GALGOTIAS UNIVERSITY
(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

IMAGE DETECTION AND BOUNDING LABEL USING YOLO, OPENCV

A Report for the Evolution 3 of Project 1

Submitted by
AJAY DUBEY
(1713104066/17SCSE104068)

In partial fulfilment for the award of the degree
Of

BACHELOR OF COMPUTER APPLICATION
IN
COMPUTER SCIENCE AND ENGINEERING

SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

Under the Supervision of
Ms. DEEPIKA SHERAWAT, Assistant Professor

APRIL/MAY-2020

GALGOTIAS UNIVERSITY

SCHOOL OF COMPUTING AND SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

Certified that this project report "**IMAGE DETECTION AND BOUNDING LABEL USING YOLO, OPENCV**" is the bonafide work of "**AJAY DUBEY (1713104066)**" who carried out the project work under my supervision.

SIGNATURE OF HEAD
Dr. Munish Sabharwal,
Professor & Dean,
School of Computing Science & Engineering

SIGNATURE OF SUPERVISOR
Ms. DEEPIKA SHERAWAT,
Assistant Professor,
School of Computing Science & Engineering

Abstract

In this project we are going to explore the Object Detection in an image with the help of the Model YOU ONLY LOOKS ONCE (version3). You only look once (YOLO) is a state-of-the-art, object detection. While this model is not so fast but it’s prior is to maintain better result. Detection of the image is done and it’s framed with label name of the object. One of the foremost common Al techniques used for processing big data is machine learning, a self-adaptive algorithm that gets increasingly better analysis and patterns with experience or with newly added data. One naive idea might be to use a CNN to several different crops of the image, CNN classifies each crop as object class or background class.this can be intractable. There might be plenty of such crops that you simply can create. YOLO itself has many model supported system it’s processing on. It uses Opencv, Python and its multiple library to perform search. YOLOV3 predicts boxes at 3 different scales. YOLOV3 may be a good detector. Its fast, it's accurate. It's not as great on the COCO average AP between 5 and .95 IOU metric.

Keywords: Deep learning, YOLO,Python, Tensroflow,Machine Learnig ;

TABLE OF CONTENTS

1. INTRODUCTION

Deep learning is a synthetic intelligence function that imitates the workings of the human brain in processing data and creating patterns to be used in deciding. Deep learning could be a subset of machine learning in Al (AI) that has networks capable of learning unsupervised from data that's unstructured or unlabelled. Also referred to as deep neural learning or deep neural network.

Let's look the YOLO (You Only Look Once) real-time object detection algorithm, which is one in every of the foremost effective object detection algorithms that also encompasses many of the foremost innovative ideas taking off of the pc vision research community. Object detection could be a critical capability of autonomous vehicle technology. It's a district of computer vision that's exploding and dealing such a lot better than simply some years ago.

Some remarkable identity said “Humanity is on the verge of digital slavery at the hands of AI and biometric technologies. One way to prevent that is to develop inbuilt modules of deep feelings of love and compassion in the learning algorithms.”

— Amit Ray, Compassionate Artificial Superintelligence AI 5.0 - AI with Block chain, BMI, Drone, IOT, and Biometric Technologies

2. LITERATURE REVIEW

One of the foremost common Al techniques used for processing big data is machine learning, a self-adaptive algorithm that gets increasingly better analysis and patterns with experience or with newly added data.

YOLO came on the pc vision scene with the seminal 2015 paper by Joseph Redmon et al. "You Only Look Once: Unified, Real Time Object Detection, and immediately got plenty of attention by fellow computer vision researchers. Compared to state-of-the-art detection systems, Compared to state-of the-art detection systems, YOLO makes more localization errors but is much less likely to predict false detections where nothing exists.

