Grocery Product Detection

Problem Statement:

1. Given a grocery store shelf image, detect all products present in the shelf image (detection only at product or no-product level)

2. Accuracy of at least 0.8 the mAP on the test set. (More the better)

Approch to Solve the Problem:

Step 1: Data Preparation

- prepared the Grocery Dataset to train an object detection model to detect products from a store shelf image.

- Gather the datasource from the given links

- Understand the structure of the dataset and the annotations,

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     "C<c>_P<p>_N<n>_S<s>_<i>.JPG"

-
     where
        <c> := camera id (1: iPhone5S, 2: iPhone4, 3: Sony Cybershot, 4: Nikon Coolpix)
        <p> := planogram id
        <n> := the rank of the top shelf on the image according to the planogram
        <s> := number of shelves on the image
        <i> := copy number

Step 2: Organize the data into training and testing splits.

- Created two different dataframes from train and test sets.

- I have implemented functions to prepare pairs of images and corresponding annotation files (.txt) for object detection.

- Train images:

Step3: Building the Detection Model and Evaluation:

- I Have selected Pytourch as deep learning framework.

- YOLO v4 Implimentation:

YOLOv4 (You Only Look Once version 4) is an object detection algorithm that improves speed and accuracy. It's used in computer vision tasks to efficiently detect and classify objects within images or videos. YOLOv4 is known for its real-time processing capabilities, making it suitable for applications like surveillance, autonomous vehicles, and object recognition in various domains.

Image for Reference:

Accuracy of at least 0.8 the mAP

- We have used transfer learning for the object detection using scaled-Yolov4-P5. Considering compatibality and checking with image shapes, Yolov4-P5 is found suitable having image size 896. The model is pre-trained with Ms-coco dataset, was trained with the FMCG Grocery data for 110 epochs.
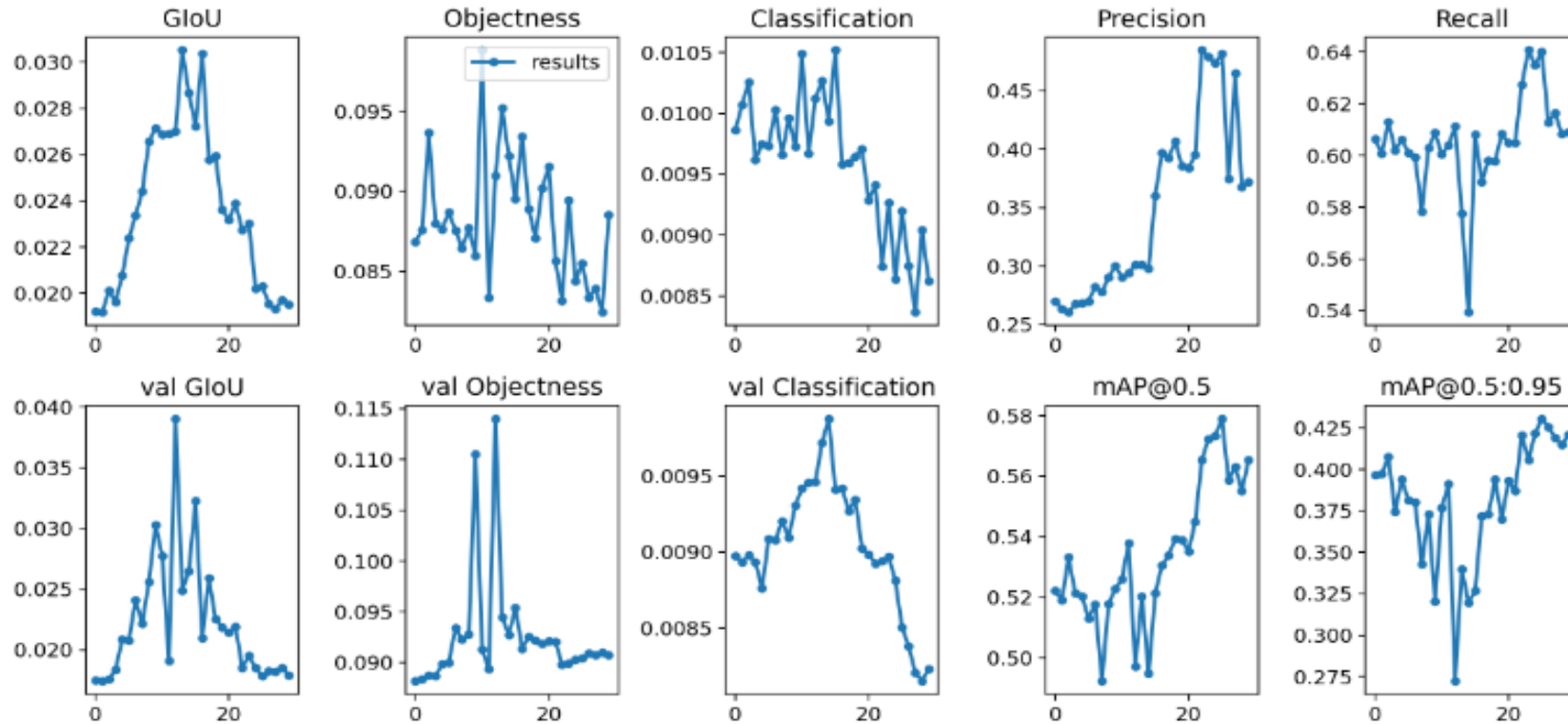
References:

- Evolution Of Object Detection Networks
- YOLOv4 PyTorch
- Scaled YOLOv4 - Pytorch
- YOLOv4-Large
- Complete IoU(CIOU) Loss Intuitive Explanation

Thank you for the Assignment, I learned a lots of things from it. I tried to get appropriate result but some error (like Model not found) might be impacted on assignment.