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A REVIEW ON OBJECT DETECTION FOR BLIND USING MACHINE LEARNING

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ABSTRACT

Object recognition is a modern computing technology related to image processing, deep learning, and computer vision for recognizing objects present in image files. All technologies used in object detection engineering are concerned with detecting instances of objects in images or videos. The application system presented here helps visually impaired people to recognize surrounding objects and navigate safely without colliding with objects on their Android-based mobile phones or PCs. Objects are detected based on real-time video recorded by the mobile phone's camera. I am using OpenCV, YOLO and DNN to recognize people and things from this video. If a person is detected, the system identifies that person. Object detection uses Open CV for image processing, video capture, and analysis, including features such as face detection and object detection.

Keywords: Object Detection, Image Recognition, Machine Learning, Pattern Analysis.

I. INTRODUCTION

Computer vision is the process of making it possible to understand images and videos, how they are stored, and how to manipulate and retrieve data from them. OpenCV is a huge open-source computer vision, machine learning, and image processing library that plays a key role in the real-time operations so critical in today's systems. With it, you can process images and videos to identify objects, faces, or someone's handwriting. Specifically, object detection draws a bounding box around these detected objects, allowing us to identify where they are in a given scene. But this project also allows you to hear the name of the detected object. This makes it easier for blind people to move from one place to another. Libraries used by Open CV for image processing, video capture, and analysis, including features such as face detection and object detection. Computer vision is the process of understanding images, how they are stored, and how to manipulate and retrieve data from them. Open CV is a huge open source library for computer vision, machine learning, and image processing that plays a key role in the real-time operations that are so critical in today's systems.

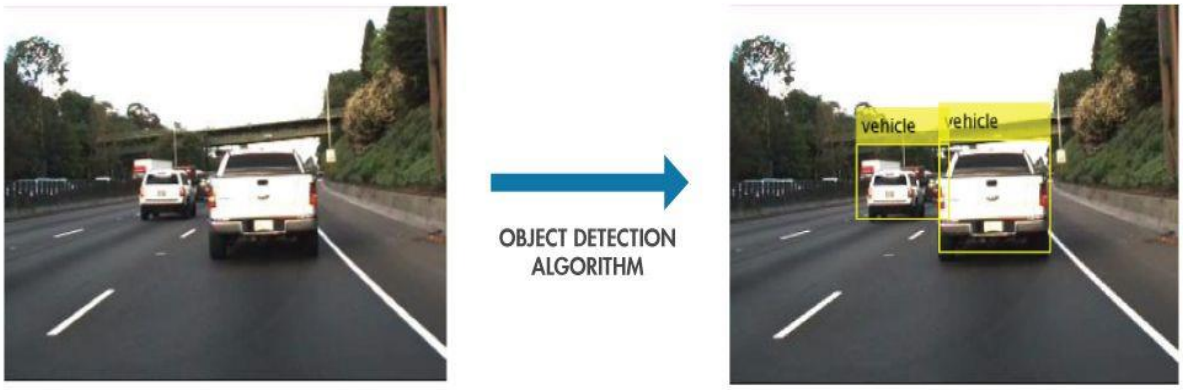

Figure 1: Object Detection

II. LITERATURE REVIEW

[1] Object detection systems have traditional approaches, usually based on video sequences. Our literature review focuses on research papers on object detection published in Elsevier. Springer, ACM Digital Library, IEEE Digital Library, and others.

[2] Object recognition, as proposed by Bumika, Gupta (2017) et al., is a well-known computing technology related to computer vision and image processing, and is used to recognize specific classes (humans, flowers, animals, etc.) in digital images and videos. It focuses on recognizing objects or their instances. There are several well-studied applications of object recognition, such as facial recognition, character recognition, and vehicle computers. Object detection can be used for a variety of purposes, including searching and monitoring. This study introduces some basic concepts used in object detection using the Python 2.7 OpenCV library to improve the efficiency and accuracy of object detection.

