Computer Vision and Deep Learning course
Homework 2
Object detection on supervisely annotated dataset

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I. Introduction

The goal of the homework is to train yolov5 model and Faster R-CNN model on a self made dataset manually annotated using supervisely for the object detection task. Other important goal is to enjoy doing it.
All materials you can find in the GitHub repository [1].

II. Data description and annotation

The first thing to do in this homework is to pick 2 objects of my interest. I thought that it will be entertaining and challenging enough to have objects with similiar shape and looking familiar to each other.
I have ended up with idea from the childhood, when you thought pear-shape lamp was real pear sometime and just start to shine.
So, my objects are: pear and pear-shaped lamp light. I have picked 39 photos for each object from Unsplash [2].
There are some of them you can see on the Figure 1.
The annotated dataset itself you can download from Google Drive, this annotation in yoloV5 format.

To annotate the dataset, I have tried 2 marvelous tools: Supervisely and Roboflow. Probably there is enough for of these, but in sake of my curiosity, I annotated the images twice, for yoloV5 by Supervisely (by adding a bitmap for the object and after convert it to rectangle annotation), for yoloV4 and faster R-CNN by Roboflow (by adding rectangles).

III. Training the models

Due to quite intense studying workload has been recently, I have not implemented training algorithms purely by myself. Instead of this, I have followed the tutorials code. I have all references inside the notebooks, just to acknowledge that.
There are the Colab notebooks for yoloV4, yoloV5 and Faster R-CNN

I have played with the initial values of model hyperparameters and train for substational amount of time.

IV. Results

You can see the results on Figures 2, 3 and 4. As we can observe, the best result were obtained by yoloV5, it's accurate and mostly correct. Put more focus on that, I have track metrics for this model in order to understand how exact the yoloV5 model is.

Fig. 1. Examples of objects in the dataset

V. Conclusion

I really have been pleased by trying new tools for me, even with lack of time, it was really interesting to practice the task. Perhaps, the results are not detailed enough, but at least I'm

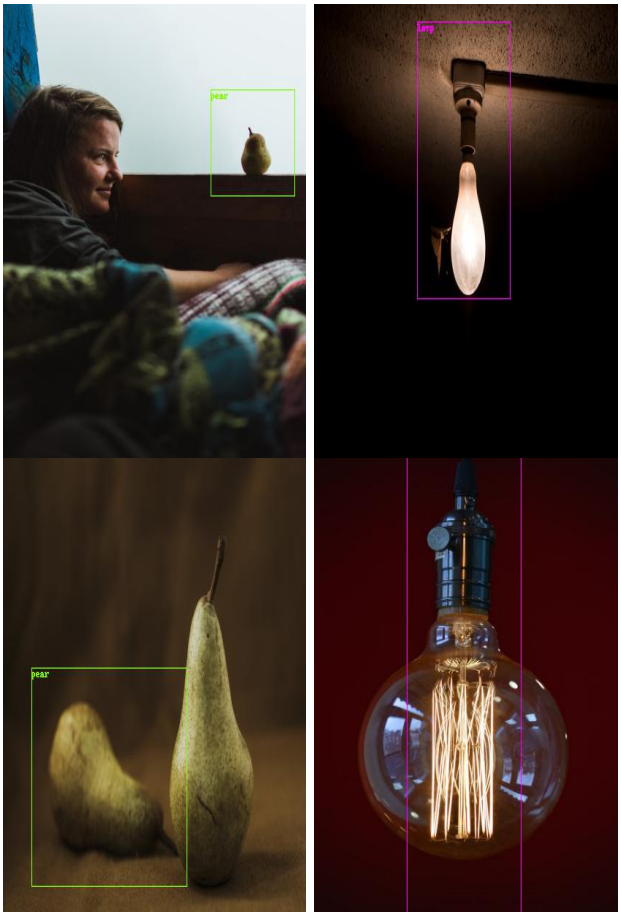

Fig. 2. yoloV4 results of object detection

truly glad to obtain something which is satisfactory, in my opinion.
Overall, it was cool! Thank you!

