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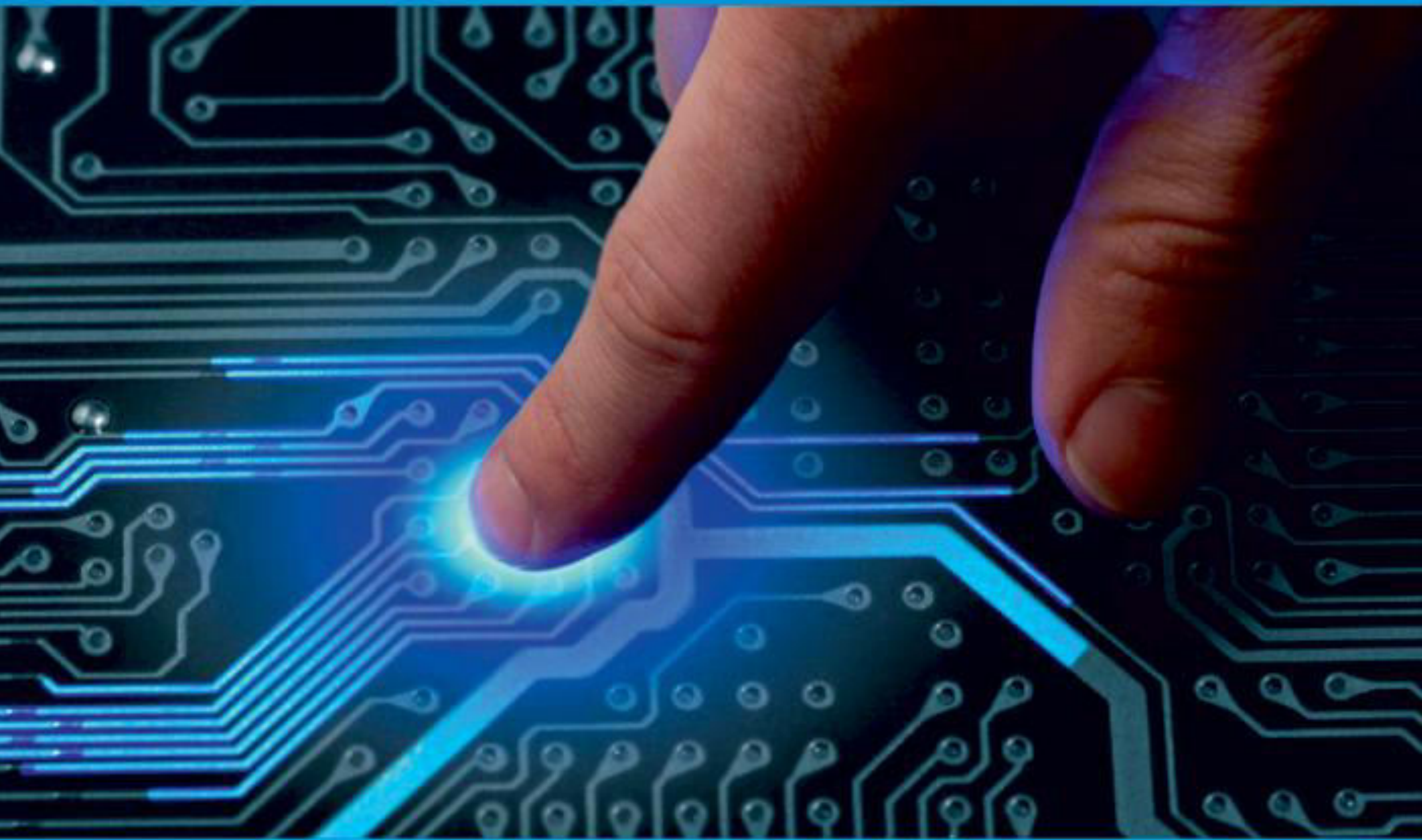

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Assistance of Blind People Using Open CV and TESSERACT

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ABSTRACT: When moving around in a familiar area, such as our home room or even our professional space, portability without eyesight is rather simple to picture. Moving about in strange locales is challenging, thou gh. We require a better version of the solution due to the drawbacks related to comfortability and mobility, user learning and adaption time with the new system, and flexible multi-feedback choices. Here, we are creating a prototype that will enable blind and visually impaired people to move around both familiar and foreign areas without the use of guides.

KEYWORDS: Image Processing, Image segmentation, Text Processing, Optical character recognition,Handwritten text analysis**.**

I.INTRODUCTION

Numerous multifaceted and ground-breaking developments are now possible thanks to modern technology. Due to the rapid accessibility of advanced technology, persons who are blind may now accomplish a variety of tasks, including read and write papers and use specialised Braille devices. However, developing software to help with mobility has never been simple. Using several modules, including object identification, text to speech translation, and distance measurement, we have improvised a help system for the blind in this system. We have employed image processing programmes, OpenCV, and physical components for distance measuring since the precision of these systems is more crucial than their speed.

