Synopsis Presentation
on
“ Wearable Assistive Device for the Blind ”

By

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Abstract

There are some technical systems which have emerged nowadays to help the blind persons. To introduce them, the first which can come in our mind is ‘Braille’. To print this Braille script which is expensive process. The solution would be a wearable assistive device for the blind which converts the text into acoustic output enabling the user to read any sort of text for that a standalone Raspberry Pi based system with finger mounted camera that can help the visually impaired people in word based reading of the textual data pointed to by the finger. The system consists of a LDR sensor which detect the ambient light condition and turns on the light accordingly, webcam that captures images which are enhanced. Following this the word pointed by the finger is extracted using a novel methodology and given to an Optical Character Recognition (OCR) engine. Subsequently, the textual output is given to a Text to Speech (TTS) converter to obtain audio via an audio output device such as earphones.

Introduction

Image Processing

Image processing is a way to convert an image to a digital aspect and perform certain functions on it, in order to get an enhanced image or extract other useful information from it. It is a type of signal time when the input is an image, such as a video frame or image and output can be an image or features associated with that image.

AI Enabled IoT

IoT is about sensors implanted into machines, which offer streams of data through internet connectivity. All IoT related services inevitably follow five basic steps called create, communicate, aggregate, analyse, and act.

While IoT provides data, artificial intelligence acquires the power to unlock responses, offering both creativity and context to drive smart actions. As the data delivered from the sensor can be analyzed with AI, businesses can make informed decisions.

Text to speech

eSpeak is a compact open source software speech synthesizer for English and other languages, and is used to convert the text file to audio output which is heard via an audio output device such as earphones. Python 3 wrapper for eSpeak is utilized to implement the algorithm.

Objectives

- To build a wearable device.
- To Check Ambient Light Conditions.
- To detect finger-tip and word pointed by the finger.
- Image To Text conversion.

Literature survey

Author and year	Title of the paper	Methodology	Findings	Shortcomings
Arunima B Krishna Meghana Hari Dr. Sudheer A.P -2019	Word Based Text Extraction Algorithm Implementation in Wearable Assistive Device for the Blind.	Capturing the image, processing to extract the intended word and final audio output to the earphone or to the audio jack.	Provides assistance to blind or visually impaired person to read a book.	The device assists the blind through a voice where voice is an intended word pointed by the user and it takes approximately 5s.
Trupti Shah Sangeeta -2019	Efficient Portable Camera Based Text to Speech Converter for Blind Person	Detecting the object region, localiztion of text on object, extraction of text and text to speech conversion.	The experiment and training are performed on Synth 90k word dataset and using OCR and CRNN a model has been developed.	Combination of OCR and CRNN overcomes drawback of individual and gives better result which successfully recognizes text image and convert it into speech for blind person.
Shalini Sonth Jagadish S 2017	OCR Based Facilitator for the Visually Challenged	Acquisition of image and pre-processing, extracting a text from the image and text-to-speech coonversion.	The image is captured after 10 seconds of button is being pressed and sent to processing.	Applying Otsu's threshold and Gaussian blur for denoising the image.

Problem Statement:

“Wearable Assistive Device for the Blind Using Word Based Text Extraction Algorithm ”