Object detection may be a computer vision technique for locating instances of objects in images or videos Object detection algorithms typically leverage machine learning or deep learning to provide meaningful results. When humans have a look at images or video, we will recognize and locate objects of interest within a matter of moments. The goal of object detection is to duplicate this intelligence employing a computer In our context of object detection we are visiting use Pre-train model from tensor flow that are visiting help to detect and determine the item with casually labelling it with what category it belongs. While the model are retrain the algorithm that are we visiting use is Darknet YOLO that was created by Joseph Redmon and Ali Farhadi. To be accurate to their algorithm utilized in the mode are the image of the tensor flow.

3. IMPLEMENTATION

Over two different machine the necessities was different to figure on the project thanks to this the project had different outcome in both of the cases. Algorithm were differ and data process was same yet different success rate. The accommodate YOLO is pretty simple. It went on the higher cases against R CNN and CNN model. In traditional computer vision approaches, a window was accustomed search for objects at different locations and scales. Because this was such an upscale operation, the ratio of the thing was usually assumed to be fixed. YOLO on the opposite hand approaches the thing detection problem in an exceedingly completely different way. It forwards the entire image just one occasion through the network. SSD is another object detection algorithm that forwards the image once through a deep learning network, but YOLOV3 is way faster than SSD while achieving very comparable accuracy.

How Does it work you ask?

First, it divides the image into a 13x13 grid of cells, the dimensions of those 169 cells vary betting on the dimensions of the input. For a 416x416 input size that we utilized in our experiments, the cell size was 32x32 Each cell is then chargeable for predicting variety of boxes within the image.

For each bounding box, the network also predicts the arrogance that the bounding box actually encloses an object, and therefore the probability of the enclosed object being a specific class.

Most of those bounding boxes are eliminated because their confidence is low or because they're enclosing the identical object as another bounding box with very high confidence score. This method is termed non-maximum suppression.

The authors of YOLOv3, Joseph Redmon and Ali Farhadi, have made YOLOv3 faster and more accurate than their previous work YOLOv2. YOLOv3 handles multiple scales better. They have also improved the network by making it bigger and taking it towards residual networks by adding shortcut connections.

***Tools:** Python and OpenCV

Here are a few reasons you may want to use

1. **Easy integration with an OpenCV application**: If your application already uses OpenCV and you simply want to use YOLOv3, you don’t have to worry about compiling and building the extra Darknet code.
2. **Python support**: Darknet is written in C, and it does not officially support Python. In contrast, OpenCV does. There are python ports available for Darknet though.

4. METHODOLOGY

While there are lot of model already skyrocketing in the market, this steady yet better working model have better approach and simplicity to it. The duration of analyzing the different model to seek the desire output in different model are different. As one model may fast but other develop models like YOLO are seemingly good and fast then other classifier based model.

The output are 85% accurate in some cases but its batter than previous based model. So the model may need to increase the data trained into it.

