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Machine Learning Based Blind People Text Reading Using OCR Algorithm

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ABSTRACT: A gift as priceless as good vision is regrettably becoming more and more prevalent. People with visual impairments describe numerous challenges in daily life. Reading texts presents one of the biggest and most significant challenges. The visible world must be translated into an aural world that can enlighten blind individuals about texts they encounter in order to assist them. In this project, we want to give them a tool that will help them with their daily tasks and studies by transforming visual texts into aural signals. This will help them learn and read more effectively. As the user points at the screen, this device takes a picture and finds the text that is there. To provide the user with a clearer result, the text is then retrieved from the image and further turned into audio. Through this initiative, we can better understand the different challenges that the average visually impaired person faces while detecting and understanding text in real time, and we can develop solutions to assist them. In our method, we first obtain the boxed geometry output of all the texts in the photos using OCR (Optical Character Recognition) for text level predictions. Then, to recognise the text, we send it to Tesseract OCR to extract the text. After that, we transform the text to speech for the final outcome. Our project's primary aim is to aid those who are blind in better reading all the materials in front of them and to enable them to go about their daily lives as normally as possible.

KEYWORDS: - Audiosignals, Directing and recognising texts, OCR (optical character recognition) algorithm, Text to speech outcome.

I. INTRODUCTION

Those with learning disabilities, limited literacy skills, visual impairments, and difficulties holding books or documents can all experience difficulties with reading. Using different reading technology and tactics may be advantageous for these people. A reading system that converts a paper document into an electronic version using optical character recognition technology and then reads the information to the user using text-to-speech technology is one solution.

For text reading technology, there are three key components. They are reading text, scanning, and recognising it. First, a camera scans a printed document. OCR transforms images into recognised characters after that. and then says the text that was recognised aloud. Using optical character recognition (OCR), letters that are represented as pixels in text or documents are transformed into their equivalent character representations. For approximately 80 years, OCR has been in development. The development of digital computers in the middle of the 1940s led to the appearance of the modern OCR. Since then, a number of character recognition methods have been suggested. German Gustav Tauscher applied for the first OCR machine patent in 1929. There are numerous software-based OCR systems available. However, there is little work done in the area of hardware implementation of OCR.

Text in everyday language is translated into speech through a text-to-speech system. Systems for converting text to speech offer a plethora of uses. Their first practical application was in reading programmes for the visually impaired, where a computer read some text from a book and then translated it into speech. The use of automatic text recognition

from images in image retrieval, video indexing, mobile robots, and intelligent transportation systems, to name just a few important applications, has recently attracted considerable interest. In order to help the blind and visually impaired, methods have been developed to read the text found in nature situations or to recognise traffic signs in videos of natural scenes. The authors do, however, generally acknowledge that the current findings are insufficient for application. A wearable camera system that automatically detects and tracks text regions in surrounding scenes is one of several intriguing additional methods. Another is a cell phone-based wayfinding system with a camera.

II. RELATED WORKS

To make it easier for blind people to read messages so they can recognise them in circumstances where they would need to, such reading the signs on cars (buses). Our project's primary motivation is to assist those who are blind or visually impaired in better understanding all the texts that are in front of them and to enable them to go about their daily lives in the same manner as anyone else. to enable those who are blind or visually handicapped to participate in their education by independently reading texts. to create a text reading assistance through the use of video processing.

III. EXISTING METHOD

With optical character recognition, printed documents can be swiftly transformed into digital text files that the user can modify. As a result, digitising documents takes very little time; this is especially useful for storing large amounts of printed materials. A study demonstrates how optical character recognition and image-processing technologies can work together to enhance text extraction from images and identification accuracy. In this work, two software systems are created and tested: a text detection and recognition system for natural sceneries, and a character recognition system used on cosmetic-related commercial photos.

IV. PROPOSED SYSTEM

Our OCR module will scan this taken image and identify the text within it using it as input. The text that has been detected by the OCR module will be fed into our text-to-speech module, which will output speech to the users. OCR is a technique that converts printed or typed text into machine-readable text from an image. This system can record live streaming video and transform it from 24 frames per second to 1 frame per second, then extract images from the video as frames. After that, OCR processing will be used to extract text from the extracted frame or image. In order for the visually impaired to access the information on the live video, the output must be delivered in voice or speech form.

V. BLOCK DIAGRAM

This module will use a camera to record live streaming video, and the video input is regarded as an input source for text recognition. In this module, live streaming video is recorded and converted from 24 frames per second to 1 frame per second in order to extract images as frames. After segmenting the images from the converted video that was extracted from the input image, this module allows for the removal of background noise. The OCR object recognition method can be used to process the extracted images in the text recognition module in order to identify text characters and numeric characters. The text is transformed into voice after it has been identified. This module allows you to convert text to audio. For blind people to understand easily, voice alert is employed.

