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An Assistive System for Visually Impaired People

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Abstract - Visually challenged people make up a good-sized populace segment, with estimates starting from tens of hundreds of thousands to loads of hundreds of thousands worldwide. Integration into society is a primary and ongoing purpose for them. A substantial deal of attempt has long gone into making sure a health-care gadget. To assist visually impaired humans, stay a regular life, many steering gadget techniques were created. These structures are often created for a unmarried purpose. Nonetheless, those answers can considerably enhance the mobility and protection of such individuals. The plan establishes a vision-primarily totally based platform for spotting real-international gadgets each interior and exterior for you to help visually impaired humans. The software program is created with Python and OpenCV library functionalities after which ported to a laptop. YOLO is a singular manner to item detection. The photo is transformed to an experiment photo for similarly processing the usage of the utility for decoding the contents. The output of the photo detected is a scanned photo, that is then used as an enter to the Tesseract OCR (Optical Character Recognition) software program, which converts the photo to textual content, further we upload street signal reputation for directing at the same time as strolling on street. We use the TTS (Text to Speech) engine to transform textual content to speech after detecting texts and objects.

Key Words: YOLO, Tesseract OCR, TTS.

1. INTRODUCTION

Visually impaired humans constitute a tremendous populace segment, presently the variety being predicted to tens of tens of thousands and thousands across the globe. Their integration withinside the society is a critical and consistent objective. A extremely good attempt has been made to guarantee a fitness care gadget. Various steerage gadget strategies were evolved to help the visually impaired humans in residing a everyday life. Often, those structures are designed best for unique tasks. Nevertheless, those structures can substantially contribute to the mobility and protection of such humans. The improvement of present-day steerage structures to help visually impaired humans is intently associated with the superior techniques in photo processing and laptop imaginative and prescient in addition to the velocity overall performance of the gadgets and unit processors. Regardless of the concerned era, the utility desires to function in actual time with brief moves and decisions, as the velocity is probably essential for taking moves. The imaginative and prescient module for photo processing proposed on this gadget is an included a part of the platform devoted to manual visually impaired humans. Moreover, the proposed module may be extensively utilized off the shell, independently of the included platform. The imaginative and prescient primarily totally based steerage gadget proposed is designed, evolved and proven at some point of experiments and iteratively optimized. The module is compliant to the precept of growing a noticeably overall performance tool however fee powerful with sensible usage. The module is the use of disruptive era and permits for updating and inclusion of latest functions.

2. OBJECTIVE

The task objectives to facilitate the motion and a clever reader tool for blind and visually impaired. The plan defines a vision-primarily based totally platform for the identity of real-lifestyles indoor and outside items to manual visually impaired humans and additionally to examine out something written texts. Using Python and OpenCV library functions, the software program is advanced and, in the end, ported to a RPi.

3. PROBLEM STATEMENT

Without imaginative and prescient, it could be hard for a visually impaired man or woman to navigate via a room or a hallway without bumping into obstacles. Even with aid, consisting of on foot stick, it could be now and again inconvenient, uncomfortable, and possibly misguided in averting obstacles. Without any assist of others, blind humans can not capable of examine which a different hassle confronted through blind humans.

4. LITERATURE SURVEY

"Assistive Technology for the Visually Impaired Using Computer Vision" [2018]

India has more than a quarter of the world's 36 million blind people. Educating the blind to avoid unemployment among their population is one of the most challenging problems faced by blind schools today. Although many schools' resort to the use of Braille to eradicate illiteracy among them, its steep learning curve, insufficient availability and high cost makes it quite unapproachable. Braille Literacy Statistics in India indicate that out of the 12 million blind people in the country, less than 10 percent

learn Braille. It is evident that one of the most crucial issues faced by the blind and the visually impaired is the inability to read and learn without the use of Braille. In order to overcome this issue, there is a need to develop a system that can assist the visually impaired in reading. Hence, the proposed solution is to design an inexpensive wearable device that uses computer vision to read out any form of text around the user in various alignments and lighting conditions. The system makes use of a Raspberry Pi with a compatible camera to capture the content around the visually impaired or blind person and reads it out to them in a regional language. A sensor is also incorporated to notify the user of the distance to the nearest object at his eye level and the device enumerates various objects in its sight. The system is based on the combination of image processing, machine learning and speech synthesis techniques. The observed accuracy combining both the optical character recognition and the object recognition algorithms was found to be 84%. [1]

