

An Excellent and Progressive Reading Aid for Unsighted People based on Optical Character Recognition

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Abstract— This paper presents an advanced and complete reading aid for visually impaired people. Among world population one third of blind people are from India. This paper describes about a complete assistance for blind people. This system works based on the character recognition method. The characters and numbers in the printed text or handwritten books can be recognized by this system and readout via headset as voice. The characters in live streaming videos can also be recognized using this advanced system. This is very helpful not only to optically challenge people, but also differently disabled people. This helps to improve the knowledge level of persons.

Keywords—Recognition; visually impaired; live streaming

I. INTRODUCTION

The number of blind people all around the world is about 12 million among 39 million globally. Human communication is mainly done via speech and text nowadays. Many of the people suffer from blindness, color blindness and different types of vision problems and reading disabilities. Braille method was commonly used by the blind people as their reading aid. But this method could be used by the skilled persons and the other thing was the persons know braille cannot recreate the things that happening in front of them. This system aims to help the blind people and also persons with different reading disabilities. This smart device reads out the printed text in a paper or handwritten text and read out the characters in the live streaming video. This advanced device consists of a set of instruction with a camera which captures the text and videos. The captured text and videos are passed through different steps to obtain voice signals. This is an emerging technology which opens new windows to differently disabled people.

II. METHODOLOGY

Optical Character Recognition method is employed in this system to convert the printed text or hand written letters into machine encoded text. This is the first step carried out after the capturing of the specimen as picture or video. Proposed system employs the use of different algorithms for the

capturing and extraction of text from images and videos. The captured text is converted into voice signals by Text to Speech algorithm. Here Python software is used to develop this system.

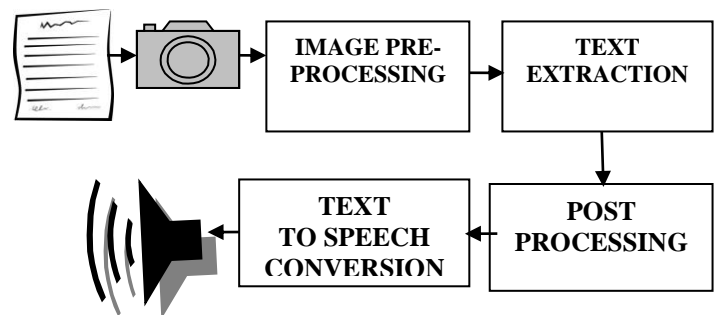


Fig .1.block diagram of the system

A. Image pre-processing.

First, we have to remove noises from the captured image. Pre-processing is the removal of noises and disturbances from the images that is captured using the mounted camera. Gray scale images are different from black and white images. In computer imaging there are only two colors namely black and white. These two colors are represented by bi-level or binary level images. Another processing could be done after noise removal is smoothing. In this step blurriness of the images are removed. Noise in image is random. There are variations in brightness which represents the aspect ratio of electronics noises. These noises are removed using different filters. Here we use median filter for removing noise content in the captured image.

B. Text extraction.

The extraction of text from the captured image is done using an algorithm. Maximum Stable External Regions algorithm is used here for detecting text regions in the given image. Note that there is a chance to detect many non-text regions in the image along with the text. First procedure done by this algorithm is to remove the non-text regions based on its geometric properties. Thus the algorithm picks out most of

the text. A rule-based approach that is geometric properties of text can be used to filter out non-text regions using simple thresholds to remove non-text regions and also a machine learning approach to train a text and non-text classifier. The combination of these two shows a better result.