REFERENCES

[1] GitHub repository of the homework https://github.com/LeoSvalov/cvdl-hw2
[2] Unsplash: The internet's source of freely-usable images. Powered by creators everywhere. https://unsplash.com/

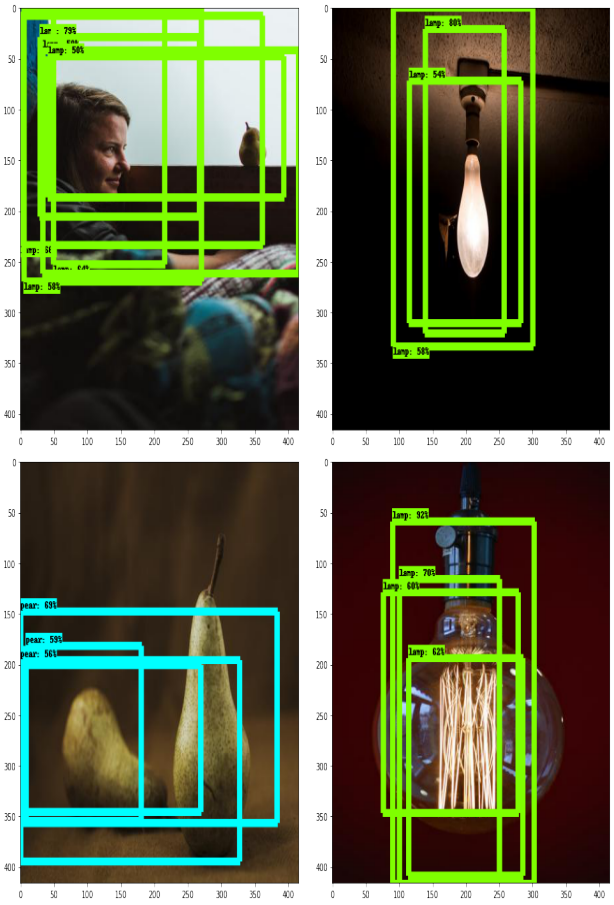

Fig. 3. faster R-CNN results of object detection

Fig. 4. yoloV5 results of object detection

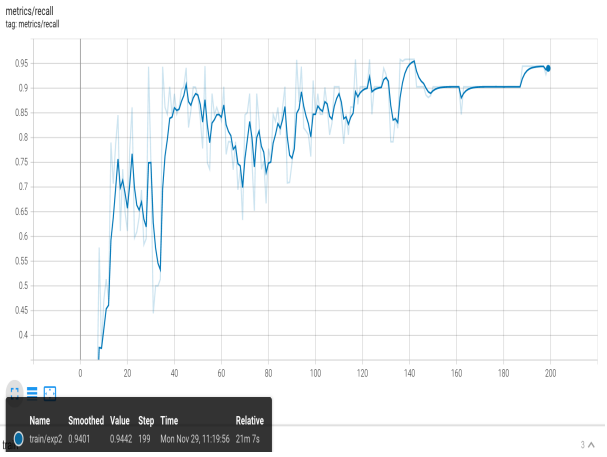

Fig. 6. Recall for yoloV5

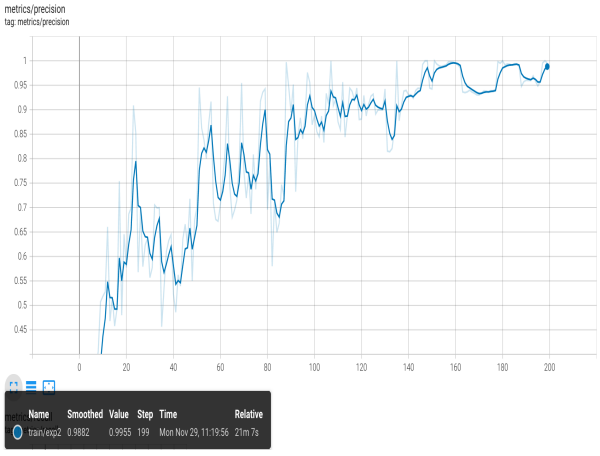

Fig. 5. Precision for yoloV5