International Research Journal of Computer Science (IRJCS) ISSN: 2393-9842
Issue 05, Volume 4 (May 2017) SPECIAL ISSUE www.irjcs.com

Text to Speech for the Visually Impaired

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Abstract ***-Perusing is fundamental in day by day life for everybody. Outwardly debilitated people can read just by utilization of unique applications by them like Braille dialect. The disadvantage of this framework is that each item does not give the content in Braille. In this paper, they have proposed an assistive content perusing system to help outwardly impeded people to peruse writings from different questions in their day by day lives. At first, we catch the picture of the required, pre-handling is performed on it. Pre-handling incorporates steps like dark scale and binarization, question of intrigue acknowledgment. In the proposed framework, we are making the utilization of OTSU calculation to change over the dim scale picture into binarized one. The content districts from the caught picture are then separated and perceived by utilizing optical character acknowledgment programming (OCR). The principle calculation in OCR to be specific MODI is utilized here. This extricated content of different textual styles and sizes then can be perceived independently and afterward consolidated in a word giving its yield as sound utilizing Text-to-discourse utilizing the SAPI libraries.***

Key Words: ***Assistive text reading, Binarization, OTSUalgorithm, SAPI libraries, OCR, MODI algorithm, and text-to speech***

I. INTRODUCTION

Reading is very important and one aspect in our day today lives. Almost 314 million visually impaired people are there all around the universe [1], 45 Million are blind and new cases being added each year as per researches done. Emerging technologies and recent developments in computerized vision, digit cameras, PDA and portable computers make it flexible to assist these individuals by developing image-based products that combine computer vision technology with other existing commercial technology such as optical character recognition (OCR) platforms. Printed text is one of the forms of reports, receipts, bank statements, restaurant menus, classroom handouts, product packages, medicine bottles, banners on road etc. There are many favoring systems available currently but they have little issues in reducing the flexibility for the visually impaired persons. For example, portable bar code readers designed to favor the blind people recognize dissimilar products, it permits the users who are unsighted to ingress. Information about these products through speech and Braille. But a big limitation is that it is very tough for unsighted people to find the location of the bar code and to exact point the bar code reader at the bar code. There are systems like K Reader Mobile it runs on a cell phone and permit the user to check mail, receipts, fliers, and many other things. Although, the document to be peruse must be nearly kept undisturbed, placed on a coherent, dark surface (i.e., a no confusion background), and contain mostly passage Furthermore, K Reader Mobile accurately sees black print on a white background but has issues in recognizing colored text or text on a colored background. It cannot read text with complex backgrounds. The main goal is to progress such a system that will peruse the texts from composite backgrounds successfully.

II. LITERATURE SURVEY

In [1], Xiaodong Yang, Yingli Tian Chucai Yi Aries Ardith "Context-based Indoor Object Detection as an Aid to Blind Persons Accessing Unfamiliar Environments" 2010 computer vision based indoor way finding system is implemented for blind people to independently access unfamiliar buildings. An unsighted person can discover vivid rooms and building exit or an escalator. This system includes text recognition. It notices the doors based on extensive symmetric shape, by combining edges and corners. To discriminate between an office doors from a bathroom door, it extracts and discover the text information. In [2] the organization benefits OCR and region can be conveyed through voice for unsighted travelers. We presented a system for detecting path borders and the vanishing point, such that blind persons can be instructed to correct their heading direction on paths and in corridors. A biologically inspired algorithm for optical flow based on multi-scale key point annotation and matching is used. Moving obstacles can be detected and tracked, such that the blind user can be alerted and informed about the approximate position on the path and whether the object is approaching or not.

