International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252

Enhanced Method for Visually Impaired People Book Reading Using Ocr To Improve Braille Conversions

B. Priya[1], N.Murugeswari[2], A.Rojashree[3]
[1, 2, 3] *Student, Panimalar Engineering college, Chennai, Tamilnadu,India*
Corresponding Author: B. Priya

Submitted: 30-03-2021 Revised: 06-04-2021 Accepted: 09-04-2021

ABSTRACT: There aretotally 285 million of blind people across the world. Out of that 40 million people are Indians.These people are unable to access the documents or electronics media which are not available in Braille scripts. Here we are implementing enhanced Braille system that helps blind people to read text or content. We scanned image from camera, then image is processed internally and separates label from image by using open CV library and finally identifies the product and it will be converted into textusing Optical Character Recognition (OCR). Now converted text should be converted to voice to hear label name as voice through ear phones connected to audio jack port using flite library. Now same text should be converted into braille scripts with the help of python packages.

KEYWORDS: OCR, Open CV,Flite library, Python, Braille scripts.

I. INTRODUCTION

There are 285 million of visually impairedpeople across the world, out of that 40 million people are Indians. Recent developments in computer vision, digital cameras and portable computers make it feasible to assist these individuals by developing camera based products that combine computer vision technology with other existing commercial products such optical character recognition (OCR) systems. [1] Reading is obviouslyessential in today's society. Printed text is everywhere in the form of reports, receipts, bank statements, restaurant menus, classroom handouts, product packages, instructions on medicine bottles,etc. The ability of people who are blind or have significant visual impairments to read printed labels and product packages will enhance independent living and foster economic and social self-sufficiency. Today, there are already a few systems that have some promise for portable use, but they cannot handle product labeling.[2]. There are approximately 285 million blind and visually problem people around the world. The term visual impairment covers a wide range and variety of vision, from lack of usable sight and blind, to low vision. Visually impairment cannot be corrected with eyeglasses or contact lenses to moderate visual impairment and an ability to read books, newspapers or any written notes. [3].visually impairment individuals usually only can read using the Braille system. The Braille system contains 63 codes of character. Each of them made of 1 to 6 raised dots in different position matrix or cells. Braille characters are embossed in lines on paper, and read by having the fingers passed lightly over the manuscript. The Braille system was invented by Louis Braille in 1824. Braille can be difficult to learn, not all people's fingertips are sensitive enough to use it. Furthermore, there are limitations to get books using Braille in the market. Study in shows that blind people face three aspects of difficulties in their daily life; environmental aspect, social aspect and technology aspect. For the environmental aspect, blind people often have difficulties in self-navigating outside well-known environments.Today, there are already a few systems that have some promise for portable use, but they cannot handle product labeling.For example, portable bar code readers designed to help blind people identify different products in an extensive product database can enable users who are blind to access information about these products through speech and Braille. But a big limitation is that it is very hard for blind users to find the position of the bar code and to correctly point the bar code reader at the bar code.Some reading assistive systems such aspen scanner might be employed in these and similar situations. [4] Although a number of reading assistants have been designed specifically for the visually impaired, to our knowledge, no existing

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252

reading assistant can read text from the kinds of challenging patterns and backgrounds found on many everyday commercial products. To assist blind persons to read text from these kinds of hand-held objects, we have conceived of a camera based assistive text reading framework to track the object of interest within the camera view and extract print text information from the object. Our proposed algorithm can effectively handle complex background and multiple patterns, and extract text information from both hand-held objects and nearby signage.

II. PROPOSED ARCHITECTURE

The block diagram consists of input image, background subtraction, thresholding, tesseract OCR dataset, extract data, text file, voice output, braille output as shown in Fig 1.

