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ARTIFICIAL VISION FOR VISUALLY IMPAIRED PEOPLE USING IMAGE AND SPEECH PROCESSING TECHNIQUES

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Abstract *- An innovative, effective, real-time and cost beneficial technique that enables user to listen the contents of text in image instead of reading through them. It is difficult to read the text within an image object for blind people. The main objective of the proposed system is to convert the text within the image to speech, so that the bind people can easily get to know, the text within the image. This system also helps the people with no proper vision.*

Key Words: Image Processing, Speech Processing, Text To Speech (TTS),

1. INTRODUCTION

The 3.88 percent of total population that is 270 million people of the world are blind. Till the last decade, Braille helped the visually impaired people to identify text. Major backlog of Braille is that only few volumes are modified into Braille and only few can read Braille. This application helps blind people to read printed and hand written text as normal person read. The term blindness is used for complete or nearly complete vision loss. Most visually impaired people who are not totally blind are able to read print, either of regular size or enlarged magnification devices. Modern technology has made many useful tools for people who read and write Braille.

There are some devices that produce books in Braille and hers that let people listen to the information using the modern technology. There is an obvious need for new technique that converts Text-to-Speech to avoid the problems that occurs by the use of Braille. Text-to-speech system converts the normal language text into speech through the speech synthesis technique. The idea is to provide a system through which a blind person can get the knowledge of the words. There are many people who are blind and have no proper vision. This idea of converting the text to speech helps them to know the text. This process is to help such people to gain the knowledge of the words which they cannot see through their naked eye.

1.1 BACKGROUND

The proposed system work motivated by refereeing many other background details of research papers. A smart device that assists the visually impaired which effectively and efficiently reads paper-printed text. The proposed project uses the methodology of a camera based assistive device that can be used by people to read Text document. The framework is on implementing image capturing technique in an embedded system based on Raspberry Pi board. The recognition process is done using OCR the character code in text files are processed using Raspberry Pi device on which it recognizes character using tesseract algorithm and python programming and audio output is listened[1]. The work which was proposed majority of the visually impaired use Braille for reading documents and books which are difficult to make and less readily available. This project aims to study the image recognition technology with speech synthesis and to develop a cost effective, user friendly image to speech conversion system with help of Raspberry Pi. It also save time and energy, but also makes life better for the visually impaired as it increases their independency [2].

The research work proposed, that the method is a camera based assistive text reading to help blind person in reading the text present on the text labels, printed notes and products. The proposed project involves Text Extraction from image and converting the Text to Speech converter, a process which makes blind persons to read the text [3]. The other proposed work, a simple, cheap, friendly user, virtual eye will be designed and implemented to improve the mobility of both blind and visually impaired people in a specific area. The microcontroller carry out the issued commands and then communicate the status of a given appliance or device back to the earphones using Raspberry pi speech synthesizer. It is a cheap, fast, and easy to use and an innovative affordable solution to blind and visually impaired people in third world countries [4].

1.2 PROBLEM STATEMENT

There are about millions of blind people and millions of visually impaired people worldwide. Disability of visual text

reading has a huge impact on the quality of life for visually disabled people. Although there have been several devices designed for helping visually disabled to see objects , there is a requirement for reading a text in their lives. The existing systems for text recognition are limited with less advantages.

1.3 EXISTING SYSTEM

There are few of the systems developed for people who are blind and have no proper vision. These help in navigation and object identification and few of the systems help to read the text. These systems convert the text to speech. The following are disadvantages of these systems.

- The system can only extract the standard font text within the scanned image, if the font varies the text is not recognized.
- It doesn't recognize the letters in differ colors and backgrounds.
- If the text is in different styles it may not be recognized.

1.3 PROPOSED SYSTEM

In the proposed system we are converting the scanned image into textual format. This is done by extracting the text from the input image, convert it into speech using the speech synthesis technique. The input can be hand written or printed text within the image, it is converted to the editable format. The following are the advantages of the proposed system.