Detection of moving obstacles complements detection of static obstacles in front on the path, just beyond the reach of the white cane. In [3] Xiaodong Yang, Shuai Yuan, and YingLi Tia "Recognizing Clothes Patterns for Blind People by Confidence Margin based Feature Combination" clothes pattern can be recognized using this system. There are many clothes patterns. This organization is classifying clothes patterns into 4 subparts: stripe, lattice, special, and pattern less. In this organization consistency scrutiny methods only focused on textures varying with special pattern changes. Due to large intra class variations in each clothes pattern category. It cannot achieve level of accuracy for clothes pattern recognition. Withdraw analytical and architectural feature from picture wavelet sub bands can be a result of this issue. In [4] Detecting Boris, Epstein Eyal, Ofek Yonatan Wexler "Text in Natural Scenes with Stroke Width Transform"2010. A unique picture engineer used to find the cost of blow width for each picture pixel. It is used in text detection in natural images. The proposed driver is info reliant and provincial, which makes it agile and it is active enough to trim the use for examine windows or multi-scale estimation. Evaluation testing shows that the implied design exceeds the updated advertised algorithms. Its modesty allows the algorithm to notice contents in many fonts and vocabularies. In [5] Asif Shahabad, Faisal Shaft, Andreas Dingell "ICDAR 2011Robust Reading Competition Challenge 2: Reading Text in Scene Images" 2011 International Conference on Document Analysis and Recognition of Text in natural scene images is becoming a prominent research area because imaging devices like mobile phones are available. The ICDAR 2011 Robust Reading Event objection was formulated to assess the act of novel algorithms in perceive and disclose content from complicated images. In [6] Sneha Sharma, Dr. Roxanne Canossa, advisor ``Extraction of Text Regions in Natural Images" 2007.The detection and extraction of text regions in an image is a well-known problem in the computer vision research area. The goal of this project is to compare two basic approaches to text extraction in natural (non-document) images: edge-based and connected-component based. The algorithms are implemented and evaluated using a set of images of natural scenes that vary along the dimensions of lighting, scale and orientation. Accuracy, precision and recall rates for each approach are analyzed to determine the success and limitations of each approach. Recommendations for improvements are given based on the results. In [7] Dimitris Dakopoulos and Nikolaos G. Bourbakis, Fellow, ``Wearable Obstacle Avoidance Electronic Travel Aids for Blind: A Survey" IEEE 2010 The variety of portable or wearable navigation systems have been developed to help blind people during navigation in out indoor or indoor environments. There are three major categories of these organizations: Computerized tour aids, and position locator devices, computerized direction aids. This paper is a provisional review of wearable hurdle disclosure systems to users and instructs the scrutiny center about the abilities of these organizations and about the evolution in dependable technology for visually impaired people. The survey is based on various performance parameters and features of the systems that classify them in categories. In [8] Bharat Bhargava, Pelini Angin, Lian Duan "A Mobile-Cloud Pedestrian Crossing Guide for the Blind" This system help blind and visually-impaired persons to detect the status of pedestrian signals at street for safe outdoor navigation. This system introduces a mobile-cloud collaborative access for situation familiar rustic exploration, where it uses the estimating power of Resources are made available by cloud computing provider's organization for real-time image processing. The suggested system architecture has the preferences of being essential framework dependence and extensile, hence granting for ample usability. The suggested way is for real-time crossing navigation for blind strollers. In [9] Yingli Tian, Chucai Yi ``Assistive Text Reading from Complex Background for Blind Persons". This paper presents a system for blind persons to read text from object and signage that are held in the hand. The system read text from complex backgrounds and then communicates this information aurally. They design a novel text localization algorithm to localize text regions in images with complex backgrounds, by learning gradient features of distributions of edge pixels in an Ad boost model and stroke orientation. Optical character recognition (OCR) software is used to recognize Text characters in the localized regions and transformed into speech outputs. The performance of the proposed system is evaluated on ICDAR 2003 Robust Reading Dataset. In [10] YasserGenera Sahin*, Bari's Aslan, Sinan Talebi, Ayberk Zeray ``A SMART TACTILE FOR VISUALLY IMPAIRED PEOPLE"2015. The impaired persons have many difficulties in society. One of the better important complications is traveling because of not suited city layouts. Latest evolutions in technology have facilitated a few provisions, such as palpable paving surfaces, to enhance their lives, but so far there is no extensive results to the issues they face. This study suggests an advanced, low cost and simple system, which consists: identified paths and nightsticks to make traveling unattended possible. The proposed system is available for Android mobile devices and IOS and consists of two software applications, "Out Guide", and "In Guide" for indoor and outdoor environments respectively.