"Smart Specs: Voice Assisted Text Reading system for Visually Impaired Persons Using TTS Method" [2017]

According to the World Health Organization, out of 7.4 billion populations around 285 million people are estimated to be visually impaired worldwide. It is observed that they are still finding it difficult to roll their day today life and it is important to take necessary measure with the emerging technologies to help them to live the current world irrespective of their impairments. In the motive of supporting them We have proposed a smart spec for the blind persons which can perform text detection thereby produce a voice output. This can help the visually impaired persons to read any printed text in vocal form. A specs inbuilt camera is used to capture the text image from the printed text and the captured image is analysed using Tesseract-Optical Character recognition (OCR). The detected text is then converted into speech using a compact open-source software speech synthesizer, eSpeak. Finally, the synthesized speech is produced by the headphone by TTS method. In this project Raspberry Pi is the main target for the implementation, as it provides an interface between camera, sensors, and image processing results, while also performing functions to manipulate peripheral units (Keyboard, USB etc.,).[2]

"A CNN Based Correlation Algorithm to Assist Visually Impaired Persons", [2011]

L. Ţepelea *et al*. [4], in this paper, a CNN based correlation algorithm to assist visually impaired people is explained. Regardless of the variant proposed, including a visual processing unit in the structure of systems that assist people with visual impairments is impetuous necessary, given the multitude of information that can be extracted from images acquired. This paper presents a correlation algorithm based on the use of cellular neural networks (CNNs) that can improve the features of assisting systems, to give more information from environment to visually impaired persons. The most of operations (calculations) included in the proposed algorithm are achievable by parallel processing. Thus, it can reduce the computing time and the computing time will not increase proportionally with increasing the size of the template images.[3]

"Multicore Portable System for Assisting Visually Impaired People", [2014]

P Szolgay *et al.*[5], the portable system is made around a smartphone but also uses external sensory modules. It covers indoor and outdoor movements of visually impaired people. Tests made show the efficiency of the system, which can be improved with the development of android based portable devices. This paper presents a portable system to assist visually impaired people in indoor and outdoor environments. It uses different sensors to detect obstacles and guide them in their movement with the aid of GPS and compass. The main part of the system consists of a multicore android smartphone. Other sensory modules detect obstacles and communicate relevant information to the main part. Optionally, the system can communicate remotely for distance monitoring. [4]

"Smart Glasses for the Visually Impaired People", [2016]

People with visual impairment face various problems in their daily life as the modern assistive devices are often not meeting the consumer requirements in term of price and level of assistance. This paper presents a new design of assistive smart glasses for visually impaired students. The objective is to assist in multiple daily tasks using the advantage of wearable design format. As a proof of concept, this paper only presents one example application, i.e. text recognition technology that can help reading from hardcopy materials. The building cost is kept low by using single board computer raspberry pi 2 as the heart of processing and the raspberry pi 2 camera for image capturing. Experiment results demonstrate that the prototype is working as intended.[5]

5. PROPOSED SYSTEM

This system consists of a voice-assisted text-reading device for visually disabled individuals. The proposed framework uses four distinct types of modules: a camera module, an image processing module, an optical character recognition module, yolo framework and a text-to - speech module.

Image Capturing: In this stage, the text image is captured using a 5-megapixel resolution Raspberry pi camera. The captured image is not flawless in shape and scale, nor is the captured image in an acceptable state for text extraction data. Thus, the captured image is first applied to the image processing module. The picture taken is in jpg format.[6-7]

Object Detection: Many artefacts are present in the captured shot. All objects are identified using the JSON.parse library, but not all objects are interpreted, although the one with more precision can be read.

