Project Report №1
Team: GroShi

Members:

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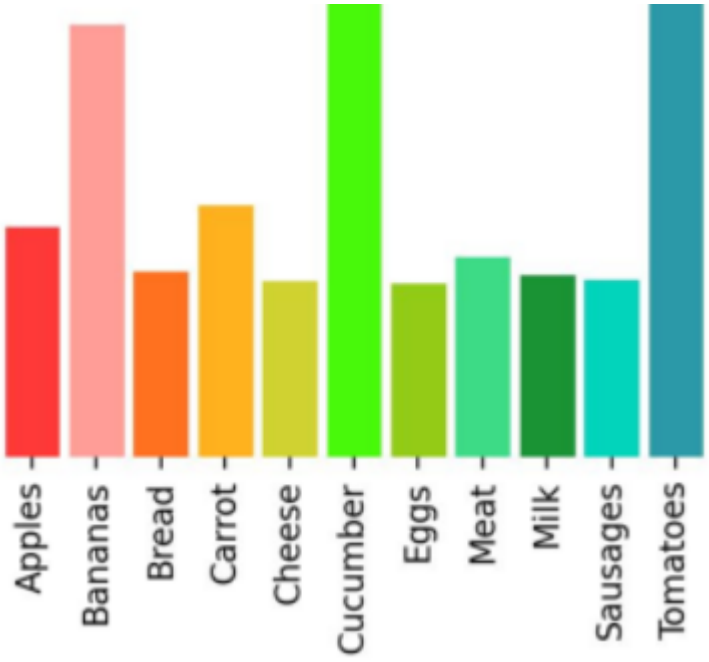
Github: https://github.com/system205/PMLDL_project
Project topic: Grocery object detection.

Current status

So far we collected quite a well rounded dataset of grocery images from the local supermarket.



We labeled all the images and split them into train/validate/test dataset in proportion 70/20/10. This work was done on the roboflow website.
Also, we added the following augmentation to enrich our training dataset: vertical and horizontal flip, 90° rotate, crop (5 to 51% zoom) and rotation between -23° and 23°.
Then we finetuned 2 models: YOLOv5 and YOLOv8; and tested them both on our task. For this we used special yolo CLI comands:
yolo task=detect mode=train model=yolov8s.pt …

yolo task=detect mode=val model=/content/runs/detect/train/weights/best.pt
yolo task=detect mode=predict model=/content/runs/detect/train/weights/best.pt conf=0.4

We are still deciding what wil be the final (production ready) level of confidence for our model to make decisions on user data.

During the training we payed much attention to the Recall metric since it is important to be sure that model recognizes all the products on the picture. The results of the training of YOLOv8 on the second version of dataset are the following (the recoll and mAP50 are quite high):

Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 1/1
all	21	99	0.887	0.768	0.91	0.806
Apples	21	12	0.994	1	0.995	0.995
Bananas	21	31	0.959	0.762	0.919	0.779
Bread	21	3	0.962	0.667	0.913	0.535
Carrot	21	18	0.795	0.389	0.65	0.483
Cheese	21	1	0.971	1	0.995	0.995
Cucumber	21	23	0.917	0.959	0.971	0.824
Eggs	21	3	1	0	0.863	0.844
Meat	21	3	0.65	0.667	0.717	0.623
Milk	21	3	0.702	1	0.995	0.995
Sausages	21	1	0.889	1	0.995	0.796
Tomatoes	21	1	0.921	1	0.995	0.995

Apparently, YOLOv8 trained faster and reached good recall level in a very short time. We think this model solves our task so we will stick to it.

Future work

Moving towards deploying and finalizing, we will prepare a handy script to run the model locally and easily in Docker container making the interaction more user friendly: image file as input and the list of product as the output. Also, we will track the inference time as a runtime metric. The second part will be to report all the metric comparison of YOLOv5 and YOLOv8 by mAP, IoU, Precision, Recall, F1 to make a clear statement about the performance and the right choice between YOLOv5 and v8 for our particular task.

Appendix - recognized by YOLOv8: