YOLO Reproduction-3

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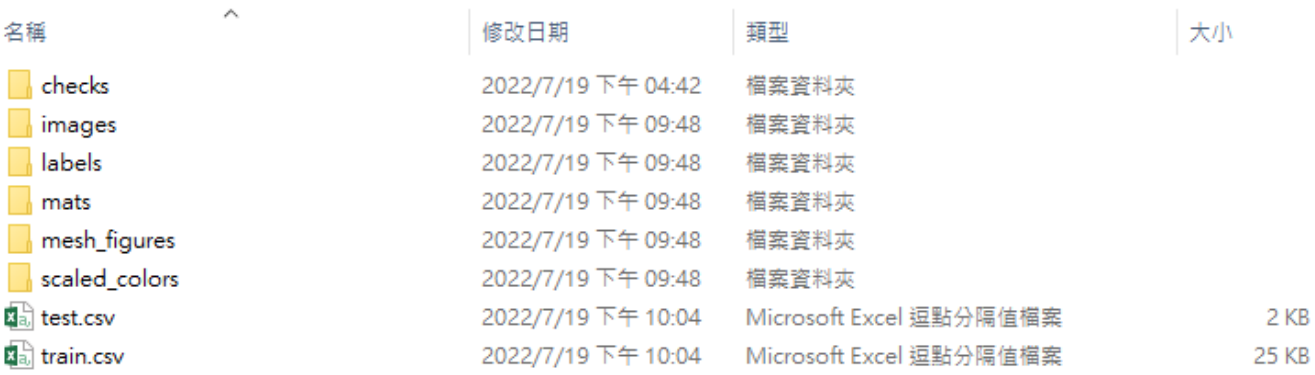
1. RDmap dataset structure

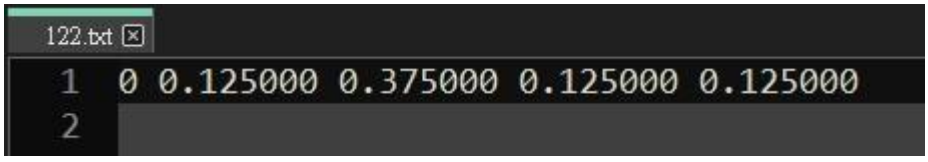
D:/Datasets/RD_maps/

```
├─checks
├─images
├─labels
├─mats
├─mesh_figures
└─scaled_colors
```



名稱	修改日期	類型	大小
checks	2022/7/19 下午 04:42	檔案資料夾	
images	2022/7/19 下午 09:48	檔案資料夾	
labels	2022/7/19 下午 09:48	檔案資料夾	
mats	2022/7/19 下午 09:48	檔案資料夾	
mesh_figures	2022/7/19 下午 09:48	檔案資料夾	
scaled_colors	2022/7/19 下午 09:48	檔案資料夾	
test.csv	2022/7/19 下午 10:04	Microsoft Excel 逗點分隔值檔案	2 KB
train.csv	2022/7/19 下午 10:04	Microsoft Excel 逗點分隔值檔案	25 KB

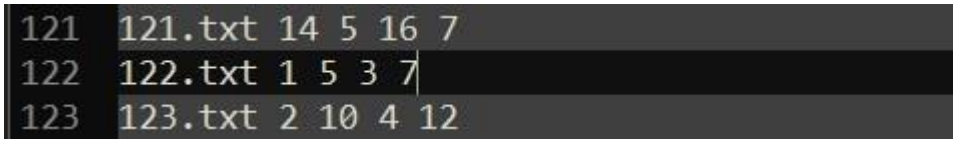
D:/Datasets/RD_maps/labels/122.txt



122.txt

```
1  0 0.125000 0.375000 0.125000 0.125000
2
```

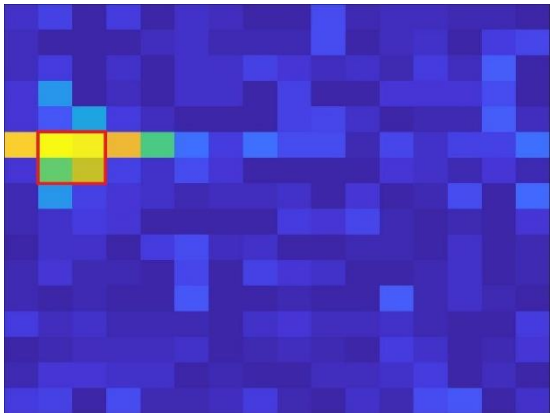
D:/Datasets/RD_maps/labels/checks/ original_coordinates.txt