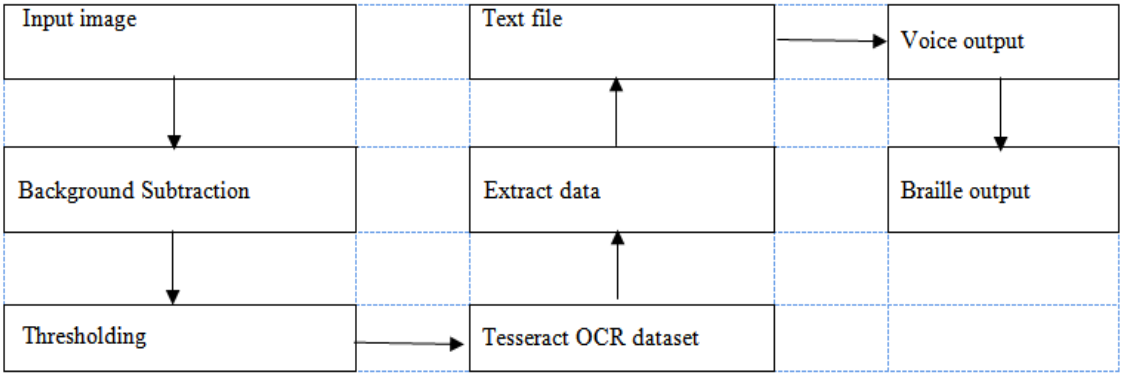


Figure 1. Functional Block Diagram

The text is captured by camera and then captured image is processed internally and separates label from image by using open CV library.Background subtraction, also known as Foreground Detection, is a technique in the fields of image processing and computer vision where in an image's foreground is extracted for further processing (object recognition etc.). Using these images the background of the image is detected along with the edge details. Thresholding is a type of image segmentation, where we change the pixels of an image to make the image easier to analyze. It is a great way to extract useful information encoded into pixels while minimizing background noise.Python-tesseract is an optical character recognition (OCR) tool for python. That is, it will recognize and "read" the text embedded in images. Additionally, if used as a script, Python-tesseract will print the recognized text instead of writing it to a file.

Optical Character Recognition, or OCR, is a technology that enables you to convert different types of documents, such as scanned paper documents, PDF files or images captured by a digital camera into editable and searchable data.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 too which convert the text entered, into audio which can be saved as a MP3 file.Simply pre-generate Google Translate TTS request URLs to feed to an external program.We scanned image from camera, then image is processed internally and separates label from image by using open CV library and finally identifies the product and it will be converted into textusing OCR(Optical Character Recognition). After the conversion, the text is identified and converted to the Braille. The braille code obtained can be used in converting the text directly into Braille code.

III. SYSTEM DESIGN

Systems design is the process of defining elements in a system like modules, architecture, and functioning of a system. Our proposed system is scanning an image is converted into text and then the same text is converted into audio and braille scripts.

3.1OCR (Optical Character Recognition)

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 (for example the text on signs and billboards in a landscape photo), or subtitle text superimposed on an image (for example: from a television broadcast).Widely used as a form of data entry from printed paper data records – whether

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252

passport documents, invoices, bank statements, computerized receipts, business cards, mail, printouts of static-data, or any suitable documentation it is common.

Figure2. OCR System Design

Method of digitizing printed texts so that they can be electronically edited, searched, stored more compactly, displayed on-line, and used in machine processes such as cognitive computing, machine translation, (extracted) text-to-speech, key data and text mining. OCR (OPTICAL CHARACTER RECOGNITION) is a field of research in pattern recognition, artificial intelligence and computer vision.

3.2 TTS (Text To Speech)

[5], A Text-to-speech synthesizer is an application that converts textinto spoken word, by analyzing and processing the text using NaturalLanguage Processing (NLP) and then using Digital Signal Processing (DSP) technology to convert this processed text into synthesized speechrepresentation of the text. The text-to-speech (TTS) synthesis procedureconsists of two main phases. The first is text analysis, where the input text is transcribed into a phonetic or some other linguistic representation, and the second one is the generation of speech waveforms, where the output is produced from this phonetic and prosodic information. These two phases are usually called high and low-level synthesis. The input text might be for example data from a word processor, standard ASCII from e-mail, a mobile text-message, or scanned text from a newspaper. The character string is then pre-processed and analyzed into phonetic representation which is usually a string of phonemes with some additional information for correct intonation, duration, and stress. Speech sound is finally generated with the low-level synthesizer by the information from high-level synthesizer.