III. PROBLEM DEFINITION

- *The current design of the Finger Reader [11] has several technical limitations, albeit with ready solutions. The camera does not auto-focus, making it hard to adjust to different finger lengths. In addition, the current implementation requires the Finger Reader to be tethered to a companion computation device.*
- *Microcontrollers are used which costs more. The voice user interface might not function perfectly in a noisy environment, rendering it limited to indoor use*
- *More expensive because they use hardware.*
- *They are less accurate.*
- *They are not portable.*

IV. EXISTING SYSTEM

In Existing researchers, have attempted to ease the burden on blind people by proposing various techniques that converts text to audible sounds. Tyflos [11] is a couple of glasses that have cameras attached to the side, earphones and a microphone. Voice mandates can be used to command the user and direct the platform. Some commands include "move paper closer," "move paper up," "move paper up, right" from the device to the user, and "rewind paragraph," "forward paragraph," and "volume up" from the user to the device. Nonetheless, the speech user integration might not work perfectly in a noisy environment, rendering it limited to indoor use. Finger Reader [12] is one such device, a wearable ring with a camera which is present on the front. The voice user interface might not function perfectly in a chaos surrounding; rendering is restricted to indoor need.

V. PROPOSED SYSTEM

The proposed system helps blind persons to read product the project aims to implement a reading aid that is small, lightweight, efficient in using computational resources, cost effective and of course user friendly the RPi-based system can be equipped with a high resolution webcam the microcontroller-based system is easier to use when compared to the mobile one. However, the accuracy of the mobile in the conversion efforts is better, primarily due to the high-resolution camera built in the device. Emerging technology and in future improvements of this project, the RPi-based system can be provided with a good and high-resolution webcam contrasted with the one used in this project, and we anticipate, this will improve its certainty. We predict more work will be produced in this critical area of assistive technology, and project that future portable gadgets will have easy to use and built in mechanism as reading aids for the blind, similar, to the mobile-based solution presented here. Labels. Users should capture image and then system read out the text from image. It will be more appropriate for persons those are going through optical surgery. It can be appropriate for road side text recognition so that visually impaired person can travel alone. The proposed system will give capable result as analyzed to most of the existing systems.

VI. DESIGN

SYSTEM ARCHITECTURE

System architecture is the conceptual design that defines the Anatomy and performance of a system an architecture description is a formal description of a system that supports the reasoning about the structural properties of system. it defines the system components or building blocks and provide a plan from which products can be procured, and system developed, that will work together to implement the overall system.

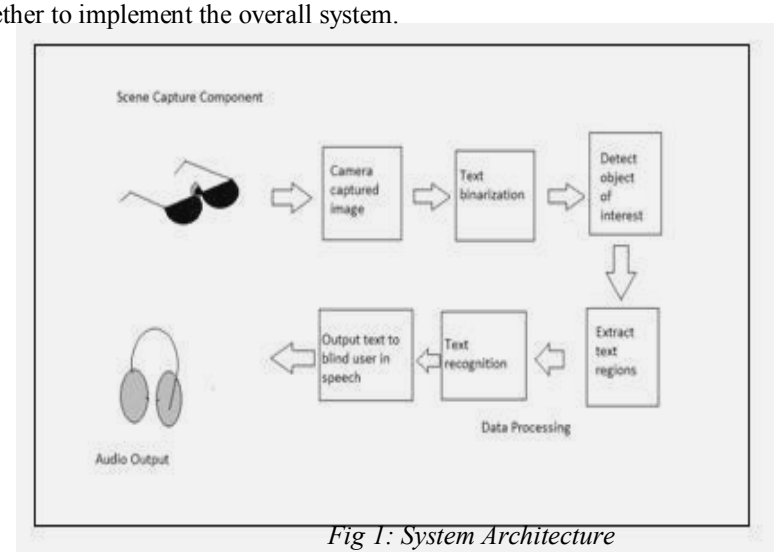

Fig 1: System Architecture

Fig1 shows the interaction between the user and application when it converts captured image to speech.

