 ISSN: 2321-8169
104 – 107

Finger Reader: Just move your finger

Prof. Rahul Ambalkar
Asst. Prof. Dept. of Electronics & Telecommunication
Mauli College of Engineering & Technology,
Shegaon, Maharashtra, India
ambalkar.rahul@gmail.com

Miss. DikshaBaluSardar
U.G.Student of Electronics and Telecommunication
Mauli College of Engineering & Technology,
Shegaon, Maharashtra, India
dikshasardar03@rediffmail.com

Abstract—- In this review paper,Finger Reader is a device that contributes visually impaired (VI) users with reading texts or printed words. Accessing printed text in a mobile context is a major challenge for blind people. It'sbasically a finger worn ring that houses a tiny camera for response. They can go faster, slower, go back etc. In this paper we are presenting the easiest manner for scanning text which enables reading text, line of texts for providing real-time auditory and tactile response or feedback. This system is implemented in a small size which is capable for eyes-free operations. Finger Reader is a device that contributes visually impaired users with reading texts or words. It's basically a finger worn ring that houses a tiny camera for feedback. When a visually impaired person wants to read some text around them, maybe a menu card of restaurant, they point the finger at the surface with the text and the device reads the words in proper sequence. They can go faster, slower, go back etc. In this paper we are presenting the easiest manner for scanning text which enables reading text or printed word, line of texts for providing real-time auditory and tactile response. This system is implemented in a small size which is capable for eyes-free operations.

***Keywords**: Finger reader, visually impaired, finger worn ring.*

*****

I. INTRODUCTION

Braille is the standard tactile reading tool used by the blind for printed text, and the system is credited for boosting literacy levels among the visually impaired. However, many blocks and materials are still not available in Braille. Dr. PattieMaes, founder and director of the MIT Media Lab's FluidInterfaces research group, who developed Finger Reader. A novel-tracking based algorithm extracts text locally and sequentially, rather than in whole text blocks and pages like many existing gadgets use.The Finger Reader is a wearable device that assists in reading printed text. This system is a weapon system or branch both for VI people that require help with accessing printed text, as well as a support or help for language translation. Wearers scan a text line with their finger and receive an audio response of the words and a touching words feedback of the layout start and end of line, new line, and other cues. This system or gadget algorithm knows to detect or line up and give feedback when the user veers away from the baseline of the printed text or word, and helps them maintain a continuously straight scanning motion within the line. Actually, Finger Reader is a proof of concept prototype. It is so easy to handle, safe and secure product that could be commercialized and useful for the community or association. Our age-old hunch to point at things we did like toknow more about has motivated a gadget that contribute the VIconsume printed text. This system is a 3-Dimensionalprinted device that is prostrate as a ring on the forefinger and uses an inbuilt small camera on top which scans printed text and softcopy also scans in monitors system by finger movement. The sensor will read and narrate the word directly above the finger while looking ahead in order to process upcoming words. If a user's finger straggles from the line, the reader will indicate that with some vibration sense. This system could bea flatbed device for helping blind people or those with VI read without braille. The benefits of this system although that is attractive astounding in its own right. The Finger Reader Gadget is meant to be used in just about every context in which people find themselves reading: restaurants, hospitals, at work, around the house and bus stand. This system the same, the user's finger is likely to disorganize the movable printed words, text and sentences. This system, we proposed using finger as a guide, and supporting or helping sequential learning or accomplished of text rather than reading printed text words or text blocks in text books, newspaper and various books.Technological barriers ban blind people's abilities to attain or gain more independence, a characteristic widely identified as important by our interviewers. In this paper results of focus or concentrate group sessions with VI or blind users that uncovered salient problems with current text reading solutions and the users ideographs of future assistive devices or gadgets and their capabilities.

