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Object Tracking Using Deep Learning

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ABSTRACT: In this project using python and OPENCV module we are detecting objects from videos and webcam. This application consists of two parts such as Browse System Videos and Image.
Browse System Videos: Using this module application allow user to upload any video from his system and application will connect to that video and start playing it, while playing if application detect any object then it will mark that object with bounding boxes.
Browse System Image: Using this module application connect itself with inbuilt system and start video uploading the image, while streaming if application detect any object then it will surround that object with bounding boxes.

KEYWORDS: OpenCV, Deep Learning, YOLOV3, Object Detection.

I.INTRODUCTION

Humans glance at an image and instantly know what are objects are in the image, where there are and how they interact. The human visual system is fast and accurate, allowing us to perform complex tasks like driving with little conscious thought. Fast , accurate algorithms for object detection would allow computers to drive cars without specialized sensors, enable assistive devices to convey real time scene information to human users and unlock the professional for general purpose, responsive robotic systems.

Current detection systems repurpose classifiers to perform detection. To detect an object these systems take a classifier for that object and evaluate it at various locations and scales in a test image. Systems like Deformable Parts Model (DPM) use a sliding window approach where a classifier is run at evenly spaced locations over the entire image methods to first generate potential bounding boxes in the image and then run a classifier on these proposed boxes.

After classification post-processing is used to refine the bounding boxes, eliminate duplicate detections, and rescore the boxes based on other objects in the scene. These complex pipelines are slow and hard to optimize because each individual component must be trained separately.

II.RELATED WORK

A single convolution network simultaneously predicts multiple bounding boxes and class coordinates and class probabilities. Using our system you only look once (yolo) at an image information about classes as well as their appearance. Fast CNN, a top detection method makes less than half the number of background errors. This unified model has several benefits over traditional methods of object detection.

We reframe object detection as a single regression problem, straight from image pixels to bounding box coordinates and class probabilities.

In the existing system we have some limitations. They are:

1. Single Regression Problem
2. Low Performance
3. Background Errors

III.PROPOSED ALGORITHM

We are detecting objects from images and videos. Yolov3 is a famous object detection algorithm developed by Washington University, this algorithm generates yolov3 weight model using Python Deep Learning Algorithm CNN

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(Convolution Neural Networks). This algorithm is pre-trained with all the images and assign unique class name to each image and then generate a model.

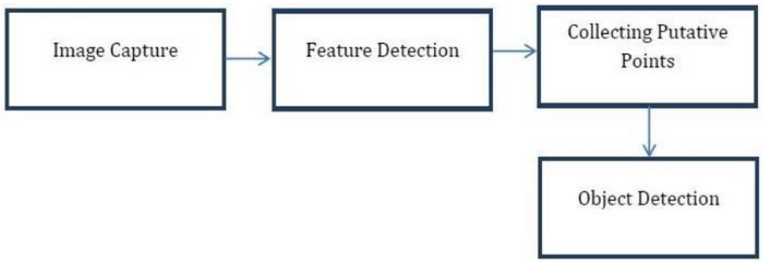
This algorithm converts each image into layers and then for each layer extract features and add weight to the model. Due to all possible images from single image, another image with some related features can also be predicted. Detect object without any pre-trained model is highly impossible as all Deep Learning CNN networks works by using pre-trained models only. Yolov3 trains on full images and directly optimizes detection performance.

This unified model has several benefits over traditional methods of object detection. Yolov3 sees the entire image during training and test time so it implicitly encodes contextual information about classes and their appearance.

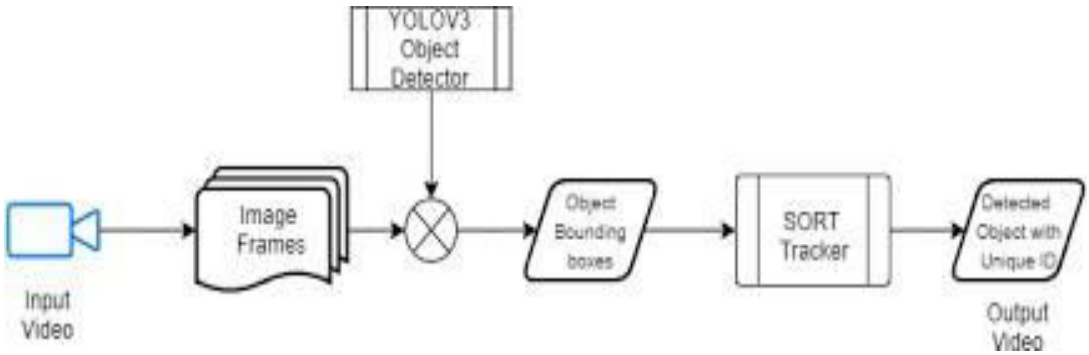
In the proposed system we have some advantages. They are:

1. Reduced Background Errors
2. High Performance
3. Faster Version

IV. PSEUDO CODE



The steps involved in an Open CV-based image detection application:
1. Upload any image from the system.
2. Apply Feature Detection technique to detect the features with unique class id.
3. Then collect the putative points based on these features.
4. By using object detection, the object is tracked and marked with bounding boxes.



The steps involved in an Open CV-based object detection application:

1.Upload any video from the system.
2. The video is divided into frames and by using the Yolov3 object detector, the object is detected and marked with bounding boxes.
3. After object detection the sort tracker is used and is presented with unique id in the output.

