Journal of Engineering Research and Application
ww.ijera.com

ISSN : 2248-9622 Vol. 9,Issue 5 (Series -III) May 2019, pp 11-14

RESEARCH ARTICLE OPEN ACCESS

BLIND MAN'S EYE USING RASPBERRY PI

Sangam Dhiman*, Vivek Kumar Kadian**, Sagar Singh***, Pranavi Mhatre****

**(Department of Electronics and Telecommunications, University of Mumbai, Maharashtra)*
***(Department of Electronics and Telecommunications, University of Mumbai, Maharashtra)*
****(Department of Electronics and Telecommunications, University of Mumbai, Maharashtra)*
*****(Department of Electronics and Telecommunications, University of Mumbai, Maharashtra)*
Corresponding Authors ; Sangam Dhiman, Vivek Kumar Kadian, Sagar Singh, Pranavi Mhatre

ABSTRACT
Blind people are visually impaired, by using this system, we can help them in letting them forget their disability to read which is to be implemented by using raspberry pi, which is very popular these days. It uses the Optical character recognition technology for the identification of the printed characters using image sensing devices and computer programming. It converts images of typed, handwritten, or printed text into machine encoded text. In this research these images are converted into Speech using OCR and Text-to-speech synthesis. The digital World we are living in allows us to use different technologies to automatically perform certain tasks. Such automation is very useful in certain areas like helping the mankind for its betterment. This project can also be used for various other applications like revolutionizing the document management process.
Keywords–Raspberry pi, OCR, Text to Speech, Visually Impaired

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Date Of Submission: 09-05-2019 Date Of Acceptance: 24-05-2019

I. INTRODUCTION:

OCR is used for the detection and reading of documented text in images to help the blind and visually impaired people. The overall algorithm has a success rate of 90 percent on the test set as the unread text is significantly small and distant from the camera. We have proposed a technique that extracts text from typed documents, 1 convert them into machine encoded text, create the text files and then process them using Digital Image Analysis (DIA0) to convert the text into audio output. Our focus is on enhancing the capabilities of blind people by providing them a solution so that the information can be fed to them in the form of a speech signal. This project can also be implemented for the automatic detection of road signs, warning signs, in other terms to improve the blind navigation on larger scale.[1]

1.1 Brief History of Character acknowledgment

Numerous techniques have been proposed for character acknowledgment; they are regularly exposed to considerable imperatives because of sudden troubles. Truly character acknowledgment framework has developed in three ages [2], specifically the periods referred to indicating as

1.1.1 1900-1980 (early ages) – The historical backdrop of character acknowledgment can be followed as right on time as 1900. At the point when the Russian Scientist Tiering endeavoured to build up a guide for outwardly impaired the primary character recognizers showed up amidst 1940s with the improvement of advanced PCs. The past work on the programmed acknowledgment of characters has been focused either upon machine printed content or upon little arrangement of very much recognized manually written content or images. The business character recognizers were accessible in 1950s.

1.1.2 1980-1990 Developments – The investigations until 1980 experienced the tack of amazing PC equipment and information securing infers. In any case, the character acknowledgment investigate was centred around fundamentally the shape

ISSN : 2248-9622 Vol. 9,Issue 5 (Series -III) May 2019, pp 11-14

acknowledgment systems without utilizing any semantic data. [2]

1.1.3 After 1990 headways – The genuine advancement on character acknowledgment framework is accomplished amid this period, utilizing the new strategies and improvement devices, which are enabled by consistently developing data advances. In the mid nineties, Image preparing and pattern recognition techniques are efficiently combined..

II. FIGURES AND TABLES:

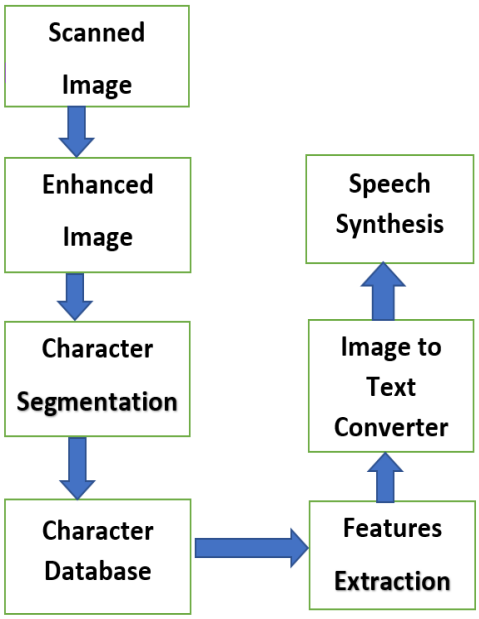

fig.1 Algorithm

Optical character recognition, usually designated by the acronym
OCR, is the process of recognition and automatic conversion of existing characters in the written-support image into the text format,
which can then be used in various applications.
The OCR has been widely studied and has displayed considerable
advances regarding the performance and accuracy of the obtained
results. The process of optical character recognition can be summarized as a process that follows a set of steps:

1. Optical image acquisition
2. Location and segmentation
3. Pre-processing
4. Feature extraction
5. Classification
6. Post-processing

OUTPUT:

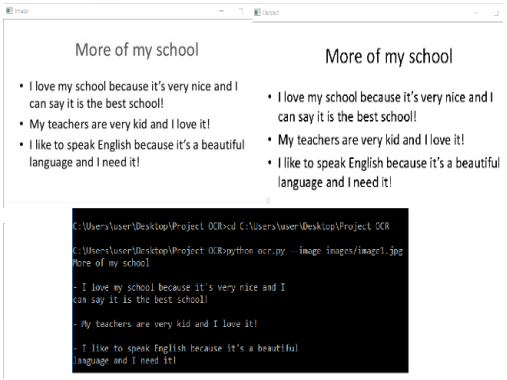

fig.2 Output 1

Fig.3 Output 2

From the above two outputs we can see that the light and background texture matters when it comes to accuracy, if the background is not plain then the accuracy will decrease.