Methodology

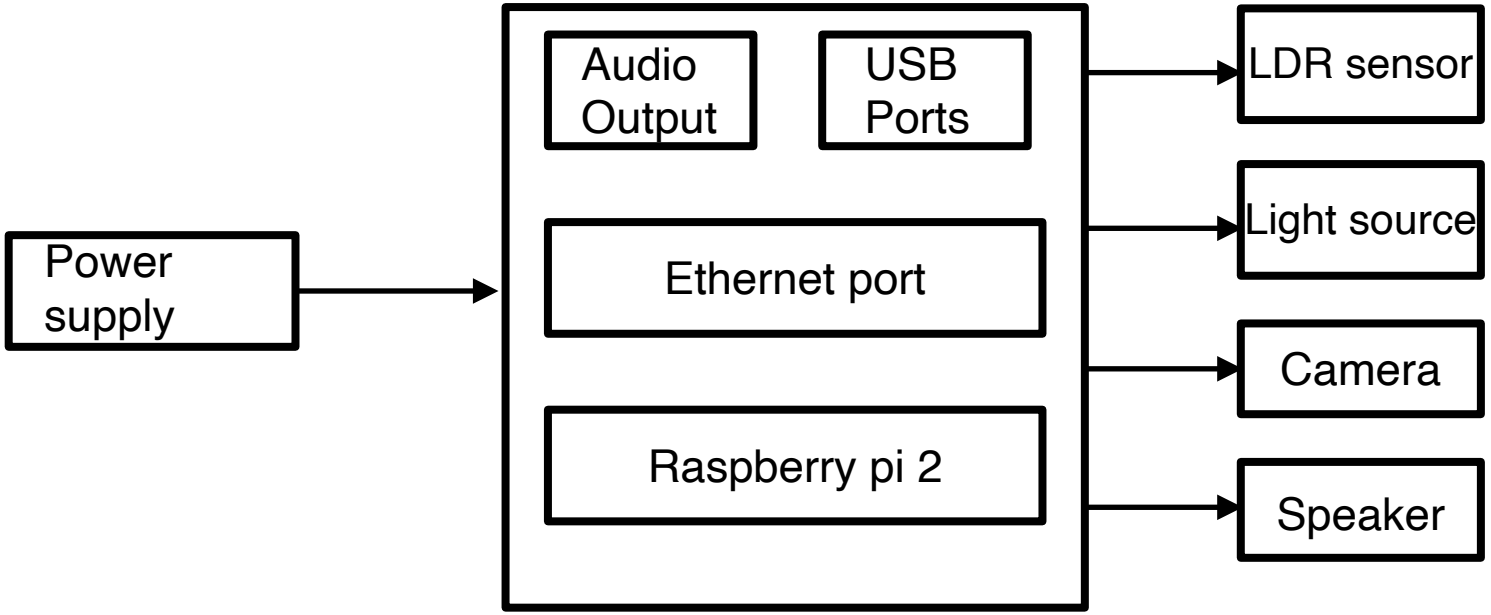


Fig 1 : System hardware design

