



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 7, Issue 3, March 2019

Smart Blocks-An Innovative Idea for a E-Learning Tool

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ABSTRACT: An innovative system in which text to speech to image conversion in e-learning tool. This is efficiently improve an interaction between human and machine. By using the OCR (Optical Character Recognition) algorithm with speech synthesis technology and to develop cost effective user friendly speech to image conversion system using MATLAB. In this work, the OCR system is implemented for the recognition of capital English character A to Z. Each character is recognized once. The recognized characters is saved as text in database. In this technique text to speech conversion system that can get the text through speech through image and directly input in the computer by using MATLAB.

I. INTRODUCTION

Image processing is one of the most growing field in research and technology in today's world. Image processing uses hardware and software as computing resources to provide an efficient interface to process an image. Image processing uses various technique such as text image pre-processing, image segmentation, image compression, feature extraction, Object recognition. Speech synthesis is the artificial production of human speech. A computer system used for this purpose speech synthesizer and can be implemented in software or hardware. A text to speech system converts a common language into speech. Finally, this turns to image. Other systems render symbolic linguistic representations like phonetic transcriptions into speech. All these process involved in OCR algorithm. OCR is the electronic conversion of machine encoded text into speech and image. It provides alphanumeric recognition of printed or handwritten characters. OCR has been an active topic of research in the recent past. OCR is a field of research in pattern recognition. In our proposed system of text to speech conversion into image.

II. PROPOSED ALGORITHM

In this technique there are two main parts:

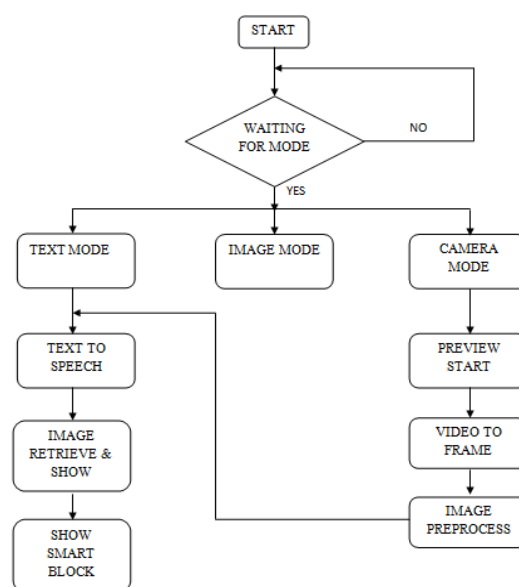
- OCR systems for text
- Text to speech conversion into image

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III. OPTICAL CHARACTER RECOGNITION

Optical character recognition usually abbreviated OCR, is the mechanical or electronic translation of an image and written, type written or printed text. Optical character recognition belongs to the family of technique performing automatic identification. The OCR consists of different level of processing methods pre processing segmentation, feature extraction, edge detection, canny detection



All a scanner can do is create an image or a snapshot of the document that is nothing more than a collection of black and white or colour dots, known as a raster image. In order to extract and repurpose data from scanned documents, camera images or image-only in jpg format, you need an OCR software that would single out letters on the image, put them into words and then - words into sentences, thus enabling you to access and edit the content of the original document.

The exact mechanisms that allow humans to recognize objects are yet to be understood, but the three basic principles are already well known by scientists – integrity, purposefulness adaptability (IPA). These principles constitute the core of ABBYY Fine Reader OCR allowing it to replicate natural or human-like recognition.



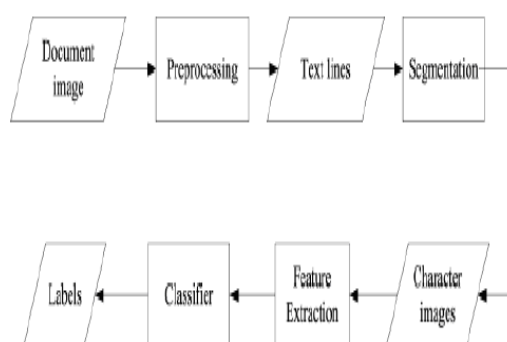
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Let's take a look on how Fine Reader OCR recognizes text. First, the program analyzes the structure of document image. It divides the page into elements such as blocks of texts, tables, images, etc. The lines are divided into words and then - into characters. Once the characters have been singled out, the program compares them with a set of pattern images. It advances numerous hypotheses about what this character is. Basing on these hypotheses the program analyzes different variants of breaking of lines into words and words into characters. After processing huge number of such probabilistic hypotheses, the program finally takes the decision, presenting you the recognized text.