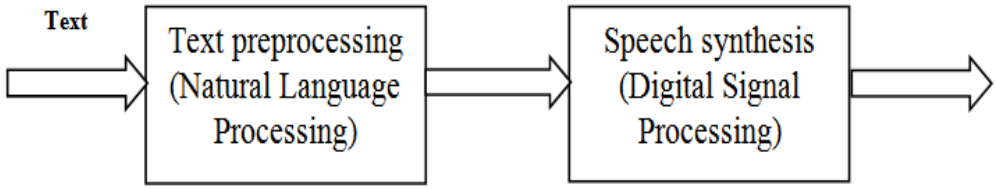


Figure 3. Functional Diagram of TTS

The structure of the text-to-speech synthesizer can be broken down into major modules:

- **Natural Language Processing (NLP) module:** It produces a phonetic transcription of the text read, together with prosody.
- **Digital Signal Processing (DSP) module:** It transforms the symbolic information it receives from NLP into audible and intelligible speech. A text -to- speech system is composed of two parts: a front-end and a back-end. The front-end has two major tasks. First, it converts raw text containing symbols like numbers and abbreviations into the equivalent of written-out words. This process is often called text normalization, pre-processing, or tokenization. The front-end then assigns phonetic transcriptions to each word and divides and marks the text into prosodic units, like phrases, clauses, and sentences. The process of assigning phonetic transcriptions to words is called text-to phoneme or grapheme-to-phoneme conversion. Phonetic transcriptions and prosody information

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252

together make up the symbolic linguistic representation that is output by the front-end. The back-end often referred to as the synthesizer then converts the symbolic linguistic representation into sound. In certain systems, this part includes the computation of the target prosody (pitch contour, phoneme durations), which is then imposed on the output.

3.3 TEXT TO BRAILLE CONVERTER

The block diagram consists of input scanned image, image enhancement, image filtering,Segmentation, text to braille converter, braille output as shown in Fig 4.

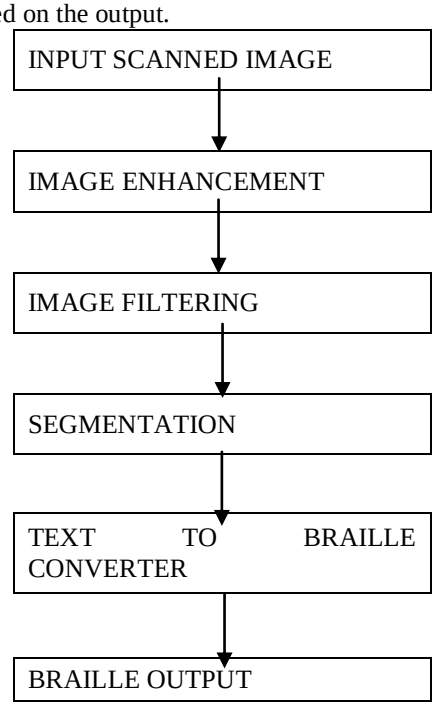


Figure 4. Functional Diagram of Braille

The text is captured by the camera and then captured image is processed internally andseparates labelfrom imageby using open CV library.[6], [7],[8] This is improvement of digital image quality. Contrast adjustment is made by histogram acquisition. And it also increases the visibility of the Image.The technique of median filtering is used in the filtering section. A median filter operates over a window by selecting the median intensity in the window in which it is supposed to operate. Median filter is an example of Non-linear filtering, it is often used to remove noise. In image processing and computer vision, image segmentation is the process of partitioning a digital image into multiple segments (sets of pixels, also known as image objects).[9],[10] The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze.Optical Character Recognition, or OCR, is a technology that enables you to convert different types of documents, such as scanned paper documents, PDF files or images captured by a digital camera into editable and searchable data.We scanned image from camera, then image is processed internally and separates label from image by using open CV library and finally identifies the product and it will be converted into textusing OCR(Optical Character Recognition). After the conversion, the text is identified and converted to the Braille. The braille code obtained can be used in converting the text directly into Braille code.