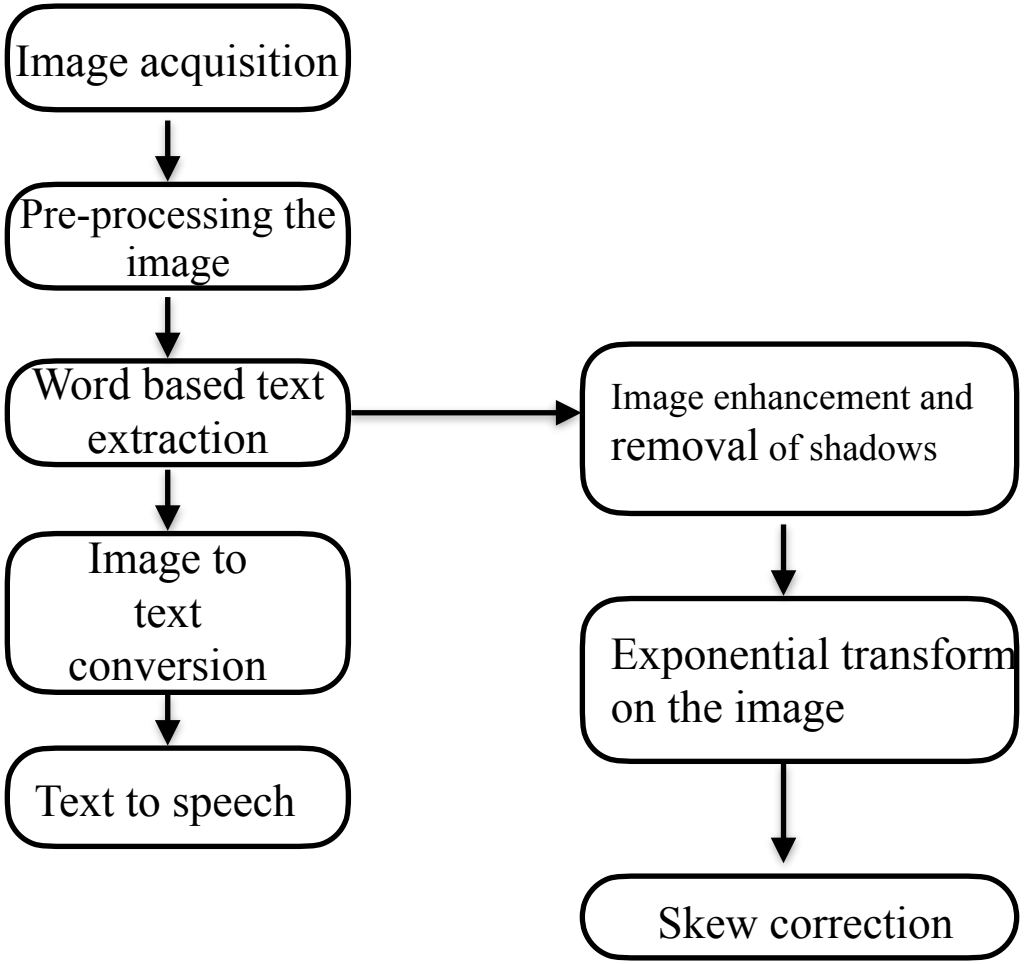
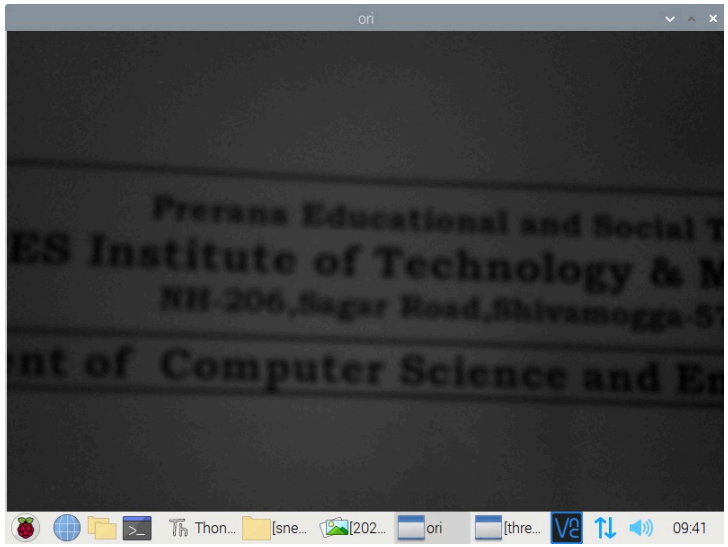