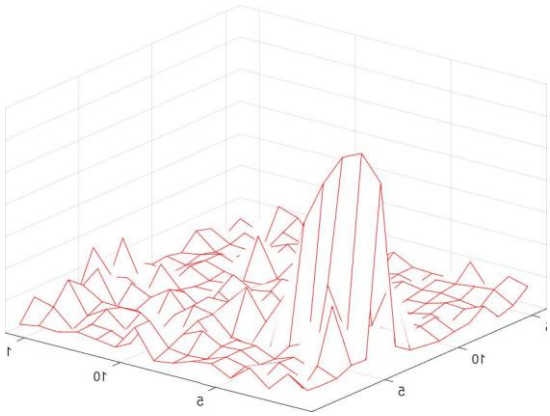
```
121  121.txt 14 5 16 7
122  122.txt 1 5 3 7
123  123.txt 2 10 4 12
```

D:/Datasets/RD_maps/scaled_colors/122_sc.jpg

D:/Datasets/RD_maps/mesh_figures/122_mesh.jpg



122_sc.jpg



122_mesh.jpg

D:/Datasets/RD_maps/images/122.mat

```
>> RD_map_softknee

RD_map_softknee =

    0.6237    1.3565    0.1301    1.1093    0.1655    0.7671    0.6011    0.1757    0.0104    1.7931    0.2513    0.4235    0.5831    0.2702    0.3489    0.1251
    0.5591    0.0701    0.1754    0.0702    0.4903    0.7674    0.3385    0.2524    0.4090    1.8136    0.0732    0.5671    0.6522    0.0227    1.1193    1.4374
    0.5641    1.0405    0.1369    0.6522    0.2019    0.8022    0.7224    1.3855    0.8741    0.4788    0.7143    0.2238    1.1999    0.4700    2.4129    0.0363
    0.9960    4.3612    0.1371    0.5768    0.1581    0.6729    0.7267    0.1373    1.3065    0.0255    0.0718    0.8957    0.9059    0.9512    1.6778    0.0139
    0.9312    2.1857    4.9669    1.0830    0.5496    0.1967    0.0239    0.1915    1.3112    1.5490    0.6463    0.0120    0.3342    0.2122    2.2992    0.5996
   11.5434   13.0763   12.5282   10.5799    7.8594    3.0291    1.0490    2.8992    1.6747    1.6749    0.2151    1.5333    0.7327    1.2783    1.3926    2.9128
    0.9659    8.2060    9.6643    1.3935    0.7738    1.6439    0.9570    0.1974    0.1902    0.0315    0.1320    0.9583    0.6724    0.2828    0.9375    0.3648
    0.3440    4.3136    1.2691    0.8410    0.6354    0.4024    0.4786    0.4389    0.6514    0.1292    0.8988    0.0508    0.4106    1.6887    0.1867    2.7031
    0.2194    0.7176    1.0330    0.8633    0.0790    0.1738    0.1479    0.1159    1.1163    0.9122    1.5545    0.2165    0.2049    0.3743    0.2079    0.8256
    0.1014    0.7129    0.7594    0.0126    1.1392    1.7349    0.6040    0.7321    0.0169    0.1816    0.2873    0.3196    0.1704    0.7689    0.0324    0.2533
    0.2902    0.8632    0.2706    0.3455    0.0355    1.4772    0.1779    1.2962    0.8341    0.7904    0.1295    0.0630    0.3513    0.7228    0.1133    0.3741
    0.4016    0.1081    0.3708    0.1024    0.0626    2.1348    0.1680    0.0147    0.4122    0.0539    0.1042    2.4468    0.2926    0.7238    0.3864    0.1728
    1.0748    0.5831    0.6665    0.3156    0.2437    0.2908    0.0406    0.6448    0.9921    0.4211    0.6108    0.7547    0.2372    0.0706    0.1380    1.1466
    0.0062    0.2354    0.4285    0.5689    0.4629    0.6794    0.1822    0.2196    0.5532    0.2815    0.1710    1.1350    0.6438    0.1373    0.2156    0.8851
    0.3112    0.9897    0.8777    0.7214    0.6765    0.1249    0.4124    0.1392    0.1686    0.4508    0.4155    0.7527    1.1777    0.0663    0.5118    0.1013
    1.0841    1.4051    0.1773    1.7003    0.3748    0.3732    0.4406    1.0764    0.2869    0.0373    0.6943    0.2973    1.6676    2.0740    0.1661    0.7061

>> max(RD_map_softknee)

ans =

   11.5434   13.0763   12.5282   10.5799    7.8594    3.0291    1.0490    2.8992    1.6747    1.8136    1.5545    2.4468    1.6676    2.0740    2.4129    2.9128
```

