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Text Reader for Visually Impaired Person using Image Processing/Open-CV

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ABSTRACT

This system proposes a camera-based assistive text reading framework to help blind persons ad text labels and product packaging from hand-held objects in their daily lives. To isolate the object from cluttered backgrounds or other surrounding objects in the camera view, we rest propose an ancient and active motion-based method to dine a Region Of Interest (ROI) in the video by asking the user to shake the object. In the extracted ROI, text localization and recognition are conducted to acquire text information. To automatically localize the text regions from the object ROI, we propose a novel text localization algorithm by learning gradient features of stroke orientations and distributions of edge pixels in an Ad boost model. Text characters in the localized text regions are then binaries and recognized by the shelf Optical Character
Recognition (OCR) software

Keywords: - : Text to speech, Image to Text, Optical Character Recognition, gTTS and Speech output, Python Programming.

1. INTRODUCTION

The World Health Organization (WHO) survey says that over 285 million people are estimated to be visually challenged worldwide and blind individuals around fifty million worldwide. Although there are many solutions to help individuals who are blind to read the content, but still it requires a lot of enhancement for better reading[1]. The first reference paper named Book reader is an assistive reading system based on the usage of camera for visually impaired people for reading the text on the hard- copied documents, printed text labels and products. This work extracts text from image and then converts it to voice. This can be developed in a Raspberry pi with a battery backup, and this smart reader will be very useful for visually impaired people and also useful for normal human beings. The existing technology poses a lot of challenges to the visually impaired people in accessing the written text or hard-copied text. Also problems like mobility, alignment issues exist. So a device is required that assists the needy people to read the text effectively.

2. OBJECTIVE

This project is designed to overcome Braille problem using IoT technology. This Project is built using a small size and low cost single board computer, named Raspberry Pi. The visual data is sent to the single board computer using WiFi connection. The image is processed to perform image to text conversion and text to voice conversion using available converters from the online site.Book reader will capture the picture of book pages using a camera and then process the images using OCR software. When the image is recognized, book reader will read it aloud. Thus, the blind people or those who have low vision will hear it without the need to touch using their fingertips. Book Reader will read aloud a book without need to touch like braille.

This System has following Modules:

- Requirements Planning
- Pre-processing
- Character recognition
- Development
- Text to Speech Synthesis

3. LITERATURE SURVEY

"OC based facilitator for the visually challenged": The paper encouraged us to do this project. From this paper we got to know that there are many people who are facing the BVI problem. Also this paper gave us brief idea about OCR technology and the implementation details which were very useful. We found this as reference and have tried to approach in a efficient way [1].

Smart Reader for Visually Impaired People Using Raspberry Pi: This paper propose that how to convert image into text and text into audio. Also this system give complete information about hardware and software implementation for blind reader. Raspberry Pi Based Reader for Blind People : The software Implementation and programming along with the details of ocr engine were very useful from this paper. This paper gave the detail information about which engines to be used for image to text conversion , and text to speech [2].

"OCR based automatic book reader for the visually impaired using Raspberry PI"–This paper provided the case study and from this paper we learnt to build a system on English language, and we were able to think that in other language can also be done, which we put it in advancement [8].

4 .METHODOLOGY

The proposed system is a kind of software module that takes input using the system's inbuilt camera or a webcam and extract the text content using the code developed and convert the text to speech and read it out using the headphone/ webcam. This project removes the usage of raspberry pi board which is considered as one of the greatest advantages of the proposed system board. Speech and text are the main medium for human communication. A person needs vision to access the information in a text. However, those who have poor vision can gather information from voice. This paper proposes a camera based assistive text reading to help visually impaired person in reading the text present on the captured image. The proposed idea involves text extraction from scanned image using Tesseract Optical Character Recognition (OCR) and the image is read using the open cv2 provided by python library and converting the text to speech by gtts (Google Text To Speech) which translates the text to speech., a process which makes visually impaired persons to

read the text. This is a prototype for blind people to recognize the products in real world by extracting the text on image and converting it into speech. Proposed method is carried out by using the installation of a software thus makes it more portable and less expensive. Optical character recognition (OCR) systems provide persons who are blind or visually impaired with the capacity to scan printed text and then have it spoken in synthetic speech or saved to a computer file. There are three essential elements to OCR technology—scanning, recognition, and reading text. The data that we collect or generate is mostly raw data, i.e. it is not fit to be used in

5 .MODELING AND ANALYSIS

HARDWARE REUIREMENT:

- Webcam/ inbuilt camera with the system.
- Headphone / speaker.

SOFTWARE REQUIREMENT:

- Python 3.8.1 ● Import pytesseract , gtts , os.