IV. IMPLEMENTATION AND RESULTS

The proposed system ensures the following:

The Input Image is captured by using Snipping Tool. Then the image is processed internally and converted into Text using OCR.The text obtained using OCR is converted into Voice using GTTS API.The text is also converted into Braille scripts with use of Python packages.

The Input Image was captured by using Snipping Tool. Snipping Tool can take still Screenshots of an open windowas shown in Figure 5.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252

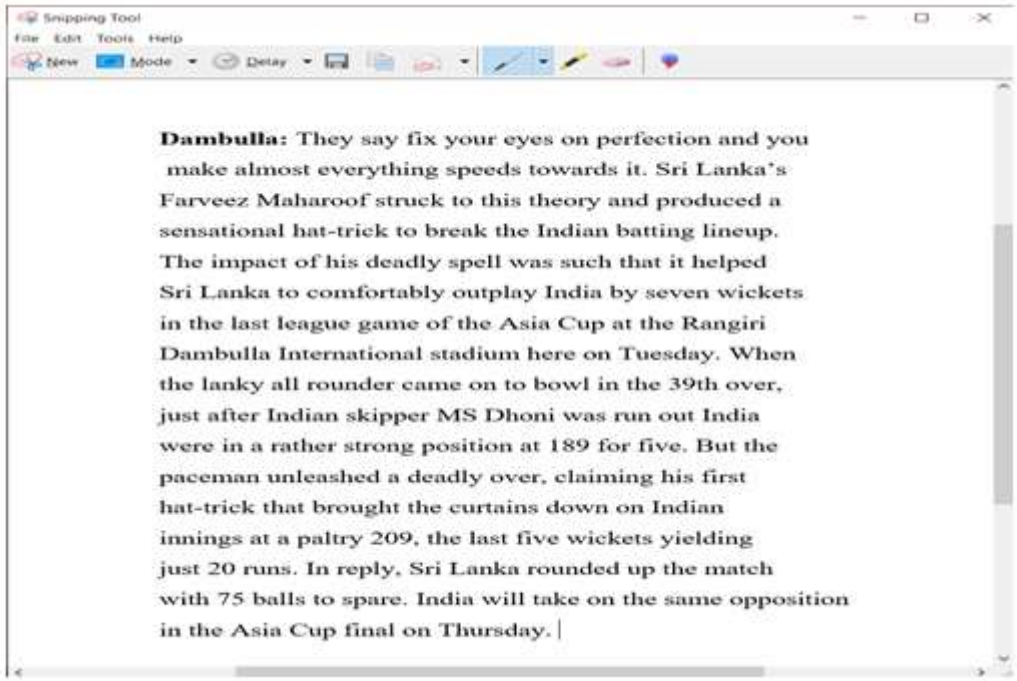


Figure 5. Input Image

After the input image is obtained, it is stored in test.py with the help of Python Coding. Then for seeing the output, we should type "**python test.py**" in command prompt and we could see "**Picture is Detected**" in that window which was shown in Figure 6.