- Initially, we present and share the results of interview sessions with visual impairment users that uncovered problems with agoing text reading solutions and the users ideographs of future assistive devices or gadgets and their capabilities. Our design choices are based on these findings.
- And we conceptualize and implement Finger Reader Gadget, a finger worn system for local-sequential text or printed scanning, where the user scans the printed text exponentially in a local view and listen the recognized words synthesized to audible speech. It enables continuous response to the blind user and allows for new ways of reading, such as non-linear skimming to different parts of the printed text. Our proposed method utilizes computer vision algorithms, along with audio and tactile cues for effectively guiding the blind user in reading text with the help of the fingertip as a cursor.

 ISSN: 2321-8169
104 – 107

- Lastly, we result findings from three evaluations: a technical evaluation to understand the printed words extraction accuracy, blind response sessions with blind participants to assess the response mechanism, and an end-to-end study to assess the system's real-world applicability and explore further design opportunities.

RELATED WORK:

The Finger Reader scans the barcode and then transmits the information that has been saved in the barcode to the Bluetooth gadget. It's also able to scan the word and read it to the user. It is very less time consume and also it is easy to handle or simple. In a wearable form factor, it is possible to use the body as a directing and focusing mechanism, the design continues the work have done by tiny camera is used this system or gadget. This tiny camera on top which scans printed text and monitors finger movements. However this work features novel hardware and software that includes haptic feedback, video-processing algorithms and different output modalities, including tactile and auditory channels. Exploring the implemented or design concept with VI users revealed the need to have a small, potable gadget that helps for free movement, requires minimal setup and utilizes real-time,distinctive multimodal feedback. The finger worn design helps focus the camera at a fixed distance and utilizes the sense of touch when scanning the surface. Additionally, the gadget provides a very simple interface for blind users as the Finger Reader Gadget or device does not button, and affords to easily identify the side with the tiny camera lens for proper orientation.

II. TECHNOLOGIES USED:

A] Hardware Details

The Finger Reader hardware was designed using:

1. Multimodal feedback via vibration motors.
2. A new dual-material case design.
3. A high-resolution mini video camera.

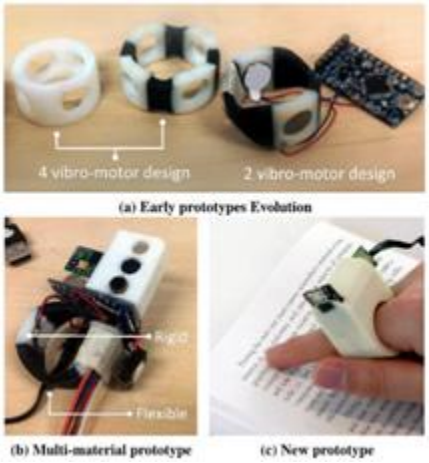

Figure 1: Finger Reader prototypes

Figure shows 1, This Reader Gadget hardware expands tactile feedback via vibration motor, a novel or fresh a dual- material case design and a very high resolution mini or micro camera. In hardware two motors are used 1st is 4 vibro-motor and 2nd is 2 vibro-motor. Both vibration motors are embedded on the top and bottom of the ring to provide some sense or touching of printed text feedback on which direction the blind user should move the tiny camera via distinctive signals. Early tests with blind users showed that in the 2 motor design signals were far simplest to distinguish than with the 4 motor implement, as the 4 motors were also close together. The dual-material implement or design provides flexibility connections and to the ring's fit as well as helps dampen the vibrations and less confusion for the user.

B] SOFTWARE DETAILS

To accopanythe a software stack that includes.

1.A text extraction algorithm.
2. Hardware control driver.
3. Integration layer with Tesseract OCR.
4.File Text-to-Speed (TTS).
5.Currently in a standalone PC application.

Figure 2. Software Prototype.

