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Raspberry Pi Based Text to Speech for Blind People

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ABSTRACT: Braille machines are very expensive and the end result is not available to many. In particular, there is a need for a portable text content reader that is cheap and convenient for the visually challenged community to obtain. The device designed is a portable, low-cost learning tool manufactured for visually impaired people. Designed devices are cheaper than typical loads, thus overcoming the problems of traditional Braille devices. This paper introduces a smart reader for the visually challenged using the Raspberry Pi. This white paper describes a combination of full text readers designed for the visually impaired. The designed gadget includes a webcam connected to the Raspberry Pi that accepts the page displaying the text. This device uses OCR generation to convert an image to text and a text-to-speech (voice output) conversion to examine text content. This gadget supports audio output from speakers in addition to head phones.

KEYWORDS: OCR, TTS, Raspberry pi, Web Cam, Optical man or woman popularity, Audio amplifier.

I. INTRODUCTION

Visually impaired people have various problems accessing texts found using the latest technology. This paper provides a clever tool to help visually impaired people effectively read the textual content displayed on the paper. The equipment proposed in this document uses digitized digital camera technology. This is a completely useful device that visually impaired people can use to study text recordings. The framework is designed to implement an image comprehension approach with built-in tools that are entirely based on the Raspberry Pi board. In this paper, we have proposed textual content for exploring devices for the visually impaired. The proposed reliably integrated device features a digital camera as an input device for supplying published text documents for digitization, and scanned reports are OCR (Optical Character Recognition) software programs. Created using the application module.

Most technical devices designed for people with blindness or low vision are based on two basic components: OCR software and the Text-to-Speech(voice output) (TTS) engine. Optical Personal Recognition is the shift of captured images from published text content to device-encoded text. OCR is a device that uses photos of men or women to create iconic connections with objects (letters, symbols, and various things). This is defined by how the tool's scanned images are converted to a PC-friendly layout. Optical character recognition is also useful for visually challenged people who cannot recognize text reports but need access to the contents of text files. Optical character recognization is used to digitize and duplicate text created on non-automated machines. Digitizing text can also reduce garage space. Reviewing and reprinting text entries published on paper can be time consuming and very extensive. It is heavily used to transform books and documents into cyberized documents that can be used in garages and file analysis. OCR allows you to apply machine translation, text content-to-speech, text content, and other plans to captured / scanned web pages. The final identified text report is sent to the output device at the consumer's choice. The output tool can be a headset connected to a Raspberry Pi, or a speaker that can spell recorded text content. Designed gadgets need to efficiently convert text content in text images to audio.

II. FACTS & PREVALENCE

In general, at least 2.2 billion people have proximity or television problems. At least one billion, or nearly half of these cases, have been able to prevent creative and visionary obstacles or simply need to be addressed. The main impact of visual impairment and blindness are uncorrected distracting errors and characters. The majority of human

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with impaired imagination, foresight and blindness are over 50 years old. However, loss of vision can affect people of all ages. Visual impairment and blind people represents a widespread international financial burden, with annual global penalties for loss of productivity associated with impaired imagination and predictive power due to uncorrected myopia. The foresight I personally valued was $ 244 billion and $ 25.4 billion, respectively. International Classification of these Diseases 11 (2018) classifies visually impaired into two groups: distant and near-impaired with imagination and visual impairment. The enjoyment of a visually challenged character depends on many different factors. These include, for example, the provision of predictive and therapeutic interventions, the right to access imaginative and predictive reconstruction (example, assistance from glasses or white canes), and inaccessible buildings, transportation, etc. And whether it contains facts or not. At least 2.2 billion people worldwide have near or far vision and visual impairment. In at least one billion, or nearly half of these cases, vision impairment may have avoided or needed to be addressed. These 1 billion people are due to untreated refractive error (88.4 million), cataracts (94 million), glaucoma (7.7 million), corneal opacity (4.2 million), and diabetic retinopathy (3.9 million). Includes people with mild or severe distance vision impairment or blindness. And trachoma (2 million), and near-imaginative predictive impairment (826 million) due to untreated presbyopia. In terms of short-distance differences, the generality of disability due to distant imagination and foresight is four times higher in low- and middle-income areas than in high-income areas (1). For near-expected near-vision impairment, which is almost imaginative and close to prediction, western, eastern, and important sub-Saharan Africa are expected to account for more than 80% of the price, but costs are comparable in the excess regions of North America. is. Australasia, Western Europe are specifically said to be less than 10%.

III. LITERATURE SURVEY

A literature survey offers us a notion about how the implementation can be completed based totally on ways to carry out work. The literature survey suggests the number of evaluations and lookup made in the area of our hobby and the outcomes already published, thinking about several parameters of the undertaking and the extent of the project. It is the most necessary section of the document as it offers us a course in the region of our research.