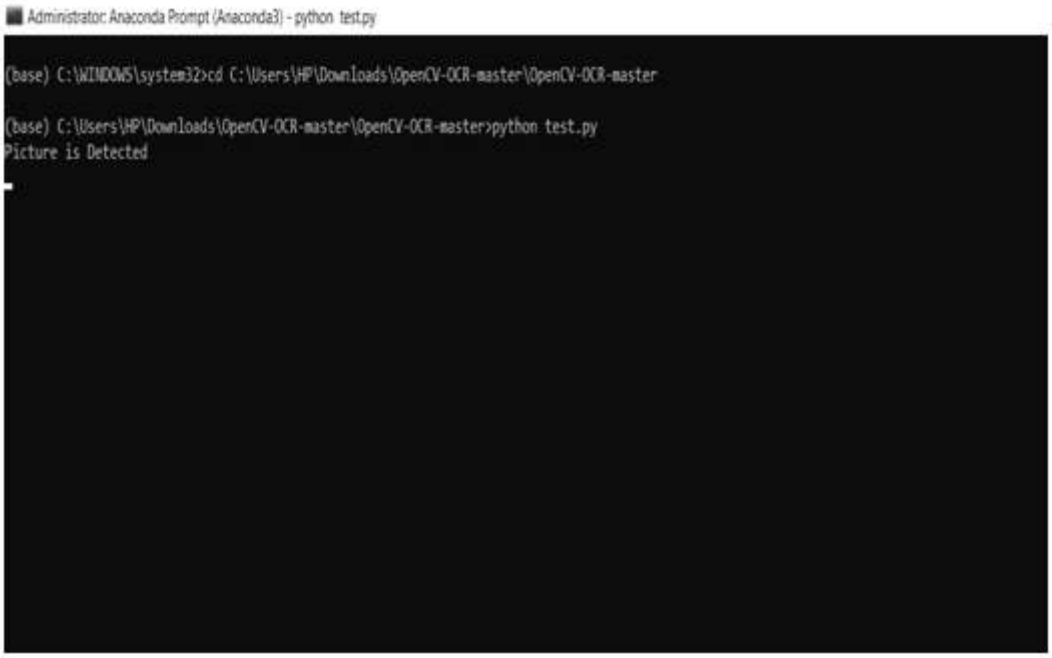


Figure 6.Picture is detected

After the picture is detected, the Input Image is converted into Text with the help of OCR which shown in Figure 7.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252

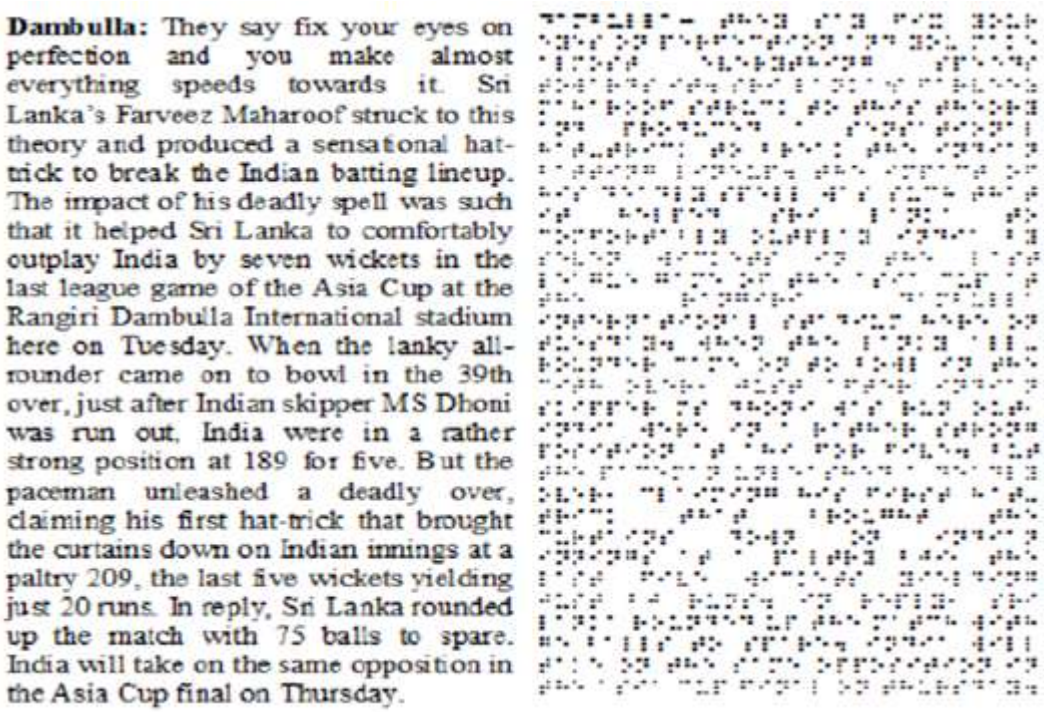
Figure 7. Input Image is converted into Text with the help of OCR

Then the text is converted into Voice by using GTTS API. GTTS is very easy to use with that we can convert the text entered into an audio and can be saved as MP3file which was shown in Figure 8.