Flow chart:

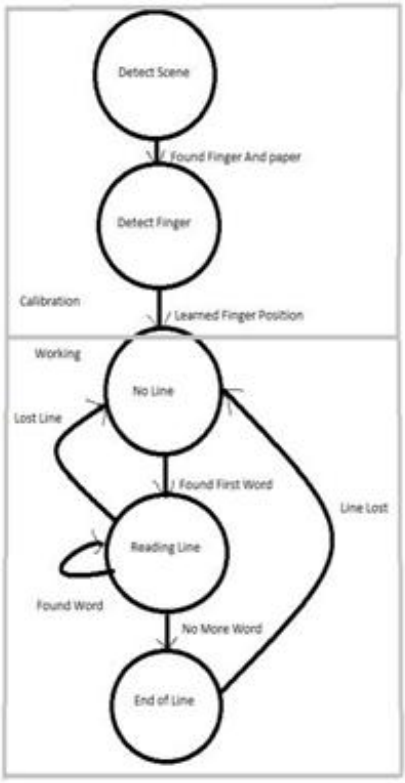

Figure 3: Sequential text reading algorithm state machine.

 ISSN: 2321-8169
104 – 107

Figure shows 3, the locally and sequential printed text reading algorithm is comprised a number of sub-algorithms joined to each there in a state-machine, to accommodate for a continuous operation by a VI users. The text-extraction algorithm expects an input of a close up view of word or block printed text. We start with image or picture binarization and selective contour extraction (Detect Scene and Learn Finger).Then net we see for printed text lines through fitting lines to triplets of prunedcontours; we then prune for lines with feasible slopes (No Line, Line Found and End of End). Every state receives or delivers in proper timely audio cues to the users to inform them of the process.

Step 1:
Scene and Finger Detection:

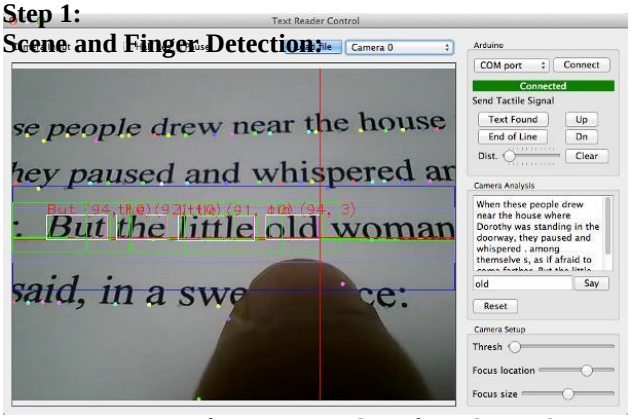

Figure 4: Our software in midst of reading, showing the detected line, words and the accumulated extracted text.

Firstly, to detect the information paper or printed text paper with the help of camera. Figure 4 shows, the camera input is in the form of image and image converted into normalized RGB space: (R, G, B) = (r/r+ g+ b, g/r + g + b, b/ r + g + b). The initial calibration step. The monochromatic image is downscaled to 50x50 pixels and matched to a dataset of pre-recorded typical pictures or images of finger and text paper from proper manner of the device camera.

Step 2: Word Extraction, Tracking and Signaling:

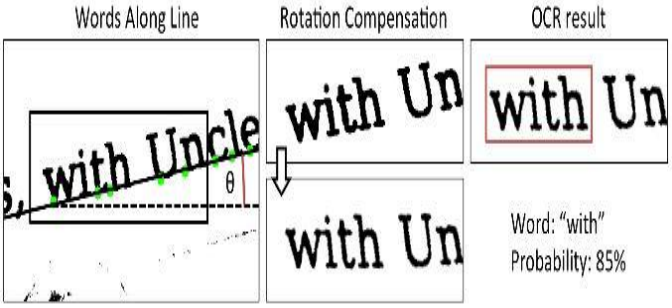

Figure 5: Word extraction process.

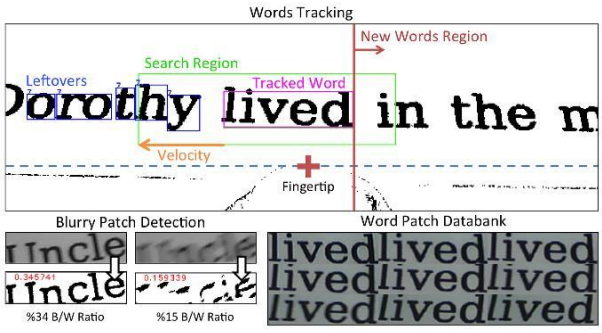

Figure 6: Word tracking process.