TEXT TO SPEECH (TTS)

Text-to-speech synthesis (TTS)is the automatic conversion ofa text into speech that resembles,as closely as possible, a nativespeaker of the language reading that text. Text-to-speech synthesizer(TTS) is the technology which lets computer speak to you. The TTSsystem gets, the text as the input and then a computer algorithmwhich is called TTS engine analyses the text, pre-processes the textand synthesizes the speech with some mathematical models. TheTTS engine usually generates sound data in an audio format as theoutput. The text-to-speech (TTS) synthesis procedure consists oftwo main phases. The first is text analysis, where the input text istranscribed into a phonetic or some other linguistic representation,and the second one is the generation of speech waveforms, wherethe output is produced from this phonetic and prosodic information. These two phases are usually called

high and low-level synthesis [4].A simplified version of this procedure is presented in figure 1 below.The input text might be for example data from a word processor,standard ASCII from e-mail, a mobile text-message, or scanned textfrom a newspaper. The character string is then pre-processed andanalysed into phonetic presentation which is usually a string ofphonemes with some additional information for correct intonation,duration, and stress. Speech sound is finally generated with thelow-level synthesizer by the information from high-level one. Theartificial production of speech-like sounds has a long history, withdocumented mechanical attempts dating to the eighteenth century.Figure 4.3: Functional Diagram of TTSSynthesizer System Text-to-speech synthesis takes place in several steps. The TTS systems get a text as input, which it first mustanalyse and then transform into a phonetic description. Then ina further step it generates the prosody. From the information now available, it can produce a speech signal. 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 symbolicinformation it receives from NLP into audible and intelligible speech.The major operations of the NLP module are as follows:

Text Analysis: First the text is segmented into tokens. The token-to-word conversion creates the orthographic form of the token. For thetoken Mr the orthographic form Mister is formed by expansion, thetoken 12 gets the orthographic form twelve and 1997 is transformedto nineteen ninety seven.Application of Pronunciation Rules: After the text analysis has beencompleted, pronunciation rules can be applied. Letters cannot betransformed 1:1 into phonemes because correspondence is not alwaysparallel. In certain environments, a single letter can correspond toeither no phoneme (for example, h in caught) or several phoneme (min Maximum).In addition, several letters can correspond to a single phoneme (chin rich). There are two strategies to determine pronunciation:In dictionary-based solution with morphological components, as manymorphemes (words) as possible are stored in a dictionary. Full formsare generated by means of inflection, derivation and compositionrules. Alternatively, a full form dictionary is used in which all possible forms are stored. Pronunciation rules determine the pronunciation of words not found in the dictionary.

In a rule based solution, pronunciation rules are generated from thephonological knowledge of dictionaries. Only words whose pronunciationis a complete exception are included in the dictionary.The two applications differ significantly in the size of their dictionaries. The dictionary-based solution is many times larger than therulesbased solutions dictionary of exception. However, dictionarybased solutions can be more exact than rule-based solution if theyhave a large enough phonetic dictionary available.Prosody Generation: after the pronunciation has been determined,the prosody is generated. The degree of naturalness of a TTS systemis dependent on prosodic factors like intonation modelling (phrasingand accentuation), amplitude modelling and duration modelling (including the duration of sound and the duration of pauses, whichdetermines the length of the syllable and the tempos of the speech).[6]

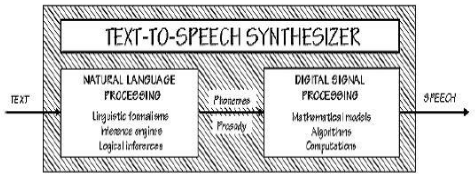

Fig.4 Text to Speech Algorithm

III. CONCLUSION:

Evidently, advanced picture preparing is a significant part of photography thinking about that innovation continues evolving. There are a large group of advanced picture handling systems that gives a wide application assortment in highlight extraction and characterization. Fake neural systems are every now and again used to embrace character acknowledgment in light of their high resilience to commotion. The frameworks have the capacity to acknowledge immaculate outcomes. Clearly, the component extraction phase of OCR is the most huge. Study speaks to an investigation of highlight extraction techniques with various classifiers executed in OCR frameworks for various Indian contents. Change between the highlights ought to be unmistakably discriminative and explicit so framework can characterize the characters with greatest effectiveness and least mistake rate. This overview paper encourages analysts and designers to

comprehend history of the OCR look into work for Indian contents. OCR for Indian contents that works under every conceivable condition and gives exceedingly exact outcomes still remains an exceptionally moving assignment to actualize.

ACKNOWLEDGEMENTS

I would like to express my cordial thanks toDr.Vikram Patil, Principal – SIES Graduate School Of Technology, Navi Mumbai for providing moral support, encouragement and advanced research facilities. Authors would like to thank the anonymous reviewers for their valuable comments. And they would like to thank Prof. Pranavi Mhatre her invaluable suggestions and constant encouragement that led to improvise the presentation quality of this paper.

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