Figure 8. Voice Output

Finally, the text is converted into Braille scripts with the use of python packages that was shown in Figure 9.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252



Dambulla: They say fix your eyes on perfection and you make almost everything speeds towards it. Sri Lanka's Farveez Maharoof struck to this theory and produced a sensatonal hat-trick to break the Indian batting lineup. The impact of his deadly spell was such that it helped Sri Lanka to comfortably outplay India by seven wickets in the last league game of the Asia Cup at the Rangiri Dambulla International stadium here on Tuesday. When the lanky all-rounder came on to bowl in the 39th over, just after Indian skipper MS Dhoni was run out, India were in a rather strong position at 189 for five. But the paceman unleashed a deadly over, claiming his first hat-trick that brought the curtains down on Indian innings at a paltry 209, the last five wickets yielding just 20 runs. In reply, Sri Lanka rounded up the match with 75 balls to spare. India will take on the same opposition in the Asia Cup final on Thursday.

Figure 9. Braille Output

BRAILLE OUTPUTS:

The text is converted into Braille scripts with the use of python packages that as shown in table 1.

`TABLE 1. BRAILLE OUTPUTS

S.NO	TEXT INPUT	BRAILLE OUPUT
1.	Flowers have an immediate impact on happiness. Flowers have a long term. Positive effect on mood. Without flowers, plants would merely be green, and the world would be a duller place.	
2.	Nature is the gift given by God to living creatures on earth. It is the most important in the world which gives basic needs to human	
3.	It is far better to be alone, than to be in bad company. Thestrongest man in the World is he who stands most alone. Loneliness adds beauty to life.	

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 3 Mar. 2021, pp: 1331-1338 www.ijaem.net ISSN: 2395-5252

V. CONCLUSION AND FUTURE WORK

Visually impairment individuals usually only can read using Braille system. Braille can be difficult to learn, not all people's fingertips are sensitive enough to use it. In this project, we are going to convert Input image into text by using OCR and text is also converted into Voice by using GTTS API. Not only text is converted into Voice but also it is converted into Braille by using Python packages. By providing this technology many of the people in this world who were unable to see will have their daily life in a normal way and they may enjoy as same as normal persons. Now the algorithm is used only for laptops. In future the present algorithm can be converted in other programming languages and also applicable for both mobile phones and laptops. So, blind people easily access all the electric gadgets to get the knowledge and daily updates from social media platform.

REFERENCES

[1]. OCR Assisted Translator 2020 7th International Conference on Smart Structures and Systems (ICSSS) (IEEE).
[2]. Text Message Based Robotic ARM Control Using OCR 2020 International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE) (IEEE).
[3]. Enhanced Braille Display Use of OCR and Solenoid to Improve Text to Braille Conversion 2020 International Conference for Emerging Technology (INCET) (IEEE**).**
[4]. Effective Emotion Transplantation in an End-to-End Text-to-Speech System Young-Sun ,JooHanbin Bae, Young-Ik Kim IEEE Access (2020)
[5]. Ajinkya Domale, "Printed Book to Audio Book Converter for Visually Impaired", in 2013 Texas Instruments India Educators' Conference.
[6]. Automatic System for Text to Braille Conversion ECAI 2017 - International Conference , Electronics, Computers and Artificial Intelligence 29 June -01 July, 2017, Targoviste, ROMANIA
[7]. A Technical Review on Text Recognition from ImagesIEEE Sponsored 9th International Conference on Intelligent Systems and Control (ISCO) 2015.
[8]. The Methods Used in Text to Braille Conversion and Vice Versa International Journal of Innovative Research in Computer and Communication Engineering 2017.
[9]. Speech to Braille Convertor for Visually Impaired Using Python **i**nternational Journal of Advance Science and Technology Vol. 29, No. 10S, (2020),
[10]. Camera Reading For Blind People HCIST 2014 - International Conference on Health and Social Care Information Systems and Technologies.

International Journal of Advances in Engineering and Management
ISSN: 2395-5252

IJAEM

Volume: 03 Issue: 03 DOI: 10.35629/5252

www.ijaem.net
Email id: ijaem.paper@gmail.com