[3] In (2017) by Kartik Umesh Sharma et al. We proposed an object recognition system that recognizes real objects present in digital images and videos. Objects can belong to any class of objects, including: B. People, cars, etc. To detect objects in images or videos, a system needs several components to perform the task of object detection. These are the model database, feature detector, hypothesis, and verifier. This white paper provides an overview of various techniques used for object detection, object localization, object classification, feature extraction, image and video representation information, and more. Comments are made based on the reviewed literature and important issues related to object detection are also identified. Source code and online dataset information are provided to support new researchers in the object detection field. Ideas for possible solutions for multiclass object recognition are also presented. This paper is suitable for researchers new to the field.

[4] Mukesh Tiwari (2017) Object detection and tracking due to regular motion changes of other objects, scene size changes, occlusions, appearance changes, and ego movements and lighting changes is one of the key areas of research. presented as one. In particular, feature selection plays an important role in object tracking. This is relevant for many real-time applications such as vehicle recognition and video surveillance. To solve the problem of detection, tracking refers to the movement and appearance of objects. Most of the algorithms focus on tracking algorithms for smoothing video sequences. On the other hand, very few methods use previously available information about an object's shape, color, texture, etc. In this work, we discuss and analyze a tracking algorithm that combines the above parameters of objects. The purpose of this white paper is to analyze and review previous approaches to object tracking and detection using video sequences at various stages. We also identify gaps and propose a new approach to improve object tracking in video frames.

[5] As Proposed by Aishwarya Sarkale (2018). This suggests that humans have an excellent ability to visually identify objects. But for machines, object recognition becomes a problem. This is how neural networks were introduced to computer science. Neural networks are also called “artificial neural networks”. Artificial neural networks are computer models of the brain that help us recognize and identify objects. This white paper describes and demonstrates various types of neural networks such as ANN, KNN, FASTER R-CNN, 3D-CNN, RNN and their accuracy. From studies in various research papers, the accuracies of different neural networks have been discussed and compared, and we can conclude that ANN provides the best accuracy for object detection in certain test cases.

[6] Gitapriya. S (2019) et al. The proposed goal is to detect objects using a You Only Look Once (YOLO) approach. This method has several advantages over other object detection algorithms. In other algorithms such as Convolutional Neural Networks, Fast Convolutional Neural Networks, the algorithms do not explore the image completely, but in YOLO, by predicting bounding boxes using convolutional networks and the class probabilities of these boxes, the algorithm examines the image completely. Recognize images faster compared to other algorithms.

[7] R Sujeetha (2020) The proposed object detection and tracking could become a huge and active field of computer vision, if not definitive and prevalent. Due to its enormous use in government surveillance, security tracking modules, and many other applications, researchers have developed many streamlined and specialized methods. However, real-time object detection and tracking implementations has a problem. Real-time tracking, providing well-optimized results, detecting efficient performance of time elements through dynamic computation, or tracking multiple objects complicates this task. Several techniques have been developed, but there is still room for improvement. In this method, we use the TensorFlow and OpenCV libraries and the CNN algorithm to label the detected layers and ensure their accuracy can be detected and simulated in real-time by additional external hardware. Finally, we see well-optimized and efficient algorithms for object tracking and detection.

III. CONCLUSION

The machine learning-based Blindenhilfe project as an object recognition system is a very useful product for blind people. The system is developed from a web camera, ultrasonic sensors, servo motors, a headset with a microphone, and the control core runs on a Raspberry Pi. All components worked fine and the sensers provided accurate data. A project can identify the objects that users need. The user requests the desired object and when the desired object is available in the camera area, the user gets information about the object to the right, left, up or down. The user also receives information about the location of the required object. This is an economical and efficient device for the visually impaired. I applied the algorithm to a number of images and found that the conversion performed successfully. It is a compact and useful device for society. So this can ultimately increase the user's confidence level and put them at ease. Now the system recognizes only 91 categories of objects. It was easy to get the system to recognize more objects. This is one of the most important updates you can make to your system.

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