DATA FLOW DIAGRAM

A Data Flow Diagram (DFD) is a graphical representation of the flow of data through an information system scan also be visualization of data processing.

Level 0 DFD

Level 0 DFD shows the interaction between the cloud and user, cloud and admin.

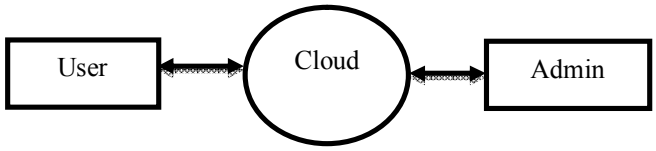

Fig 2: level 0 DFD

User interacting with the cloud for converting the image into text and text into audio and admin interacting with cloud to keep track of user profiles.

Level 1 DFD

Level 1 DFD shows the user registration and profile

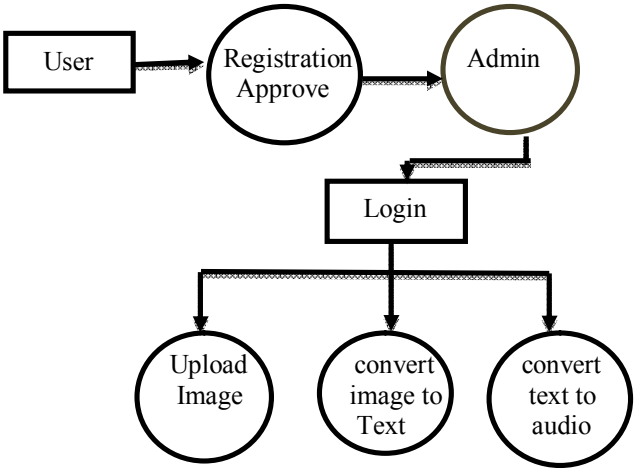

Fig 3: level 1 DFD

The Fig 3 shows the user registration and the profile of the user can be viewed and convert the image files into text files, also view uploaded images and converted images.

Level 2 DFD

Level 2 DFD shows the admin login and the function of admin.

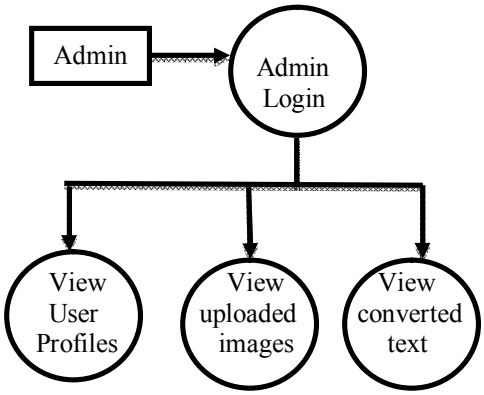

Fig 4: Level 2 DFD

The admin registration and the profile of the user can be viewed and converted the image files into text files, also view uploaded images and converted images.

SEQUENCE DIAGRAM

A Sequence diagram shows the participants in an interaction and the sequence of message among them. A sequence diagram shows the interaction of a system with its actors to perform allor part of a use case. Sequence diagram shows the interaction between the user and cloud for registering, uploading the images, converting image to text and text to audio.