T.Rubesh Kumar "Support System for Label Detection with Audio Output for the Visually Impaired" International Journal of Research in Engineering & Advanced Technology 2014,The reading proposed by T. Rubesh Kumar is of great importance in today's society. Printed text is everywhere in the form of stories, receipts, and bank statements. There are already some structures that you can expect to use on mobile, but we can't handle product labeling. However, the big problem is that it is very difficult for the visually impaired customer to find the location of the barcode and place the barcode reader correctly on the barcode. T. Rubesh Kumar has developed a digital camera-based text content analysis support system to help visually impaired people look up text labels and product packages on portable devices in their daily lives. The main contribution of this prototype system is the new motion-based complete rule to eliminate the blind customer aiming effort by actually shaking the object of interest for a short time. A set of new rules for computer-assisted localization of text content from complex ancient pasts and exclusive text styles to real text areas. A portable digital camera-based tool that helps the visually impaired to read text from a handheld device. Introducing the growing interest in imaginative and advanced laptops in recent years.

Pooja Sharma, Microcontroller-based Virtual Eye Design for the Blind, International Journal of Scientific Research Engineering Technology, 2014. Pooja Sharmaetal
is a country that lacks visual perception due to physiological or neurological factors. In this proposed painting by Pooja Sharma, Simi, a simple, low-cost virtual eye is designed to improve the mobility of all visually challenged and partially visually impaired people in selected areas. And can be applied. The proposed artwork consists of a wearable system that includes a head hat, mini hand sticks, and foot shoes, allowing visually impaired characters to move properly and encounter permanent or mobile characters. Apart from certain restrictions, you can prevent all possible accidents. The main element of this device is an ultrasonic sensor are those, which is used to blindly test a given area by radiating and reflecting waves. Reflective characters captured by the barrier gadget are used as input to the Arduino microcontroller. The microcontroller speaks the call to the specific device or device returned to the headphones using the Raspberry Pi speech synthesizer after executing the issued command. The introduced machine is a cheap, fast, modern and affordable option for the visually impaired and the visually impaired in 0.33 international locations around the world.

Anusha Bhargava, British Sachdeva, Monil Samel "Reading Assistant for the Blind", International Journal of Current Engineering and Technology, 2015, Anusha Bhargavaetal suggested that most visually impaired people use Braille to read documents and books. These are difficult to create and much less easy to obtain. This increases the need

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to develop devices that relieve the pain faced by the visually impaired, says Anusha Bhargava of Karthik. This challenge aims to explore the generation of photos by speech synthesis and to develop a low-cost, easy-to-use image-to-speech conversion device using the Raspberry Pi. The company scans text displayed on paper and converts it into voice format, uses synthetic voice to read the scanned text, and quickly translates books, documents, and other materials for everyday use. Built-in digital camera. Especially far from home and work. Not only does this save time and energy, but it also enhances the independence of the visually impaired and thus improves the presence of the visually impaired people.

Nagaraja L, Nagarajun R S, Nishith M Anand "Challenge the Vision Based on Full Text Recognition by Raspberry Pi" National Conference on Power Systems and Industrial Automation (NCPSIA 2015), Nagaraja L proposed that the technique is a digicam based totally assistive text reading to assist blind character in reading the textual content present at the textual content labels, found out notes and products. The proposed project involves Text Extraction from photograph and changing the Text to Speech converter, a device which makes blind people to observe the textual content. This is finished by way of the usage of Raspberry pi version, in which portability is the precept goal it really is executed thus it offering a battery backup and can be performed as a future region. The portability permits the consumer to hold the tool anywhere and may use any time. To extract the text from photo we use optical individual recognition technique. A Text-To-Speech (TTS) synthesizer is a laptop-based totally system that have to be capable of reading any textual content aloud, whether or not it grow to be without delay added inside the laptop through an machinist or scanned and submitted to an Optical Character Recognition (OCR) device.

Mallapa D, Salimath, Shruti B. Hatti, Vijayalaxmi I. Byakod, "B-LIGHT: A Convenient Reading Resource for the Visually Impaired to Use OCR and OpenCV," International Journal of Scientific Research Engineering & Technology (IJSRET 2017). Mallapa D. Guravetal has suggested that this mission is a clever tool to help visually impaired people or blind people read printed text content normally and efficiently. The proposed task primarily uses a virtual digital camera-based auxiliary device method that humans can use to read text reports. The framework is designed to apply image capture methods with built-in tools that are entirely based on the Raspberry Pi board. The offers fully integrated machine features a camera as an input device to supply a published text dataset for digitization of input, and the scanned phrases are OCR (Optical Character Recognition), a software program application module. It is processed by the reputation engine). Optical Personal Recognition (OCR) is the recognition of exposed characters using photoelectric devices and PC software applications. Converts a snapshot or photo of the text content you type or display from text content with captions overlaid on a scanned file or photo to machine-encoded text. In this study, photos are converted to audio output. OCR is applied system by system along with cognitive computing, device conversion, text-to-speech, key recording, and text content mining. The popular path is completed with OCR, the character encoding of the text file is handled on the Raspberry Pi device or machine, and male or female confirms the use of Tesseract prescription and Python programming and voice output.