TECHNOLOGIES USED:

- Image processing
- OCR technique(OpticalCharacter Recognition)
- GTTS (Google Text To Speech Converter)

IMAGE

PROCESSING:

Image processing library mainly focused on real-time computer vision with application in wide-range of areas like 2D and 3D feature toolkits, facial & gesture recognition,
Human-computer interaction, Mobile robotics, Object identification and others
.The image processing is done using the library open CV2.To perform basic operations on images like create thumnails , resize, rotation, convert between different file formats etc we use PIL . the image is loaded directely using the open () function on Image class. This returns an image object that contains the pixel data for the image as well as details about the image .The format property on the image will report the image format(e.g png, jpeg), the mode will report the pixel channel format (e.g. CMYK or RGB) and the size will report the dimensions of the image in pixels (e.g. 400*260).The show() function will display the image using operating systems default application. One of the most popular and considered as default library of python for image processing is Pillow. Pillow is an updated version of the Python Image Library or PIL and supports a range of simple and advanced image manipulation functionality. It is also the basis for simple image support in other Python libraries such as SciPy and Matplotlib. OCR TECHNIQUE: Optical character recognition or optical character reader (OCR) is the electronic or mechanical conversion of images of typed, handwritten or printed text into machine-encoded text, whether from a scanned document, a photo of a document, a scene-photo or from subtitle text superimposed on an image.It deals with recognizing text from the image files and storing it into a text file. Here, we process the images and convert it into text. Once we have the text as a string variable, we can do any processing on the text.Optical Character Recognition involves the detection of text content on images and translation of the images to encoded text that the computer can easily understand. An image containing text is scanned and analyzed in order to identify the characters in it. Upon identification, the character is converted to machine-encoded text. The image is now split into zones identifying the areas of interest such as where the images or \text are and this helps kick off the extraction process. The areas containing text can now be broken down further into lines and words and characters and now the

software is able to match the characters through comparison and various detection algorithms. The final result is the text in the image that we're given

The fundamental information gathered from web sources is still presented in its unprocessed state as statements, numbers, and qualitative phrases. There are mistakes, omissions, and discrepancies in the raw data. After carefully examining the filled questionnaires, modifications are necessary. Processing the primary data involves the subsequent processes. Field surveys generate a tremendous amount of raw data, which must be classified according to the similarity of the individual responses. Data preprocessing is a method for transforming unclean data into clean data sets. In other words, anytime data are collected from several sources, they are combined into a raw format that is not useful for analysis. As a result, specific actions are taken to reduce the data to a manageable and clean collection.

This technique is performed before the execution of Iterative Analysis. These set of steps is known as Data Preprocessing. After this it includes Data Cleaning, Preprocessing, Feature Extraction, Classification.

Two Modules: User and Doctor are been developed. The incremental build model is a method of software development where the product is designed, implemented, and tested incrementally (a little more is added each time) until the product is finished. It involves both development and maintenance

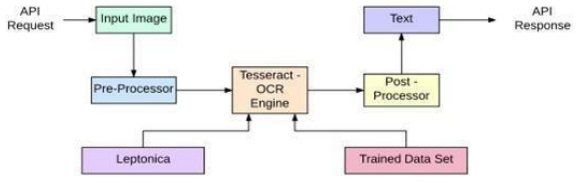

Fig 1. OCR PROCESS FLOW

GOOGLE TEXT TO SPEECH CONVERTER:

gTTS (Google Text-to-Speech), a Python library and CLI tool to interface with Google Translate's text-to-speech API. There are several APIs available to convert text to speech in python. One of such APIs is the Google Text to Speech API commonly known as the gTTS API. gTTS is a very easy to use tool which converts the text entered, into audio which can be saved as a mp3 file.The gTTS API supports several languages including English, Hindi, Tamil, French, German and many more. The speech can be delivered in any one of the two available audio speeds, fast or slow. However, as of the latest update, it is not possible to change the voice of the generated audio.

CONCLUSION

According to the survey made through the reference papers, the smart reader for blind produces a positive outcome when applied in practical world. This system is useful for visually impaired persons to access information which is in the form of documents, texts or printed forms. The future implementation may include accuracy and fulfil the limitations of existing system.

REFERENCES

[1]. SandeepMusale, VikramGhiye, “Smart Reader For Visually Impaired,” IEEE Xplore International Conference on Inventive Systems and Control, June 2018.

[2]. Deepthi Jain B, Shwetha M Thakur and K V Suresh, “Visual IJESC, June 2020 26164 http:// ijesc.org/ Assistance for Blind using Image Processing,” IEEE International Conference on Communication and Signal Processing, April 2018. [3]. ShaliniSonth, Jagadish S. Kalliman,

"OCR based facilitator for the visually challenged", International Conference on Electrical, Electronics, Communication, Computer and Optimization Techniques, Dec. 2017.
[4].Ani R, Effy Maria, J Jameema Joyce, "Smart Specs: Voice Assisted Text Reading system for Visually Impaired Persons Using TTS Method," IEEE International Conference on Innovations in Green Energy and Healthcare Technologies, Nov 2017. [5].PranabGajananBhat, Deepak Kumar Rout, "Vision Sensory Substitution to Aid the Blind in Reading and Object Recognition IEEE International Conference on Image Information Processing (ICIIP), March 2018.