II.LITERATURE SURVEY

Medical image processing, facial identification, pedestrian detection, and other applications employ image segmentation technology extensively. A few of the current methods for segmenting images are region-based segmentation, edge detection segmentation, segmentation based on clustering, segmentation based on CNN's weakly-supervised learning, etc. The methods for segmenting images are examined, summarised, and their benefits and drawbacks are compared in this study. On the basis of Song Yuheng and Yan Hao's overview of image segmentation algorithms, we conclude by predicting the future direction of image segmentation using this combination of techniques.

In the system described in this study, computer vision and a building's geographic information system are combined. It just employs one camera, like the camera on a phone. In order to localise the user in the building and to trace and validate a path for the user's navigation, visual markers including frontal and lateral doors, stairs, signs, and fire extinguishers are used. The created system, based on computer vision and GIS for the navigation of blind people in buildings by M. Serra o and S. Shahrabadi, clearly increases the autonomy of people with extremely low vision during interior navigation. J. I. Rodrigues, J. M. F. Rodrigues, M. Moreno, J. T. Jose, and J.M.H. du Buf.

Apps for smartphones can only be utilised in certain circumstances. In this paper, we first highlight the aforementioned fact by classifying the tasks that obtain visual information using computer vision techniques based on Masakazu Iwamura, Yoshihiko Inoue, Kazunori Minatani, and Koichi Kise's Suitable Camera and Rotation Navigation for People with Visual Impairment on Looking for Something Using Object Detection Technique.

In this study, a totally autonomous assistive technology based on artificial intelligence is proposed to distinguish various objects and to deliver real-time aural inputs to the user, improving the sight impaired person's awareness of

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their environment. Based on Efficient Multi-Object Detection and Smart Navigation Using Artificial Intelligence for Visually Impaired People by Rakesh Chandra Joshi and Saumya Yadav, a deep learning model is trained with several photos of items that are extremely important to the visually impaired individual. Carlos M. Travieso-Gonzalez and Kishore Dutta from Malaysia.

Humans can traverse both indoor and outdoor areas and stay away from a variety of hazards thanks to their vision sense. For those who are blind, however, these activities are quite challenging. Blind persons can only sense their surroundings with assistance. This essay does not just discuss blind people's navigational aids. However, it tends to develop an automated system for blind people that senses the surroundings in all conceivable ways based on An automated navigation system for blind people by Md. Atiqur Rahman, Sadia SiddikaMd, Abdullah Al-Baky, and Md. Jueal Mia.

III.PROPOSED SOUTION

Machine learning method for analysis, to enhance the segmentation impact. like the K-means algorithm. Use of a geographic information system for blind persons to navigate public spaces. We suggested a prototype system that utilised an omnidirectional camera and voice control for rotational navigation.To provide the learned model additional resilience, training photos are enhanced and manually annotated. The gadget for identifying impediments while moving from one point to another incorporates distance-measuring sensor and computer vision-based approaches for object detection. After scene segmentation and obstacle recognition, the aural information that is presented to the user is tailored to collect more data more quickly for quicker processing of video frames.The Raspberry Pi 4 model incorporates all of the sensors. Sensors are utilised to gather the environmental information necessary to create a system with accurate navigation. The virtual eye for the blind is a five-megapixel stereo camera, and the obstacle detection system is an ultrasonic distance sensor.
Three steps make up the barriers detecting process:
1.Detection and recognition - YOLO algorithm (YOLO framework neural networks)
2.Object detection and recognition
3.Face identification - Face landmark estimation algorithm.

IV.OPTIMAL CHOICE OF RECOMMENDATION

When compared to other current systems, the suggested approach has a 98% accuracy rate. For object detection, voice, face recognition, and person distance, it displayed good results. A machine learning analysis algorithm to enhance the segmentation result. the K-means method, for instance. It enhances user autonomy while locating a destination.Object identification, rotational navigation, and forward movement. For both object detection and recognition, the suggested method's average accuracy is 95.19% and 99.69%, respectively. Because of the minimal temporal complexity, a user may see the surroundings in real time[1].

V.MERITS AND DEMERITS

With the combination of these algorithms, we forecast the development trend of picture segmentation, but measurement of the location or building is not reliable. The devised approach clearly increases the autonomy of people with extremely low vision during interior navigation, however measurement of the location or structure cannot be precise. The camera is fast enough to record the area around it for a better field of vision, but as previously said, they can only be utilised under certain conditions[8]. It is only when the user is able to photograph the object of interest themselves.