In addition, ABBYY Fine Reader provides dictionary support for 48 languages. This enables secondary analysis of the text elements on word level. With dictionary support, the program ensures even more accurate analysis and recognition of documents and simplifies further verification of recognition results.

a. Pre processing segmentation:

Pre processing contains process for image segmentation, image enhancement and colour space conversion firstly image digital image is enhanced by filter. Character image is filtered form the background image. Then filtered image's RGB contains process for image segmentation, image enhancement and color space conversion firstly image digital image is enhanced by filter. Character image is filtered form the background image. Then filtered image's RGB.

b. Feature extractions: Feature extraction is the process done after segmentation. According to the segmented information and predefined dataset some features of the image should be extracted. This extraction could be the any of statistical, structural, fractal or signal processing. Color co-occurrence Method, Grey Level Co-occurrence Matrices (GLCM), Spatial Gray-level Dependence Matrices (SGDM) method, Gabor Filters, Wavelets Transform and Principal component analysis are some methods used for feature extraction.

c. EDGE DETECTION:

Edge detection is an important image processing task, both as a process itself, and as a component in other process. The purpose of edge detection in l images is to identify the areas of image where the large change in intensity occurs. The edges in the images characterise the object boundaries and are useful for registration ,segmentation and identification of object in a scene. The canny edge detector is one of the standard edge detection method used to find out the real edge points by maximizing the signal to noise ratio in images.

d. Canny edge detection:

The Canny edge detector is an edge_detection operator that uses a multi-stage algorithm to detect a wide range of edges with noise suppressed at the same time. It is a technique to extract useful structural information from different vision objects and dramatically reduce the amount of data to be processed. The Conversion of input image to the gray-scale is necessary in order to limit the edge detection computational requirements.



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IV. READING ABOUT OCR (optical character recognition)

- Xerox offers one of the leading lines of OCR products in its Text bridge scanning suite.
- The OCR Lab has detailed information on OCR and OCR products.
- The character Corporation sells OCR products and their site has some useful information about OCR technology.
- **Optical character recognition** or **optical character reader**, often abbreviated as **OCR**, is the mechanical or electronic 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 from subtitle text superimposed on an image (for example from a television broadcast). It is a common method of digitising 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 is a field of research in pattern recognition, artificial intelligence and computer vision.
- Early versions needed to be trained with images of each character, and worked on one font at a time. Advanced systems capable of producing a high degree of recognition accuracy for most fonts are now common, and with support for a variety of digital image file format inputs.^[2] Some systems are capable of reproducing formatted output that closely approximates the original page including images, columns, and other non-textual components.

V. TEXT TO SPEECH TO IMAGE

Text to speech, abbreviated as TTS, is a form of speech synthesis that converts text into spoken voice output. Text to speech systems were first developed to aid the visually impaired by offering a computer-generated spoken voice that would "read" text to the user.

TTS should not be confused with voice response systems. Voice response systems synthesize speech by concatenating sentences from a database of pre-recorded words and are used for different purposes than TTS systems, which form sentences and/or phrases based on a language's graphemes and phonemes. Voice response systems are limited to synthesizing sentences that contain only words that have been predetermined by the system.

TTS systems, in contrast, are theoretically capable of "reading" any string of text characters to form original sentences.

V. CONCLUSION

In this technique text to speech conversion and then that speech conversion into image by MATLAB. Text into speech is converted into image successfully. Gray image is converted into binary image by thresholding and then it converted into text by MATLAB. The MATLAB library has been used to build speech enabled applications, which retrieve audio output information available for computer. In this technique, one character can be converted into text at once. As further extension, OCR system can be developed for converting words or sentence text image into speech conversion into image.

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