- This system can recognize the text in any font size within the scanned image which is the main drawback in the existing system.
- It also recognizes the text with different style.
- The text can be extracted if it is in different colors.
- It is a cost effective system.

2. SYSTEM DESCRIPTION

System design is a process of defining the architecture, modules, interfaces, and data for a system to satisfy requirements. Systems design can be seen as an application of systems theory to product development. Systems design is therefore the process of defining and developing systems to satisfy requirements to the user. The architectural design emphasizes the design of the system architecture and logical design pertains to an abstract representation of the dataflow.

Open source character recognition software called Tesseract is used as a basis for the implementation of text reading system for visually disabled in this platform. Today, Tesseract is considered the most accurate free recognition engine in existence. User can select an image already stored on the Android device or use the device's camera to capture a new image, it then runs through an image and passes the input image to the Tesseract service.

When the character recognition process is complete it produces a returns a string of text which is displayed on the user interface screen, where the user is also allowed to edit the text if required then using the TTS (Text To Speech) API enables our device to speak text of different languages. The TTS engine that ships with the this platform supports a number of languages that are supported. The TTS engine needs to know which language to speak. So the voice and dictionary are language-specific resources that need to be loaded before the engine can start to speak.

2.1 SYSTEM ARCHITECTURE

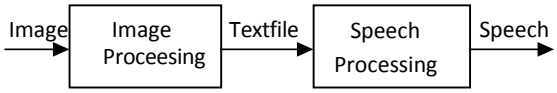

Fig 2.1: Block diagram of text-to-speech device.

The above figure shows the architecture diagram of the proposed system, which has two main processes. In the proposed system the input is the image which is processed and the text within the image is extracted and stored in a text file. This text file is given as an input to the Speech processing module and this stored text is output as speech.

The process of translating the scanned image into textual form, whether the image is hand written or in a printed form.

The text is extracted from the input . And the extracted text is then converted to the speech. The main objective is to provide a simple and cost efficient system.

A data flow diagram is graphic representation of the "flow" of data through an information system. A data flow diagram can also be used for the visualization of data processing i.e., structured design. It is common practice for a designer to draw a context level DFD first which shows the interaction between the system and outside entities. DFD's show the flow of data from external entities into the system, how the data moves from one process to another, as well as its logical storage.

The below Fig 2.2 shows the data flow diagram of the proposed system, which takes input as image and pass the image to Tesseract-OCR engine. This engine extract the text from image and stores in a format of text file. Pass the text file into the TTS module, which converts text to speech and also displays the text on output screen.

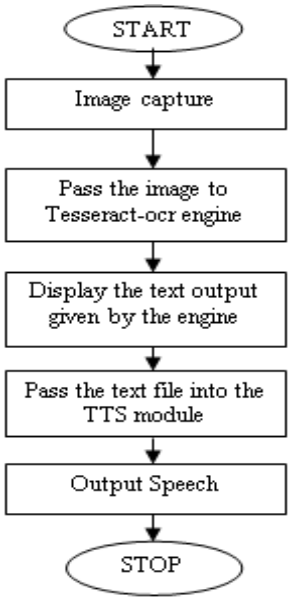

Fig 2.2: Dataflow diagram of the system

3. RESULTS

The proposed system is implemented for the recognition and conversion of the text within the image to speech. The input image may contain only alphabet, only numerical, combination of both or it may not contain text. The system identifies the text if present and converts it to speech. Otherwise it outputs that "the image does not contain text "as the result. For our reference the extracted text is also printed on the output screen, which is shown in the below snapshots.