Less temporal complexity is needed with this model. If a trained model does not perform well with lower loss model files, either the dataset should be expanded, or other augmentations should be made to an existing dataset[9]. Therefore, a sufficient dataset is needed for complicated data.

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VI.METHODOLOGIES AND MODELS USED

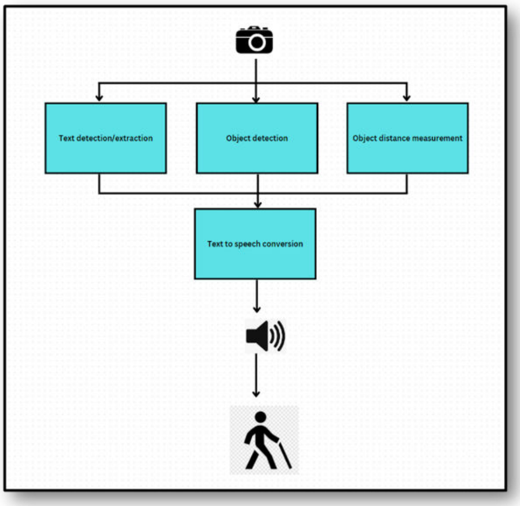

Fig .1 block diagram of the proposed system

SSD MobileNet:From an input picture, this Single Shot Detector (SSD) object detection model computes the output bounding box and class of an item. It makes advantage of Mobilenet as its backbone to deliver quick object identification tailored for mobile devices.

Tesseract:For a number of operating systems, Tesseract is an optical character recognition engine. The Apache License was used to release the free software[2].The most well-known and effective OCR-library is Tesseract, an optical character recognition engine with open-source code. OCR searches for text and recognises it on photos using artificial intelligence.Finding templates in pixels, letters, words, and phrases is done using tesseract.

PyCharm:Python programming is done using the integrated development environment (IDE) PyCharm. It offers sophisticated coding capabilities including code completion, debugging, and testing tools in order to aid developers in becoming more effective and productive. The web development frameworks Django, Flask, and Pyramid, as well as the scientific computing libraries NumPy and Pandas, are all supported by PyCharm. PyCharm is a well-liked option among Python developers because of its intuitive user interface, thorough documentation, and support for plugins.

Haar Cascade:Haar Cascade classifiers are an efficient method of detecting objects. Haar Cascade is a machine learning-based strategy in which the classifier is trained using a large number of positive and negative pictures[10].

GTTS:With Google Translate's text-to-speech API, gTTS (Google Text-to-Speech) uses a Python library and CLI. Streams spoken mp3 data to stdout, a file, a file-like object (byte string), or a file. Pre-processing and tokenizing are both flexible.

Object detection: A computer vision-based visual system for blind individuals that locates occurrences of objects in imagery and vids.

Distance measurement: The distance between the source camera and the identified objects is the focus of distance measurement.Among the recognised things, the one closest to the camera will be transmitted to blind persons via external speakers.

Text extraction: An image is processed and segmented in order to recognise the characters in it. After joining the individual characters to create words, the text files are stored. A voice rendering of this text file has been done.

Text to speech: Text-to-speech technology analyses English alphabets and numbers seen in photographs and translates them into sounds using optical character recognition (OCR) technology.

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VII.OUTPUT SCREENS

Object Detection:

Dataset:COCO – Common Objects in Context.

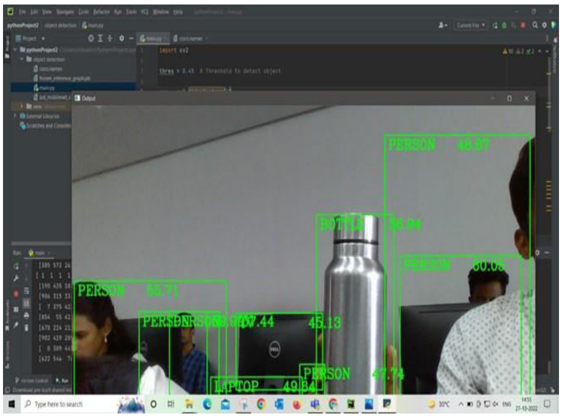

Fig .2 Working screen of object detection

Distance measurement:

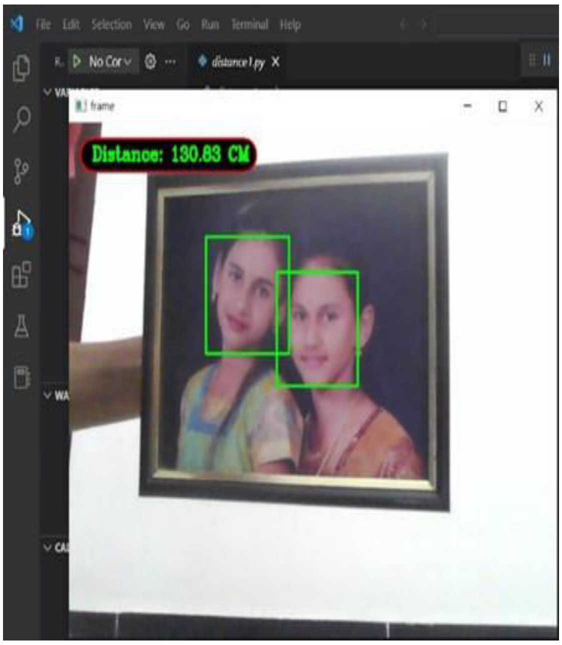

Fig .3 Working screen of distance measurement

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Text Extraction:

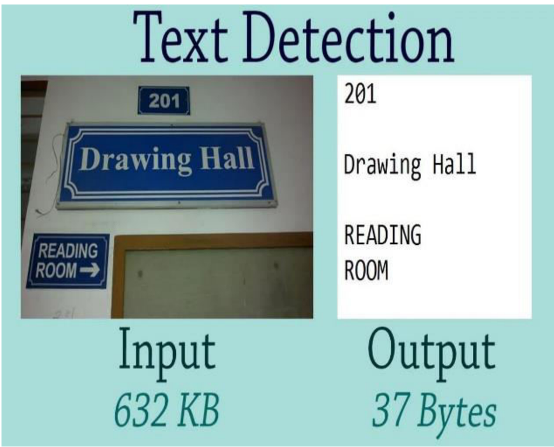

Fig .4 Working screen of text extraction

Text-to-Speech conversion:

Fig .5 screen of Text to speech conversion

VIII.RESULT

Based on the technological breakthrough, the navigation systems for blind or visually impaired people are categorised in this literature review, giving a general idea of the state of the art. In the review, some fascinating findings are given. To help the blind in their navigation, several different methods have been offered throughout the years. The lack of flexible multi-feedback options, lack of mobility and comfort, time required for users to learn and acclimatise to the new system, etc. were some of the disadvantages that many of them faced. The systems that have been shown up until this point have not attracted much attention from their intended users, maybe as a result of these shortcomings.

In this work, recommendations are provided in light of Comparable systems can be created in the future by analysing the issues with the ones we now have.

It is challenging to conduct research on designing navigation assistive technology for people with visual impairments since there are occasions when humanitarian concerns must also be taken into account[5]. In addition, we suggest that future navigation systems should take use of technological improvements if they are to create a navigation system that is accessible to everybody. The systems analysis and recommendations presented in this work, in our opinion, might be used as a springboard for further research in the area.

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IX.FUTURE SCOPE

Future study and investigation are expected to lead to the further development and increased use of more picture segmentation techniques. The development of a speech-based interface with queries and messages to replace the temporary one based on different beeps, as well as increasing the number of landmarks in the database to allow for a more dense coverage of all spaces, improving the detection of doors and stairs, particularly at oblique viewing angles, and allowing the user to restrict the pointing angles of the camera to 45° from the front.

Make camera improvements to catch moving things. Future work will concentrate on adding additional objects to the collection, which can improve the dataset's effectiveness for helping persons with visual impairments. In order to provide the blind with a greater variety of assistance, more sensors will be connected to it to detect things like downstairs and other trajectories[6]. The effectiveness of the created system may be increased by utilising efficient algorithms, a wider variety of sensors, and features[7]

X.CONCLUSION

It must have been suggested to use a single picture to assess depth without using any human input, and its potential to assist the blind was investigated. Without user intervention, the obstacles in the background surroundings ahead of the users are distinguished from the foreground and their depths are computed. Barriers that are split in accordance with a specific depth hypothesis determined by the disappearing point's axis. This strategy supplied geographical information regarding the relative size and location of the obstacles rather than just depending on the user 's preference of barriers[3].

The ability to assist the blind also does not necessitate any prior understanding from the user or the surroundings, like the user's height. The recommended approach does not employ any form of learning that is independent of its environment and thus independent of its surroundings. Therefore, it may be used in both knowing and unknowable circumstances.

Furthermore, it is demonstrated that the offered system is appropriate for real-time applications because it does not need US sensors. Even while the variation of the depth data within the same obstacle may be retrieved, the suggested approach could not be able to capture the depth discontinuity between both the potential adjacent sub segments in the same obstacle touching each other.

Consequently, graph-based categorization might well be employed to separate the sub segments contained inside a particular barrier.

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