A SMART READER FOR VISUALLY IMPAIRED DEVICES

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Abstract

Human communication today is mainly via speech and text. To access information in a text, a person needs to have vision. However those who are deprived of vision can gather information using their hearing capability. The proposed method is a camera based assistive text reading to help blind person and the travellers in reading the text present on the text labels, printed notes and products in their own respective languages. It combines the concept of Optical Character Recognition (OCR), text to Speech Synthesizer (TTS) and translator in Raspberry pi. Optical character recognition (OCR) is the identification of printed characters using photoelectric devices and computer software. It converts images of typed, handwritten or printed text into machine encoded text from scanned document or from subtitle text superimposed on an image.Text-to-Speech conversion is a method that scans and reads any language letters and numbers that are in the image using OCR technique and then

translates it into any desired language and at last it gives audio output of the translated text. The audio output is heard through the raspberry pi's audio jack using speakers .

INTRODUCTION

Machine replication of human functions like reading is an ancient dream. However, over the last five decades, machine reading has grown from a dream to reality.Visually impaired people report numerous difficulties with accessing printed text using existing technology, including problems with alignment, focus, accuracy, mobility and efficiency. We present a smart device that assists the visually impaired and travellers 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 design is motivated by preliminary studies with visually impaired people, and it is small-scale and mobile, which enables a more manageable operation with little setup. In this project we have proposed a text read out system for the travellers and visually challenged. The proposed fully integrated system has a camera as an input device to feed the printed text document for digitization.Speech is probably the most efficient medium for communication between humans.To extract the text from image we use optical character recognition technique (OCR). Optical character recognition has become one of the most successful applications of technology in the field of pattern recognition and artificial intelligence. Optical character Recognition (OCR) is a process that converts scanned or printed text images, handwritten text into editable text for further processing. Speech synthesis is the artificial synthesis of human speech. A Text-To-Speech (TTS) synthesizer is a computer-based system that should be able to read any text aloud, whether it was directly introduced in the computer by an operator or scanned and submitted to an Optical Character Recognition (OCR).

LITERATURE SURVEY

Image to Speech Conversion for Visually Impaired(International Journal of Latest Research in Engineering and Technology-2017) Asha G. Hagargund et al carried out a work and they concluded that the basic framework is an embedded system that captures an image, extracts only the region of interest (i.e. region of the image that contains text) and converts that text to speech. It is implemented using a Raspberry Pi and a Raspberry Pi camera. The captured image undergoes a series of image pre-processing steps to locate only that part of the image that contains the text and removes the background. Two tools are used convert the new image (which contains only the text) to speech. They are OCR (Optical Character Recognition) software and TTS (Text-to-Speech) engines. The audio output is heard through the raspberry pi's audio jack using speakers or earphones. OCR based automatic book reader for the visually impaired using Raspberry PI (International Journal of Innovative Research in Computer and

Communication Engineering - 2016) Aaron James S et al carried out a work and they concluded that Optical character recognition (OCR) is the identification of printed characters using photoelectric devices and computer software. It coverts images of typed, handwritten or printed text into machine encoded text from scanned document or from subtitle text superimposed on an image. In this research these images are converted into audio output. OCR is used in machine process such as cognitive computing, machine translation, text to speech,key data and text mining. It is mainly used in the field of research in Character recognition, Artificial intelligence and computer vision.In this research , as the recognition process is done using OCR the character code in text files are processed using Raspberry Pi device   A Smart Reader for Visually Impaired People Using Raspberry PI (International Journal of Engineering Science and Computing – 2016) D.Velmurugan et al carried a work and they concluded that this work proposes a smart reader for visually challenged people using raspberry pi. This paper addresses the integration of a complete Text Read-out system designed for the visually challenged. The system consists of a webcam interfaced with raspberry pi which accepts a page of printed text. The OCR (Optical Character Recognition) package installed in raspberry pi scans it into a digital document which is then subjected to skew correction, segmentation, before feature extraction to perform classification. Once classified, the text is readout by a text to speech conversion unit (TTS engine) installed in raspberry pi. The output is fed to an audio amplifier before it is read out. The simulation for the proposed project can be done in MATLAB. Image Processing based Multilingual Translator for Travellers using Raspberry pi(International Journal of Advanced Research in Computer and Communication Engineering 2017) G.Madhavan et al carried a work and the paper is about an innovative, efficient and realtime cost beneficial method that enables international travelers to hear the text images of sign boards, routes in their own languages. It combines the concept of Optical Character Recognition (OCR), text to Speech Synthesizer (TTS) and translator in Raspberry pi. Text Extraction from color images is a challenging task in computer vision. Text-to-Speech conversion is a method that scans and reads any language letters and numbers that are in the image using OCR technique and then translates it into any desired language and at last it gives audio output of the translated text. The translate shell which is used to translate the text to is available in many languages. The translate shellis utilized to provide audio output too. This paper describes the design, implementation and experimental results of the device.

Block Diagram:
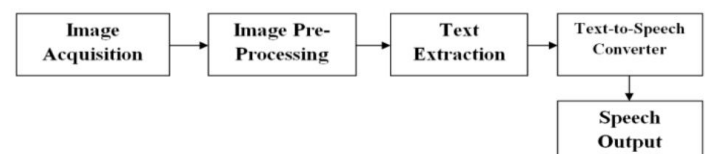
Image Acquisition In this step the image of the text is captured using raspberry pi camera or an HD webcam with high resolution. The acquired image is then applied to the image preprocessing step for reduction of unwanted noise. In image processing, it is defined as the action of retrieving an image from some source, usually a hardware-based source for processing it is first step in the workflow sequence because without an image, no processing is possible. The image that is acquired is completely unprocessed. Now the incoming energies transformed into a voltage by the combination of input electrical power and sensor material that is responsive to a particular type of energy being detected. The output voltage waveform is the response of the sensor(s) and a digital quantity is obtained from each sensor by digitizing its response.

HARDWARE USE:

RASPBERRY PI 3

RASPBERRY PI CAMERA

SPEAKER

POWER SUPPLY

SOFTWARE \

Raspbian   Raspbian is a Debian-based computer operating system for Raspberry Pi.   Programming languages Python

APPLICATION REFERENCES

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