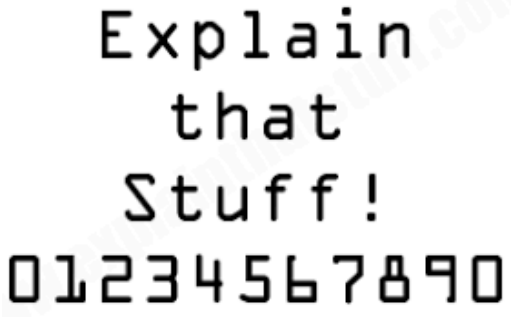

Fig 3.1: Image with text

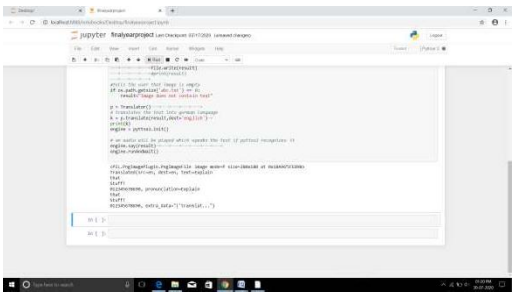

Fig 3.2: Output of the above image printed on the screen

As shown in the above snapshots the input image is the text image which contains alphabets and numerical. The content of the image is extracted and printed in the system and printed it out with the voice output.

Fig 3.3: Image with background

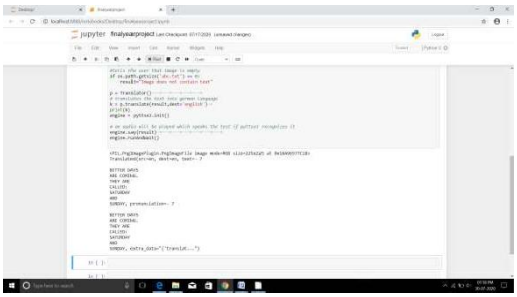

Fig 3.4: Output of the above image printed on the screen

As shown in the above snapshot the input image is the text image with the background. In this test case the system reads the text within the image and the text is even printed as shown above.

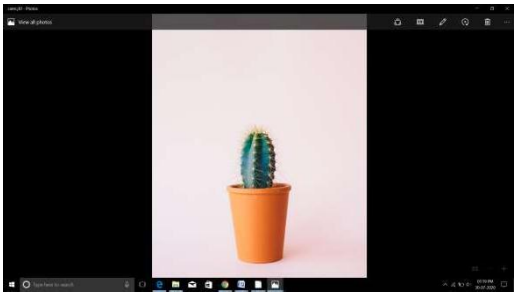

Fig 3.5: Image without text

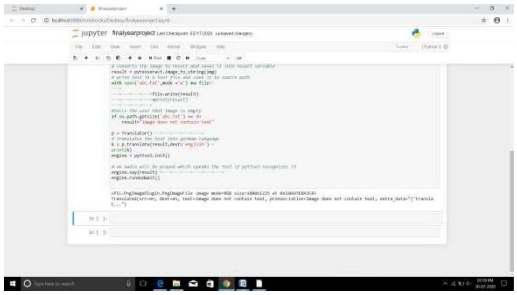

Fig 3.6: Output of above image printed on the screen

As shown in the above snapshot the input does not contain the text. The System outputs that the image does not contain text which is also prints on the screen.

4. CONCLUSION

The proposed system helps for visually impaired people to listen easily the text they want to read. And with the help of the translation tools one can extract text and again convert the text to speech. In future, the system can be implement to detect the object which is encountered in image.

REFERENCES

[1] MallapaD.Gurav,ShrutiS.Salimath, Shruti B. Hatti VijayalaxmiI. Byad, "BLIGHT: A Reading aid for the Blind People using OCR and OpenCV" International Journal of ScientificResearch Engineering &Technology (IJSRET 2017).

[2] Anusha Bhargava, KarthikV. Nath, PritishSachdeva and MonilSamel "Reading Assistant for the Visually Impaired" International Journal of Current Engineering andTechnology,2015

[3] Nagaraja L, Nithin D, Nagarjun R S, Veena S Murthy, Nishanth M Anand "Vision based Text Recognition using Raspberry Pi" National Conference on Power Systems & Industrial Automation (NCPSIA 2015).

[4] Pooja Sharma, Mrs. Shimi S. L and Dr. S.Chatterji, "Design of microcontroller based virtual eye for the blind" International Journal of Scientific Research Engineering &Technology,2014.

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