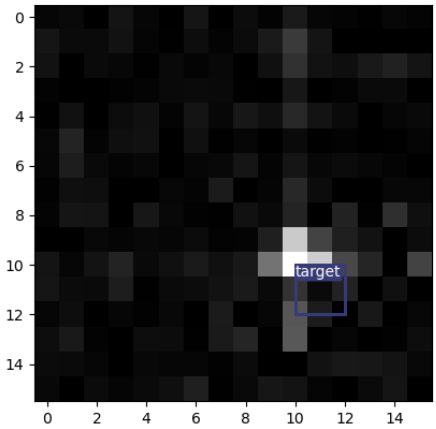
1.1 Dataset problems

(1) Every Anchor box are with fixed size (w, h) = (2, 2)

(2) Have not figure how to fit .mat files in

(3) Will rescaling dramatically change features? rescale every .mat file to [0, 255] grayscale and store them as 16-by-16 .jpg files, for convenient

(4) In grayscale, the labels seems not correct?



2. YOLOv3 problem

(1) currently untrainable (

(2) the proposed YOLO network seems not the same as the one described in the source code

(3) the output channel (output dimension) of scale prediction seems not [2, 4, 8] but [13, 26, 52]

(4) hyper-parameters like padding, stride size, anchors etc., are not the same as original Darknet, but unspecified?

(5) my current hyper-parameter settings

```
DATASET = 'D:/Datasets/RD_maps' # 'D:/Datasets/PASCAL_VOC', 'D:/Datasets/RD_maps'
DEVICE = "cuda" if torch.cuda.is_available() else "cpu"

# seed_everything()  # If you want deterministic behavior

NUM_WORKERS = 1      # 4
BATCH_SIZE = 16      # 32
IMAGE_SIZE = 16     # 416
NUM_CLASSES = 1     # PASCAL VOV has 20 classes, MS COCO has 80 classes
LEARNING_RATE = 3e-4 # 3e-5
WEIGHT_DECAY = 0     # 1e-4, 5e-4
NUM_EPOCHS = 10      # 1000
CONF_THRESHOLD = 0.4 # 0.6
MAP_IOU_THRESH = 0.5
NMS_IOU_THRESH = 0.45
# S = [IMAGE_SIZE // 32, IMAGE_SIZE // 16, IMAGE_SIZE // 8] # [13, 26, 52]
S = [IMAGE_SIZE // 8, IMAGE_SIZE // 4, IMAGE_SIZE // 2] # [2, 4, 8]
PIN_MEMORY = False # True
LOAD_MODEL = False # True
SAVE_MODEL = True
# "D:/Datasets/PASCAL_VOC/checkpoint.pth.tar", "D:/Datasets/RD_maps/checkpoint.pth.tar"
CHECKPOINT_FILE = "D:/Datasets/RD_maps/checkpoint.pth.tar" #
IMG_DIR = DATASET + "/images/"   # "/images/"
LABEL_DIR = DATASET + "/labels/" # "/labels/"

# ANCHORS = [
#     [(0.28, 0.22), (0.38, 0.48), (0.9, 0.78)],
#     [(0.07, 0.15), (0.15, 0.11), (0.14, 0.29)],
#     [(0.02, 0.03), (0.04, 0.07), (0.08, 0.06)],
# ]  # Note these have been rescaled to be between [0, 1]

ANCHORS = [
    [(0.1250, 0.1250), (0.1250, 0.1250), (0.1250, 0.1250)],
    [(0.1250, 0.1250), (0.1250, 0.1250), (0.1250, 0.1250)],
    [(0.1250, 0.1250), (0.1250, 0.1250), (0.1250, 0.1250)],
]
```