PROPOSED METHODOLOGY

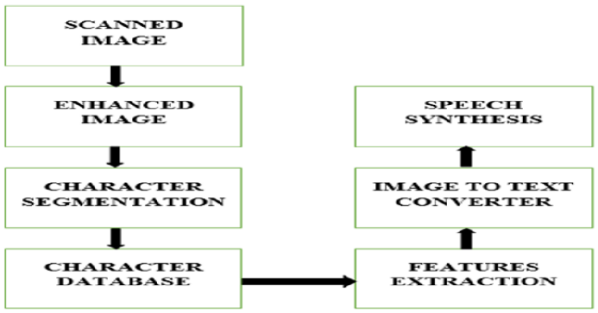

Figure 4.1: Flowchart of the designed machine

The details of flow process is explained below:

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A. Image Processing:

The first step where the device navigates over the posted page and the digital camera captures an image of the text. The beauty of the pictures you take can be too high, so thanks to the high resolution camera, you can quickly and cleanly gain popularity.

B. Pre-Processing:

The preprocessing stage consists of three steps: skew correction, linearization, and denoising. Check the distortion of the captured image. If you rotate it left or right, the image may be distorted. Here, the image is first brightened or focussed and binarized. The feature of skew detection is that it checks the azimuth angle of ± 15 steps, and when it is detected, a slight image rotation is completed until the line coincides with the true horizontal axis, and a skew-corrected photo is generated. Background noise and bad website noise generated while taking a photo should be removed before further processing.

C. Segmentation(Decomposition):

After preprocessing, the noise(voice)-free image is passed to the segment. This is an task that aims to break down a image of a character's collection into a sub-image of a person image (character). The binarized image is checked for line spacing. If the interlaced area is placed, the photo will be split into a set of paragraphs during the interlaced gap. Lines in paragraphs are scanned for horizontal intersections to detect past sounds in the past. The histogram in the photo is used to find the width of the horizontal track. Then scan the lines that intersect in vertical space vertically. Here we use a histogram to find out the width of the term. The word is then split into letters using human latitude calculations.

D. Image To Text:

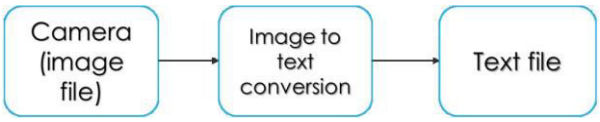

Figure 4.2: Image To Text Conversion

The ASCII value of the recognized text is processed using the Raspberry Pi model. Here, each word is matched against the corresponding device and saved as a standarized transcription of the text content. This transcription is also sent to the voice output.

E. Text To Speech:

Figure 4.3: Text to Speech Conversion

The main scope of this module is introduced in the concept of the backward module of phrase recognition. The module performs the mapping of the converted word content to audio format.

IV. TECHNOLOGIES USED

A. OCR(Optical Character Recognision):

Optical Character Recognition is a material recognition strategy for content that you enter and render into an editable copy or content dataset by entering the created content or a published copy of the content. OCR is performed to check the content of the image and convert this photo into editable audio content. It digitizes transmitted messages with the aim of electronically modifying, searching, minimizing, and reviewing transmitted messages on the Internet,

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for example, embedding them in device tactics such as: This is a typical method to do. B. Intellectual processing, AI and interpretation, text to discourse, etc.

V. RESULT

When the text is captured by the web camera first it will go to the google then it convert to speech after it come out as audio speech. Through this visually impaired people and blind people can easily read the text.

VI. CONCLUSION

Convert images to text and text content to audio using Raspberry Pi. This mission is useful for the visually and voice impaired. However, due to the limited number of digital camera options, the output you get is not always 100%. You can improve the accuracy by using an HD digital camera. Converts voice to text. For the AMR voice app to recognize the phrase successfully, the input voice must be clear and the idiom must be good.

VII. FUTURE SCOPE

Time application. Here are some of the applications that are particularly useful:

• Assistance for the visually impaired who need to clarify the text and who need to look up the broadcast text and listen to the audio.

• Speech synthesis can be used in human interactions and interfaces with different types of devices. For example, warnings, alert systems, and clocks can use synthetic speech for actual recording.

• Speech synthesis can be used in robotics.

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