Fig 2 : Preprocessing Flow Chart

Results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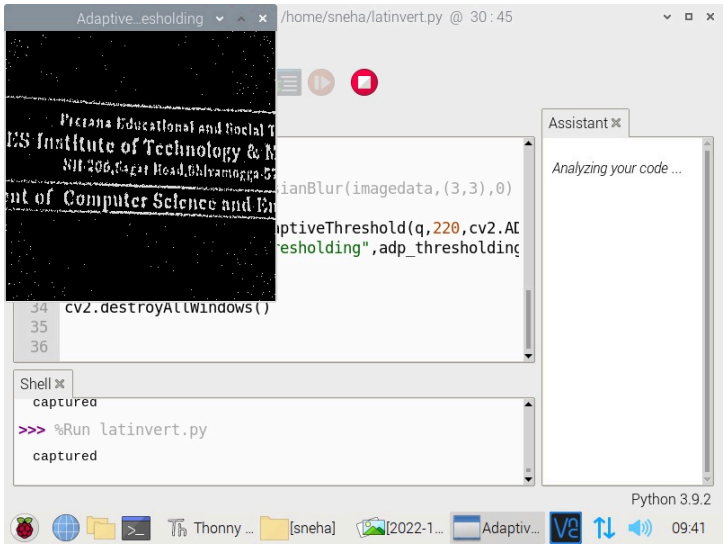
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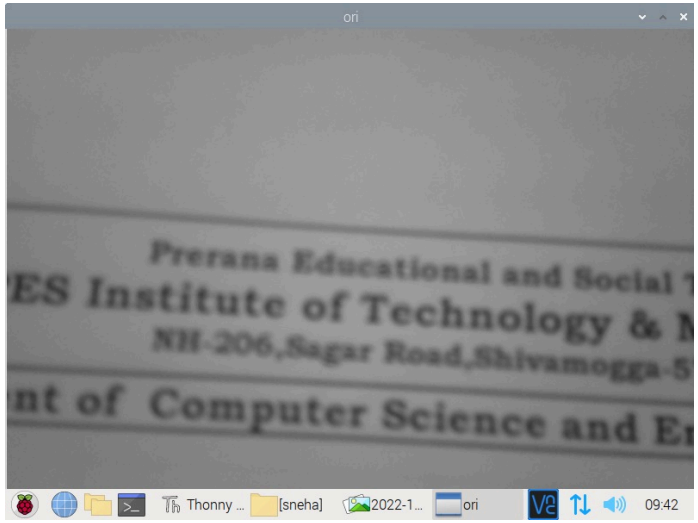
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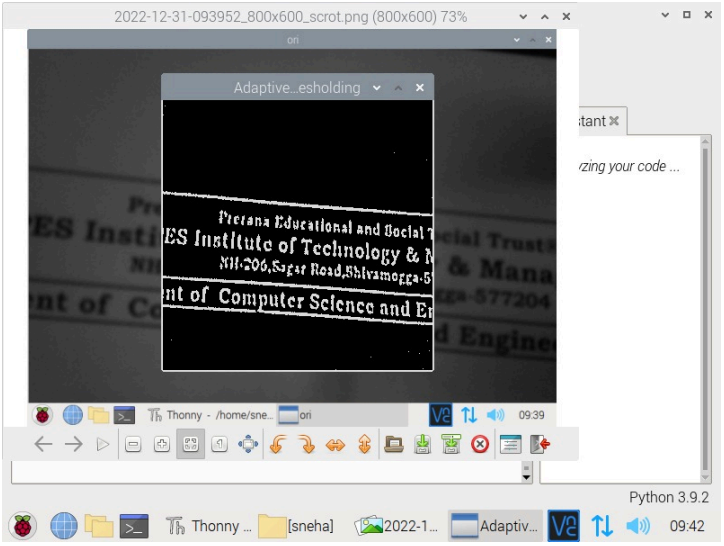
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Conclusion

The proposed wearable assistive device provides simple and effective assistance to the visually impaired by aiding them to read any text available with them using an efficient algorithm. The model possesses various advantages such as portability, computational effectiveness and affordability when compared to the other existing technologies. Despite this,various shortcomings of this technology includes the requirement of sensitivity to varying lighting conditions

References

[1] Visual impairment and blindness 2010," 2013. [Online]. Available: http:// www.who.int/ blindness/data_maps/

[2] Trupti Shah and Sangeeta Parshionikar :Efficient Portable Camera Based Text to Speech Converter for Blind Person,

[3] Arunima B Krishna, Meghana Hari and Dr. Sudheer A.P : Word Based Text Extraction Algorithm Implementation in Wearable Assistive Device for the Blind,

[4] Shalini Sonth and Jagadish S. Kallimani : OCR based facilitator for the visually challenged,

[5] Prabhakar Manage,Veeresh Ambe, Prayag Gokhale, Vaishnavi Patil, Rajamani M.Kulkarni, Preetam R. Kalburgimath. : An Intelligent Text Reader based on Python,

[6] M. A. Hersh and M. A. Johnson, Eds. Berlin : D. Keating, Assistive technology for visually impaired and blind people,: Springer London, 2008.

Thank You