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Detection of Bottle Can Coca Cola and Pepsi Image Processing Techniques

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ABSTRACT*:* Due to object detection's close relationship with video analysis and image understanding, it has attracted much research attention in recent years. Traditional object detection methods are built on handcrafted features and shallow trainable architectures. Their performance easily stagnates by constructing complex ensembles which combine multiple low-level image features with high-level context from object detectors and scene classifiers. With the rapid development in deep learning, more powerful tools, which are able to learn semantic, high-level, deeper features, are introduced to address the problems existing in traditional architectures. These models behave differently in network architecture, training strategy and optimization function, etc. In this paper, we provide a review on python-based object detection frameworks. We focus on typical generic object detection architectures along with some modifications and useful tricks to improve detection performance further. As distinct specific detection tasks exhibit different characteristics, we also briefly survey several specific tasks, including salient object detection, face detection and pedestrian detection. Experimental analyses are also provided to compare various methods and draw some meaningful conclusions. Finally, several promising directions and tasks are provided to serve as guidelines for future work in both object detection and relevant neural network-based learning systems.

KEYWORDS: Object, Detection, Python OpenCV

I. INTRODUCTION

Coca-Cola and Pepsi bottle cans are detected in this project utilizing RGB and Grayscale approach and programming, which is based on the image detection using Python and OpenCV. This study improves the effectiveness and accuracy of object recognition by presenting numerous fundamental ideas utilized in object detection with the help of the Python 2.7 OpenCV package. We also provide a brief overview of several specific tasks, such as salient item detection, face detection, and pedestrian detection, as different specific detection tasks exhibit different characteristics.
Additionally, experimental studies are offered to contrast different approaches and reach some insightful results.

II. LITERATURE SURVEY

In 2007, et al. invented object detection, a well-known computer technology related to computer vision and image processing that focuses on identifying items or instances of those objects in digital photos and videos that belong to a particular class (such as people, flowers, and animals). Face detection, character recognition, and vehicle estimator are just a few of the well-researched object detection applications. There are several uses for object detection, including retrieval and surveillance. This study improves the effectiveness and accuracy of object recognition by presenting numerous fundamental ideas utilised in object detection with the help of the Python 2.7 OpenCV package.
An object detection system was proposed by Kartik Umesh Sharma (2017) et al. to identify real-world things that are present in digital images or a video, where the object can come from any category of objects, such as people, cars, etc. A model database, a feature detector, a hypothesis, and a hypothesis verifier are the four components that the system must have in order to successfully detect an item in an image or video. The numerous methods for object detection, localization, classification, feature extraction, appearance information extraction, and many other tasks in photos and videos are reviewed in this study. The conclusions are formed from the literature that has been researched, and significant concerns that are pertinent to object detection are also identified. The source codes and online datasets are described in the offered information. facilitate the new researcher in object detection area. A concept for a potential remedy for the multiclass object detection is also offered. For researchers who are new to this field, this publication is appropriate. A crucial topic of research, according to Mukesh Tiwari (2017) et al., is object detection and tracking due to routine changes in object motion and fluctuations in scene size, occlusions, appearance variations, and ego-motion and illumination changes. The crucial role in object tracking is feature selection, namely.

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It relates to numerous real-time applications, including video surveillance and vehicle perception. Tracking that is concerned with object movement and appearance can help to solve the detection problem.

The algorithm's main objective is the tracking algorithm to smudge the video sequence. On the other hand, very few techniques make advantage of the previously accessible data regarding item shape, color, texture, and so forth. In this study, a tracking method that incorporates the object properties mentioned above is discussed and examined. The aim of this work is to evaluate and analyze the existing methods for object tracking and detection in video sequences over various stages. Additionally, note the gap and provide a fresh strategy to enhance the tracking of objects throughout video frames. According to Aishwarya Sar Kale (2018) and colleagues, humans are very good at differentiating items through eyesight. However, object detection is a problem for machines. The area of computer science has now been brought to neural networks. the neural networks artificial neural networks, also known as. Artificial neural networks are computer representations of the brain that aid in the identification and detection of objects. This study describes and illustrates the accuracy of many neural network types, including ANN, KNN, FASTER R-CNN, 3D-CNN, and RNN. The accuracy of various Neural Networks is examined and compared through the analysis of numerous research articles, and it can be said that in the test cases provided, the ANN provides the highest accuracy for object detection.