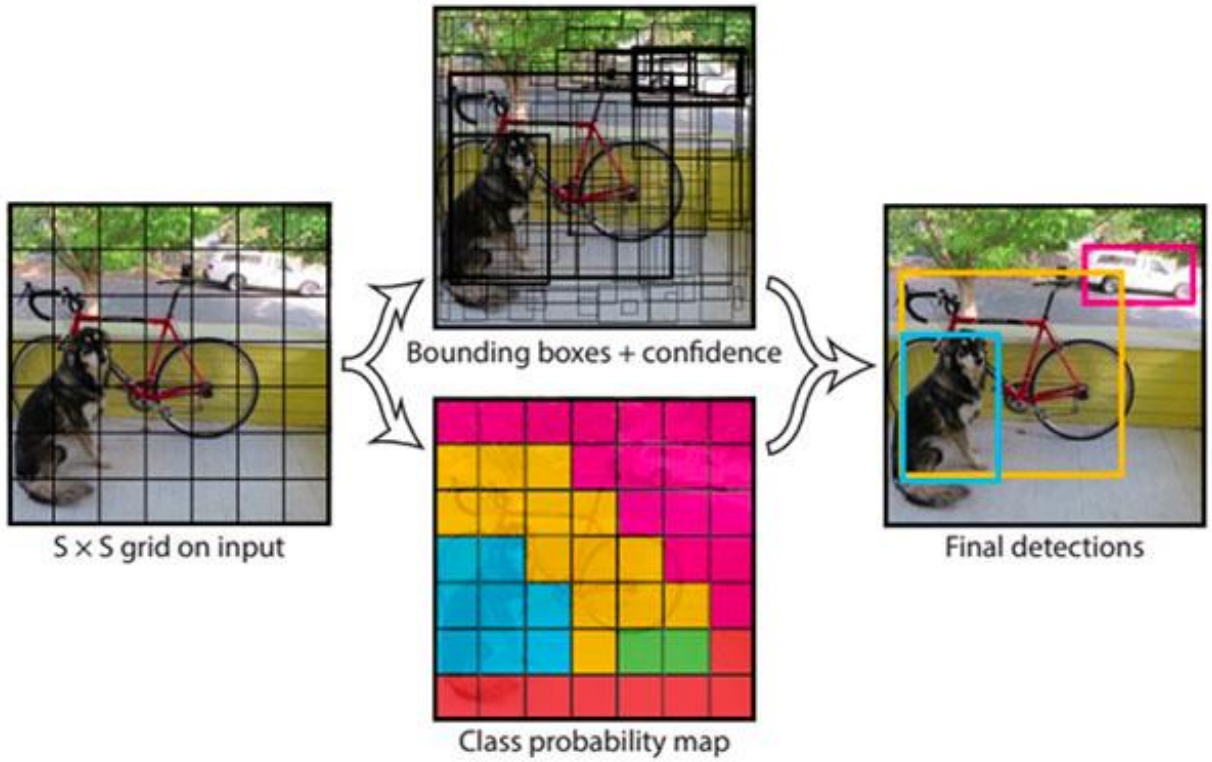


FIG.4.1:how data is scripted

5.OUTPUT/RESULTS:

So in our process of finding a better solution, we compared the output below:

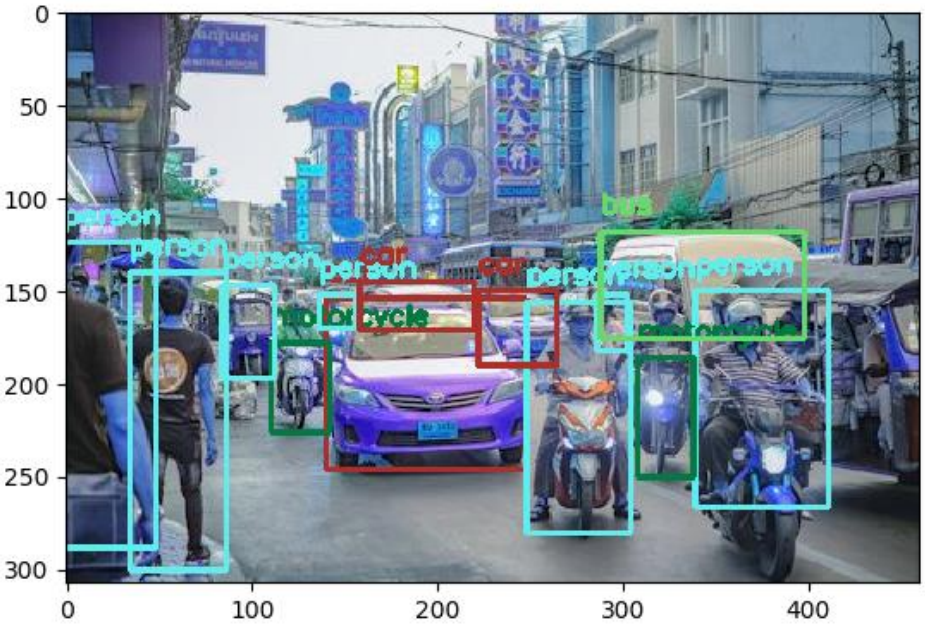


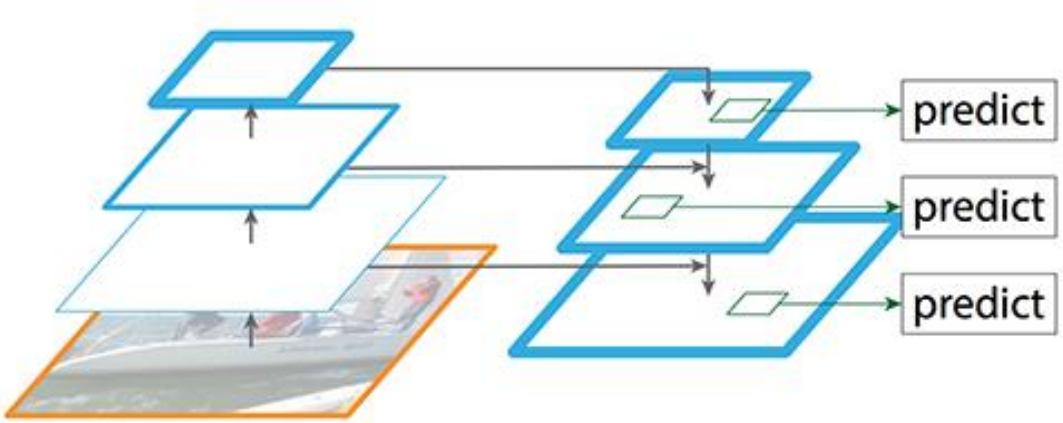
Fig:5:output

6.DISCUSSION

After going through a lot of model in past and testing and building those into an Object detection machine has gave a good idea on models use in object detection. Some basic support was driven by the site Dark net for understanding the YOLO system with the weight produced and data collected the project is success.

But meanwhile when the project was in development it was found that most of the resources were somehow connected to the model weight and openCV. A recent trail on the model shows the YOLOv3 weight that we use sometime gave bad results and were not according to the desire output.

The model detect better with any data given and proceeds with same accuracy that it promise. In case study of paper REMOTE sense similar data was taken into account for the work. Our Research shows good results comparatively.



7.CONCLUSION

The project went on the good hand and delivered successive output. May end up on a worse case scenario of updates given by change in code and execution, may end up god or bad for the system. While the product seems to be a good output vs a lack of time taken the model seems to be working well against other model.

Basically all object detection framework still struggle with small objects, especially those bunched along with partial occlusions. Real-time detection with top-level classification and localization accuracy remains challenging, and practitioners must often prioritize one or the opposite when making design decisions. Video tracking may even see improvements within the future if some continuity between frames is assumed instead of processing each frame individually. Furthermore, a noteworthy enhancement which will see more exploration would extend this two-dimensional bounding boxes into three-dimensional bounding cubes.

although many object detection obstacles have seen creative solutions, these additional considerations-and plenty more signal that object detection research is in no way done!

References

[1]] J. Kleban, X. Xie, W.-Y. Ma. “Spatial pyramid mining for logo detection in natural scenes.” IEEE International Conference, 2008. https://ieeexplore.ieee.org/document/4607625

[2] YOLOv3: An Incremental Improvement Joseph Redmon, Ali Farhadi

[3] pjreddie.com/yolo/darknet

[4] OPENCV https://www.pyimagesearch.com/2018/11/12/yolo-object-detection-with-opencv/

[5] G. Oliveira, X. Frazão, A. Pimentel, B. Ribeiro. “Automatic graphic logo detection via fastregion-basedconvolutionalnetworks.”IEEE,2016. https://arxiv.org/abs/1604.06083Amit Ray Research on AI nureal network

[6] DarknetYOLOv3Weights. https://pjreddie.com/darknet/yolo/