, (2015).

[6] S. M. A. Hague et al., "Automatic detection and translation of Bengali text on road sign for visually impaired," Daffodil Int. Univ. J. of Sc. andTech, vol. 2, (2007).

[7] B.B.Chaudhuri and U.Pal, "A complete printed Bangla OCR system," Pat. Rec., vol. 31, pp. 531-549, (1997).

[8] Dr. Tulio sulbaran, "Web Based Speech to Text and Text To speech Application for Provide Online Academic text for Blind Students, (2004) June 3.