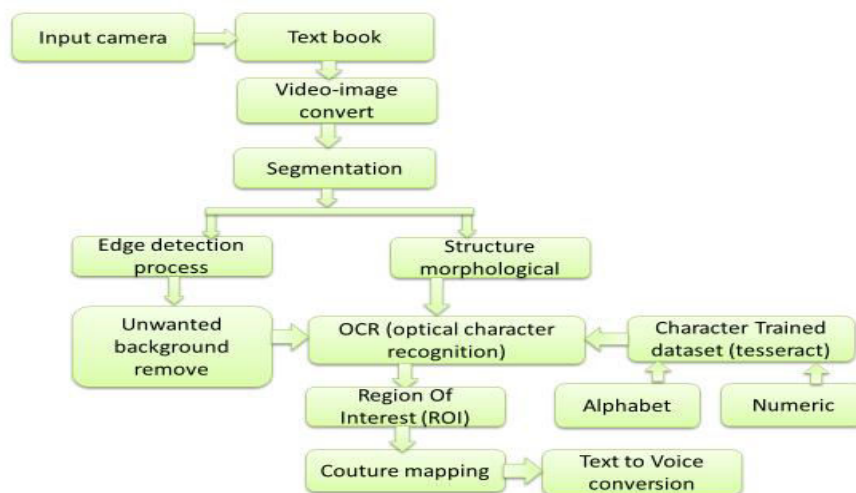


Fig 1. Flow diagram for proposed method

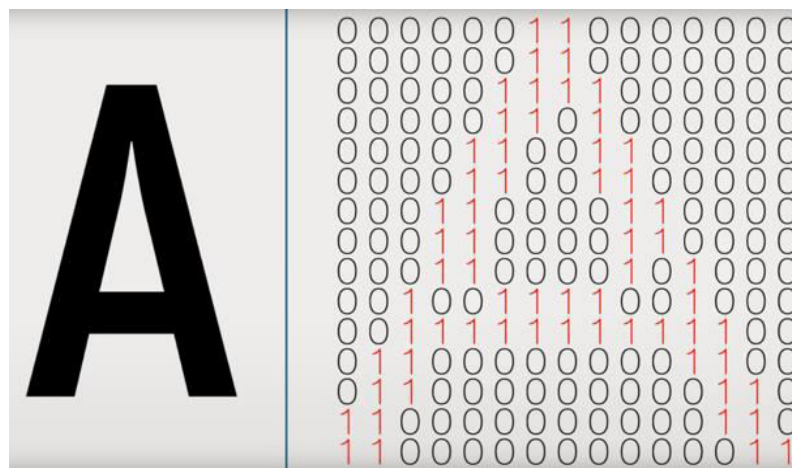


Fig 2. Sample of binary matrix

we convert the image of the character into a binary matrix where white pixels are 0s and black pixels are 1s as shown in the following image 2. Then, by using the distance formula, we can find the distance from the center of the matrix to the farthest 1.

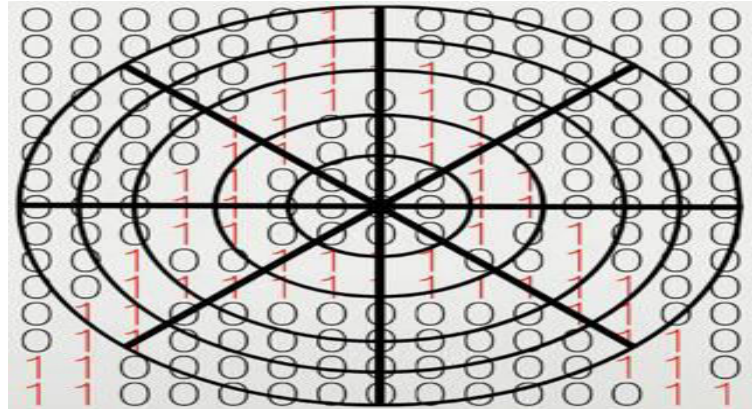


Fig 3. Compare each subsection against the matrix database

VI. EXPERIMENTAL RESULTS

With a pre-loaded database template, optical character recognition is utilised to forecast the input text. The two characters are compared, and if they match, a text-to-speech synthesiser generates speech output. Python programme is used to simulate the work and generate the voice output. The proposed module makes it easier for the user to read the text aloud utilising optical character recognition and audio synthesis.



Fig. 4 & 5 Text detection process

VII. FUTURE SCOPE

The use of goggles and optical head-mounted displays is particularly practical for the aerospace and aero electronic engineering industries. The most difficult maintenance and procedures are here achievable at the nano and micro levels. You may effortlessly deliver virtual instructions with smart glasses. Smart glasses will help to improve the navigation experience. Finding the quickest and safest path will be simple with this situation map. Travelers can calculate and visualise the necessary time by connecting the traffic management system with smart glass. Smart Glass and optical head-mounted displays' augmented reality and computer game elements make gaming more enjoyable.

VIII. CONCLUSION

The system enabling visually handicapped people to read texts aloud is discussed. The results are displayed for the different input data sets, such as text-only inputs, text and picture merges, etc. With a pre-loaded database template, optical character recognition is utilised to forecast the input text. The two characters are compared, and if they match, a text-to-speech synthesiser generates speech output. PYCHARM software is used to mimic the work and generate the voice output. The proposed module makes it more comfortable for the user to read text aloud utilising speech synthesis and optical character recognition. The suggested work is evaluated using various printed text input sets, where noise components are eliminated and text is retrieved to anticipate the text aurally. It is further improved by detecting the nearby character recognition for efficient reading to avoid discontinuity. An audio output that reads the corresponding input is produced to assist blind persons in reading any written text aloud.

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