Karanbir Chahal (2018) and coworkers suggested Object detection involves locating and classifying an object in an image as well as identifying it. It is a vital part of vision-based software systems and has numerous uses. This essay aims to conduct a rigorous survey of modern object detection algorithms that use deep learning. As part of the survey, the topics explored include various algorithms, quality metrics, speed/size tradeoffs and training methodologies. This paper focuses on the two types of object detection algorithms- the SSD class of single step detectors and the Faster R-CNN class of two step detectors.

Techniques to construct detectors that are portable and fast on low powered devices are also addressed by exploring new light weight convolutional base architectures. Ultimately, a rigorous review of the strengths and weaknesses of each detector leads us to the present state of the art.

Richard Socher (2018) et al. proposed recent advances in 3D sensing technologies make it possible to easily record color and depth images which together can improve object recognition. Most current methods rely on very well-designed features for this new 3D modality. We introduce a model based on a combination of convolutional and recursive neural networks (CNN and RNN) for learning features and classifying RGB-D images. The CNN layer learns low-level translationally invariant features which are then given as inputs to multiple, fixed-tree RNNs in order to compose higher order features. RNN scan be seen as combining convolution and pooling into one efficient, hierarchical operation. Our main result is that even RNNs with random weights compose powerful features. Our model obtains state of the art performance on a standard RGB-D object data set while being more accurate and faster during training and testing than comparable architectures such as two-layer CNNs.

Yordanka Karayaneva (2018) et al. presented schools in many parts of the world use robots as social peers in order to interact with children and young students for a rich experience. Such use has shown significant

enhancement of children's learning. This project uses the humanoid robot NAO which provides object recognition of colors, shapes, typed words, and handwritten digits and operators. The recognition of typed words

provides performance of the corresponding movements in the sign language. Five classifiers including neural networks are used for the handwritten recognition of digits and operators. The accuracy of the object recognition algorithms is within the range of 82%-92% when tested on images captured by the robot including the movements which represent words in the sign language. The five classifiers for handwritten recognition produce highly accurate results which are within the range of 87%-98%.

This project will serve as a promising provision for an affective touch for children and young students.

Abdul Muhsin M (2019) et al. proposed everybody deserve to live independently, especially those who disabled, with the last decades, technology gives attention to disabled to make them control their life as possible. In this work, assistive system for blind is suggested, to let him knows what is around him, by using YOLO for detecting objects within images and video streams quickly based on deep neural network to make accurate detection, and OpenCV under Python using Raspberry Pi3. The obtained results indicated the success of the proposed model in giving blind users the capability to move around in unfamiliar indoor-outdoor environment, through a user-friendly device by person and object identification model.

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Geethapriya. S (2019) et al. proposed the Objective is to detect of objects using You Only Look Once (YOLO) approach. This method has several advantages as compared to other object detection algorithms. In other algorithms like Convolutional Neural Network, Fast Convolutional Neural Network the algorithm will not look at the image completely but in YOLO the algorithm looks the image completely by predicting the bounding boxes using convolutional network and the class probabilities for these boxes and detects the image faster as compared to other algorithms.

R. Sujeetha (2019) et al. proposed object detection and tracking could be a immense, vivacious however inconclusive and trending area of computer vision. Due to its immense use in official surveillances, tracking modules applied in security and lots of other's applications have made researchers to devise a lot of optimized and specialized methods. However, problems are faced in implementing object detection and tracking in real-time; like tracking in real time and giving appropriate optimized results, over dynamic computation to find the efficient performance with respect to time factor, or multiple objects tracking create this task more difficult. Though, several techniques are devised but still lies a lot of scope of improvement, however during this literature review we've seen some illustrious and multiple ways of object detection and tracking. In this method we will be using Tensor Flow and Open CV library and CNN algorithm will be used and we will be labelling the detected layers with accuracy being checked at the same time. For validation purpose live input video will be taken for the same where objects will be getting detected and it can be simulated same for real-time through external hardware added. In the end we see the proper optimized and efficient algorithm for object tracking and detection.