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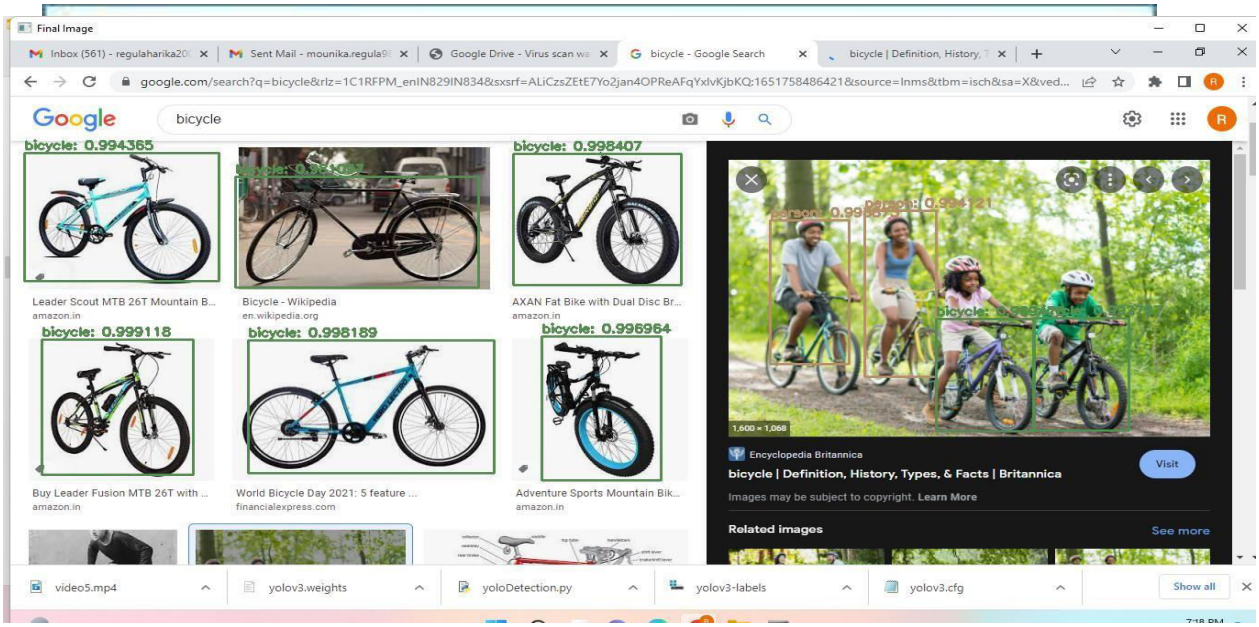
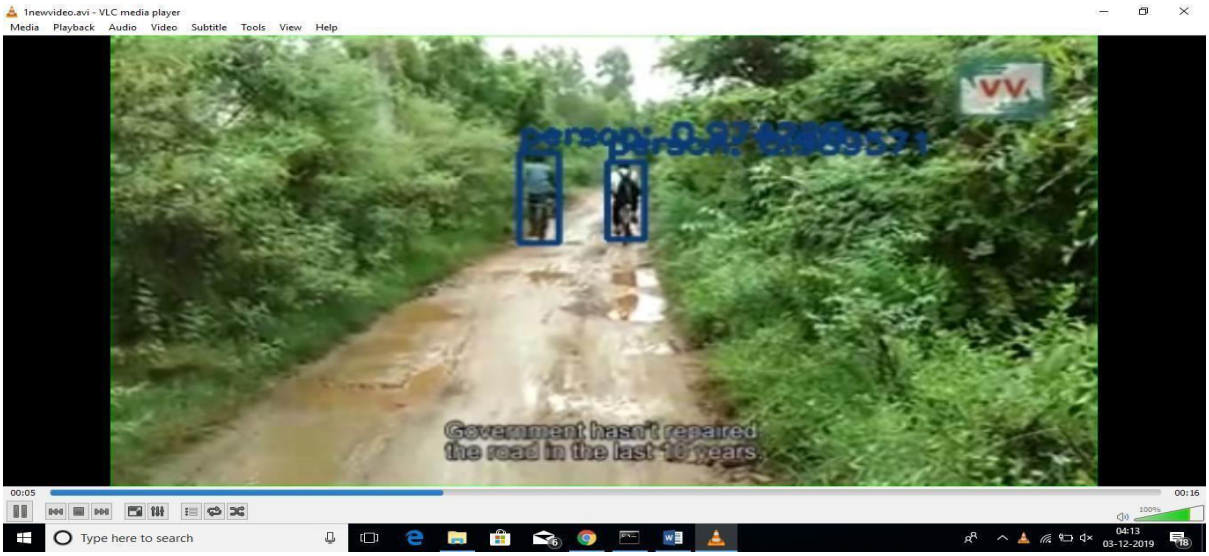
V.SIMULATION RESULTS

System testing is an investigation conducted to provide stakeholders with information about the quality of the software product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation.
Test techniques include the process of executing a program or application with the intent of finding failures, and verifying that the software product is fit for use.

TEST CASES





VI.CONCLUSION AND FUTURE WORK

We introduce YOLOV3, a unified model for object detection. Our model is simple to construct and can be trained directly on full images. Unlike classifier-based approaches, YOLOV3 is trained on a loss function that directly corresponds to detection performance and the entire model is trained jointly.

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Fast YOLOV3 is the fastest general-purpose object detector in the literature and YOLOV3 pushes the state of the art in real time object detection. YOLOV3 also generalizes well to new domains making it ideal for applications that rely on fast, robust object detection.

We can add additional features like identifying details about the identified related objects which is represented in bounded box. Fast YOLOV3 is the fastest general-purpose object detector in the literature and YOLOV3 pushes the state of the art in real time object detection. YOLOV3 also generalizes well to new domains making it ideal for applications that rely on fast, robust object detection.

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