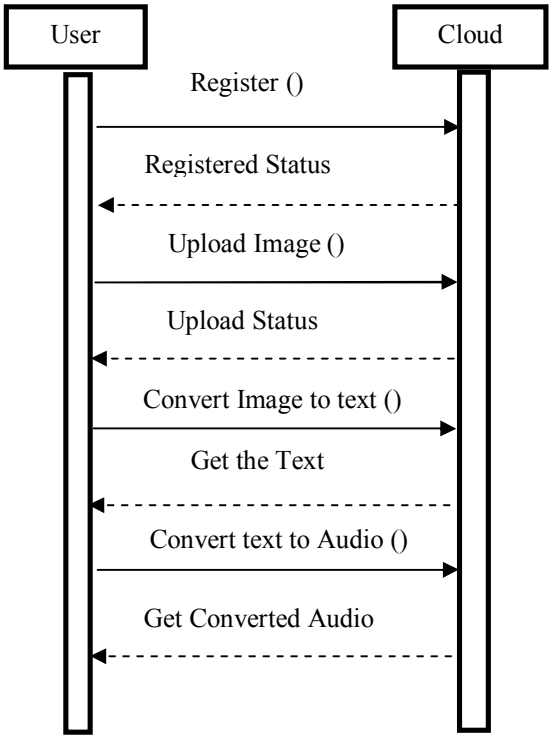

Fig 5: sequence diagram

USE CASE DIAGRAM

A use case is a coherent piece of functionality that a system can provide by interacting with actors. Each use case associates one or more actors as well as the system itself. It involves a sequence of message among system and its actors.

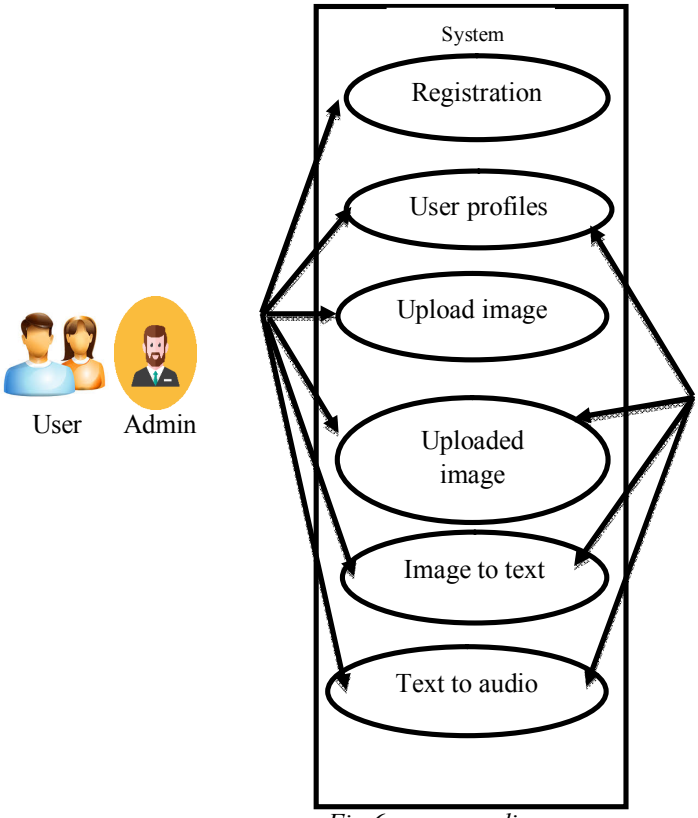

Fig 6: use case diagram

A rectangle contains the use cases for a system with the actors listed on outside. A solid line connects use case to participating actors.

VII. METHODOLOGY

Image capture module

The image capture module will catch the image captured by the Camera attached to the goggles. This will be easy for the visually impaired person to capture the image as the camera will be situated on the goggles. The image captured will be converted into grayscale and binarization

Image correction module

This module will correct the image by reducing the noises by mean of filtering algorithm like median filter so that the text will be effectively recognized

Text extraction module

This module will recognize and extract the text. This will be achieved using OCR-Optical Character Recognition - is the Mechanical or electronic conversion of images of typed, handwritten or printed text into machine-encoded text. We will be using here MODI algorithm of OCR.

Audio module

This module will get the extracted text as an input and it will read out the text using Text to Speech available in the mobile. If no text is recognized, then default audio output will be given. This will be done using SAPI libraries.

VIII. CONCLUSION

We propose an assistive system to read printed text on objects for assisting blind persons. To solve the common problems of blind people we have proposed a method in which the blind people will click the image. This method can effectively separate the objects of interest from complex background and other objects in the camera view OCR is used to perform word recognition of the localized text regions and transform into audio output for blind people. The RPi-based system can be equipped with a high-resolution webcam compared with the one used in this project, and we expect this will improve its accuracy. We predict more work will be produced in this critical area of assistive technology, and project that future portable gadgets will have easy to use and built in mechanism as reading aids for the blind, similar, to the mobile-based solution presented here.

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