III. PROBLEM STATEMENT

The object detection can detect objects in image at one time this program can detect two objects in image using OpenCV programs and methodology

IV. PROPOSED METHODOLOGY

The model that is proposed by us to detect and classify the infected plant leaves consists of 5 phases. Those phases are: -

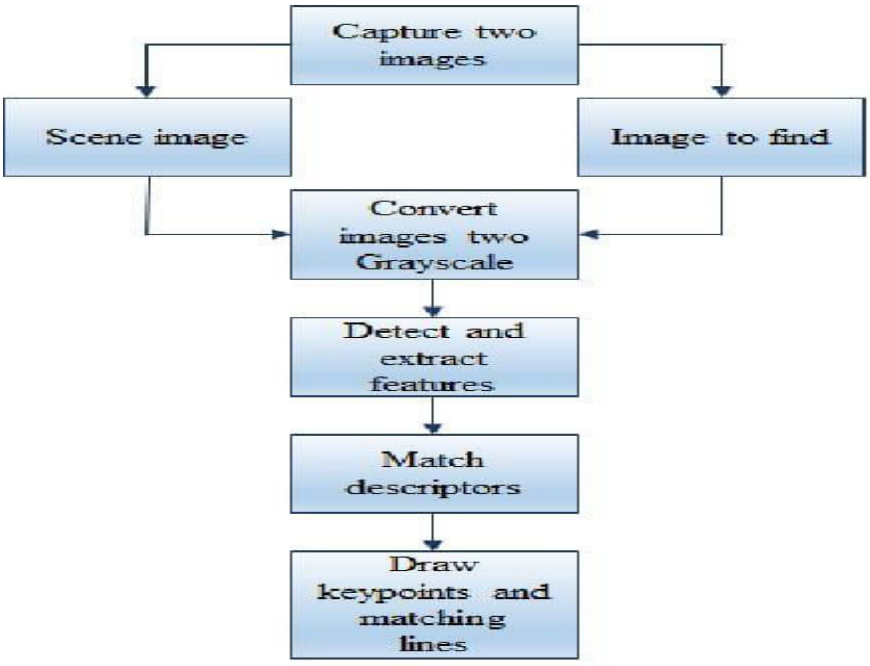

Fig. 3. Detailed description of the SURF algorithm.

Fig. 1 Workflow Diagram of Proposed Methodology

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capturing two images:

1. It will capture 2 image / object in images saved in folder.
2. image and to find means: it will find objects in images
3. Convert images in two Grayscales: it will convert image in grayscale
4. Detect and Extract Features: it will detect the object in RGB.
5. Match Descriptions: it will match color of object in RGB and Grayscale.
6. Draw Key points and Matching lines: It will match the object in Grayscale and detect object using lines

V. RESULT

As a result, the coca cola and Pepsi can will be detected, Using the RGB and Grayscales methodology of OpenCV

CLASSIFIER	ACCURACY (%)
Logistic Regression	66.4
KNN	54.5
SVM	53.4
CNN	98.0

VI. FUTURE ENHANCEMENT

Traditional object detection methods are built on handcrafted features and shallow trainable architectures. Their performance easily stagnates by constructing complex ensembles which combine multiple low-level image features with high-level context from object detectors and scene classifiers.

VII. CONCLUSION

Due to its powerful learning ability and advantages in dealing with occlusion, scale transformation and background switches, deep learning-based object detection has been a research hotspot in recent years. This paper provides a detailed review on deep learning-based object detection frameworks which handle different sub-problems, such as occlusion, clutter, and low resolution, with different degrees of modifications on R-CNN. The review starts on generic object detection pipelines which provide base architectures for other related tasks. Then, three other common tasks, namely salient object detection, face detection and pedestrian detection, are also briefly reviewed. Finally, we propose several promising future directions to gain a thorough understanding of the object detection landscape. This review is also meaningful for the developments in neural networks and related learning systems, which provides valuable insights and guidelines for future progress.

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