Image Processing: In the image processing, unnecessary noise is eliminated by using the image magic program. Imagemagick is an open source and free software. Imagemagick consists of a variety of tools in which the proposed technique uses image sharpening and text washing. Image sharpening increases the contrast between the light and dark regions of the image. Text cleaning is used to clean the scan document to make the final image more readable for the OCR process.[6-7]

Text Extraction: In this step, the output image of the image magic programme is translated into text or editable data. We used tesseract OCR programme for this operation. The Tesseract OCR programme detects text in the capture image after it has been analyzed. The performance of the text extraction is in the form of a.txt format.[8-11]

Sign Detection: Sign classification includes RGB images of the traffic sign boards. These RGB images are being preprocessed using multiple techniques namely Shuffling, Gray scaling, Local Histogram Equalization and Normalization. To generate additional training data transform image function is being used which includes Rotation, Sharing, and image Translations. Using TensorFlow the data is being trained and tested.

Text to Speech Converter: In this step, the extracted text is translated to speech using a speech synthesizer. We used the e-speak TTS engine and the google speech synthesizer for this operation. The output of the speech synthesizer is in sound or audio format.[8-11]

6. CONCLUSION

According to the analysis done in this work, we have applied the audio-aided text-reading system and defined the target on our I system. The EPc methodology has treated the image taken and read it clearly in audio form so an easy audio collection of visually impaired people can be an effective and economically useful tool for blind people.

REFERENCES

[1] M.P. Arakeri, N.S. Keerthana, M. Madhura, A. Sankar, T. Munnavar, "Assistive Technology for the Visually Impaired Using Computer Vision", International Conference on Advances in Computing, Communications and Informatics (ICACCI), Bangalore, India, pp. 1725-1730, sept. 2018.

[2] R. Ani, E. Maria, J.J. Joyce, V. Sakkaravarthy, M.A. Raja, "Smart Specs: Voice Assisted Text Reading system for Visually Impaired Persons Using TTS Method", IEEE International Conference on Innovations in Green Energy and Healthcare Technologies (IGEHT), Coimbatore, India, Mar. 2017.

[3] L. Ţepelea, A. Gacsádi, I. Gavriluţ, V. Tiponuţ, "A CNN Based Correlation Algorithm to Assist Visually Impaired Persons", IEEE Proceedings of the International Symposium on Signals Circuits and Systems (ISSCS 2011), pp.169-172, Iasi, Romania,2011.

[4] P. Szolgay,L. Ţepelea, V. Tiponuţ, A. Gacsádi, "Multicore Portable System for Assisting Visually Impaired People", 14th International Workshop on Cellular Nanoscale Networks and their Applications, pp. 1-2, University of Notre Dame, USA, July 29-31, 2014.

[5] E.A. Hassan, T.B. Tang, "Smart Glasses for the Visually Impaired People", 15th International Conference on Computers Helping People with Special Needs (ICCHP), pp. 579-582, Linz, Austria, 2016.

[6] Manjunatha Kumar, B. H., Achyutha , P. N., Kalashetty, J. N., Rekha, V. S., & Nirmala, G. (2022). Business analysis and modelling of flight delays using artificial intelligence. *International Journal of Health Sciences*, *6*(S1), 7897–7908. https://doi.org/10.53730/ijhs.v6nS1.6735

[7]Manjunatha Kumar, B., M.Siddappa, D., & J.Prakash, D. (2018). Kannada word sense disambiguation by finding the overlaps between the concepts. International Journal of Engineering & Technology, 7(2.6), 189-192. https://dx.doi.org/10.14419/ijet.v7i2.6.10565.

[8] Kumar, BH Manjunatha, and M. Siddappa. "Kannada word sense disambiguation using semantic relations." Journal of Physics: Conference Series. Vol. 1767. No. 1. IOP Publishing, 2021.

[9] Hebbale, S., Marndi, A., Manjunatha Kumar, B. H., Mohan, B. R. ., Achyutha, P. N., & Pareek, P. K. (2022). A survey on automated medical image classification using deep learning. *International Journal of Health Sciences*, *6*(S1), 7850–7865. https://doi.org/10.53730/ijhs.v6nS1.6791

[10] Manjunatha Kumar B H, Siddappa M and Prakash J Unsupervised Kannada Stemmer using Partial Lemmatizer and Indo – Word Net 2017 International Journal of Engineering Research and Applications (IJERA) 7

[11}BH, Manjunatha Kumar, M. Siddappa, and J. Prakash. "Kannada Word Sense Disambiguation by Finding the Overlaps between the Concepts." *International Journal of Engineering & Technology* 7 (2018): 189-192.