Another better way to remove non-text regions is based on stroke width variation. Mainly Stroke width refers to measure of the width of the curves and lines that build a character. Non-text regions have large stroke variations whereas the text regions have small stroke width variation. This will help to distinguish between text region and non-text region in an image. Next step is to merge all the non-text regions together for final detection results. All the detection results comprised of individual text characters. The individual text must be merged to form words or text lines. For example, for recognizing the string 'WELCOME' and the set of individual characters {'E','W','L','O','C', 'M'}, where the meaning of the word is lost without the correct ordering. Final step in this recognize the text which is done by optical character recognition. This is the process of converting printed document into ASCII characters which could be recognized by a computer system. Different algorithms are available to detect character based on feature selection. Here we discussed a pattern matching based method for character recognition that could effectively reduce the image processing time while maintaining efficiency and versatility.

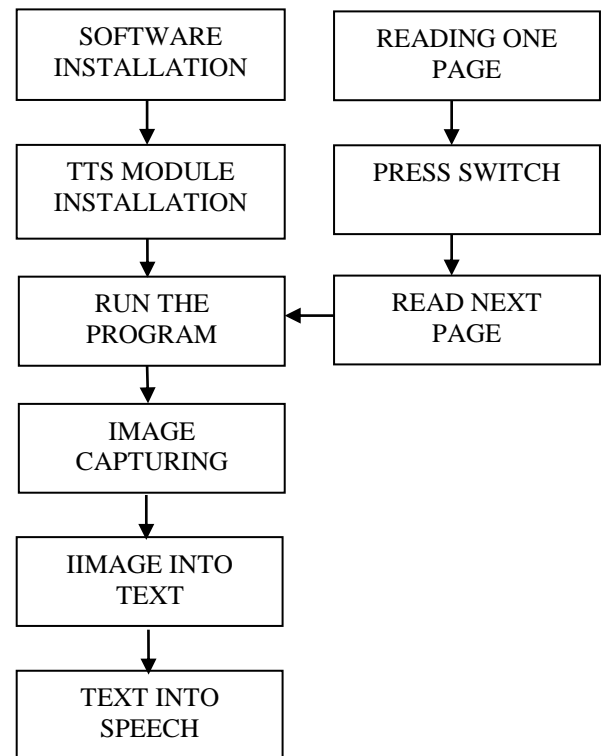
C. Post Processing

The main aim of this step is to correct errors and uncertainties. This could do by different level that is word level or sentence level. The recognized out is compared with the build-in dictionary of the system. There exist many non-trivial error correction algorithms with helps in corrections of errors that made in the processing method. At this stage, outlines are gathered together, purely by nesting, into Blobs. These blobs are organized into text organized to form lines and then into regions, these regions are organized to analyze proportional text or fixed pitch. Proportional text is broken into words using definite spaces and fuzzy spaces. Identification proceeds as a two-pass process. In the first pass, attempt for recognize each word in turn. Each word that is satisfactory is passed to an adaptive classifier as training data. The adaptive classifier then gets a chance to more accurately recognize text lower down the page.

D. Text to Speech conversion

This process refers to the conversion of text into speech signals. In this final step, the text is converted into speech by means of speech synthesizer. This speech synthesizer is called TTS engine. Either festival TTS Engine or Google cloud text to speech can be used to convert text to speech conversion. In this project we use Google cloud text to speech converter is used

III. FLOW CHART



IV. APPLICATIONS

This advanced system can be used in various types of applications. This system is highly applicable to blind people. This system offer guidance for person with learning disabilities. Offering them an easier option for experiencing website content is a better way to engage them. it could also be made a better option to help people with literacy difficulties. The people who can speak the language but couldn't read also can made use of this system. Multitasking persons and persons with different learning styles could also use this system as a helpful aid.

V. RESULT

The result obtained from the above said procedure will be speech signals. Python language is used here for achieving the accurate result. The images are captured using a camera. The image quality can improve further by using a HD camera module. Quality of the image is the prime factor that affects the efficiency of the whole system. This is a simple and miniaturized handy system which aims to assist blind people.

VI. CONCLUSION

An Excellent and Progressive Reading Aid for Un sighted People Based on Optical Character Recognition helps the optically challenged people to understand whatever written or printed. As we all know blind people could not do their daily need without an assistant. This system help them to read without any help of others.

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