The output of the Finger Detection is applied to the word extraction. And the output of detecting as an input of word extraction. Shows figure 5,we extract words from characters along the selected text line and send them to the OCR engine. The OCR engine is instructed to only extract a single word, and it return: the word, the bounding rectangle with high confidence are retained and tracked as the user scans the line. Whenever a fresh word is added to a pool of word to track along with its initial bounding rectangle. Figure 6 shows, every successful tracking, marked by a low matching score and a feasible tracking velocity, then properly tracked this words then the other word will be tracked. This process is also calibration.

Step 3:No line:

In the step 3, if there is no word or block text on the printed text paper then suddenly camera checks or found the word or line. And getting the line to detect this line and send to the other step.

Step 4:Reading lines:

The output of the no line act as an input of the Reading line. After detecting the lines then these lines will be readied.

Step 5:End of Line:

This is the last step, there is no line so jump into the step 3.Hence, and these are the overall details about of Finger Reader Gadget.

III. RESULTS:

Although the results are promising, the systemrequires further tests and improvements. For further development, we intend to design a customized electro-tactile grid-array to provide Braille pulse patterns to the finger-tip. We intend to develop a thimble like wearable device for the finger, with an electro-tactile grid array on the finger tip.

IV. APPLICATION:

i).This paper will be a desktop application to be developed in VB 6.0 havingMs Access as backend.
ii).Database Design (Ms Access)
iii).Form Design (VB 6.0)
iv).Coding (VB 6.0)
v).Testing (VB 6.0)
vi).Reporting Tool (Data Report)

ADVANTAGES:

1).The Finger Reader gadget or system wearable device is easily to read or access the text and easy to handle it.
2).The index-finger worn device is "a lot more flexible, a lot more immediate then any solution that they have right now."
3).It can possibly increase the ability of the blind to Learn.
4).Ability to read school books without the need for a Braille version.
5).Simple tasks such as ordering from menu.
6).Substitution for those who can't read Braille.

FUTURE SCOPE:

a).It can be used in any Hospital, Clinic, Dispensary or Pathology labs for maintaining details and their tests results.
b).This web application includes the IT fields.

 ISSN: 2321-8169
104 – 107

c).Secure Administrative panel.
d).Normal users are the participants.
e).They have to register for the events.

CONCLUSION:

This system enables the visually-impaired users to read text not only from books and papers, but also from billboards and signs at a greater distance. The use of everyday objects in the development of this device will also reduce the cost of manufacturing the device, thus making it available to people at reasonable price. Finger Reader presents a new way for people or users to read printed text locally and sequentially rather than in blocks like existing technologies. The design is motivated by a user needs study that shows the benefit in using continuous multimodal feedback for text scanning, which again shows in this paper analysis.

BIBLIOGRAPHY:

[1] Levenshtein, V. I. Binary codes capable of correcting deletions, insertions and reversals. In Soviet physics doklady, vol.10, 707.

[2] Bigham, J. P., JAYANT, C., Ji, H., Little, G., Miller, A., Miller, R. C., MILLER, R., Tatarowicz, a., White, B., White, S., and Yeh, T. Vizwiz: Nearly real-time answers to visual questions. In Proc. Of UIST, ACM.

[3] Ezaki, N., Bulacu, M., and Schomaker, L. Text detection from natural scene images: towards a system for VI persons.

[4] Shen, h., AND Coughlan, J. M. Towards a real-time system for VI users. In Computers Helping People with Special Needs.

[5] Black, A. W., and Lenzo, K. A. Flite: a small fast run-time synthesis engine. In 4th ISCA Tutorial and Research Workshop (ITRW) on Speech Synthesis.

[6] Hanif, S. M., and Prevost, L. Texture based text detection in natural scene images-a help to blind and visually impaired users.