Malaria Bounding Boxes

1. Business Problem

1.1. Description

Data Source: https://www.kaggle.com/kmader/malaria-bounding-boxes

Data: malaria-bounding-boxes

Problem statement :

Malaria is a disease caused by Plasmodium parasites that remains a major threat in global health, affecting 200 million people and causing 400,000 deaths a year. The main species of malaria that affect humans are Plasmodium falciparum and Plasmodium vivax. For malaria as well as other microbial infections, manual inspection of thick and thin blood smears by trained microscopists remains the gold standard for parasite detection and stage determination because of its low reagent and instrument cost and high flexibility. Despite manual inspection being extremely low throughput and susceptible to human bias, automatic counting software remains largely unused because of the wide range of variations in brightfield microscopy images. However, a robust automatic counting and cell classification solution would provide enormous benefits due to faster and more accurate quantitative results without human variability; researchers and medical professionals could better characterize stage-specific drug targets and better quantify patient reactions to drugs.

The data consists of two classes of uninfected cells (RBCs and leukocytes) and four classes of infected cells (gametocytes, rings, trophozoites, and schizonts).Annotators were permitted to mark some cells as difficult if not clearly in one of the cell classes.

1.2. Acknowledgements

Original data available from the Broad Institute Repository at https://data.broadinstitute.org/bbbc/BBBC041/

These images were contributed by Jane Hung of MIT and the Broad Institute in Cambridge, MA.

There is also a Github repository that lists malaria parasite imaging datasets (blood smears): https://github.com/tobsecret/Awesome_Malaria_Parasite_Imaging_Datasets

Published results using this image set These datasets will be evaluated in a publication to be submitted.

Recommended citation "We used image set BBBC041v1, available from the Broad Bioimage Benchmark Collection [Ljosa et al., Nature Methods, 2012]."

1.3. Real-world/Business objectives and constraints.

- No low-latency requirement.
- Interpretability is also important. Model should provide the probability score of classifying into the specific category.
- As it is a matter of human health, misclassification very danger.

1.4. References

https://arxiv.org/pdf/1504.08083.pdf

https://arxiv.org/ftp/arxiv/papers/1804/1804.09548.pdf

https://github.com/kbardool/keras-frcnn

https://medium.com/@whatdhack/a-deeper-look-at-how-faster-rcnn-works-84081284e1cd

1.5. Environment

I am using Google Colab to build this model. Google Colab reconnects and loose all variables some times. So It is important to build a model in such a way that it should allow resuming of ttraining if colab reconnect during training

References

https://arxiv.org/pdf/1504.08083.pdf

https://arxiv.org/ftp/arxiv/papers/1804/1804.09548.pdf

https://github.com/kbardool/keras-frcnn

https://medium.com/@whatdhack/a-deeper-look-at-how-faster-rcnn-works-84081284e1cd

In [0]:

```
#Mouning Google Drive
from google.colab import drive
drive.mount('/content/drive',force_remount=True)
```

```
Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client_id=947318989803-6bn6
qk8qdgf4n4g3pfee6491hc0brc4i.apps.googleusercontent.com&redirect_uri=urn%3aietf%3awg%3aoauth%3a2.0%
b&response_type=code&scope=email%20https%3a%2f%2fwww.googleapis.com%2fauth%2fdocs.test%20https%3a%2
www.googleapis.com%2fauth%2fdrive%20https%3a%2f%2fwww.googleapis.com%2fauth%2fdrive.photos.readonly
ttps%3a%2f%2fwww.googleapis.com%2fauth%2fpeopleapi.readonly

Enter your authorization code:
··········
Mounted at /content/drive
```

In [0]:

```
# Importing necessary libraries
import pandas as pd
import matplotlib.pyplot as plt
from matplotlib import patches
import numpy as np
from os import path
from tqdm import tqdm
import tensorflow.python.keras
from tensorflow.python.keras import models, layers
from tensorflow.python.keras.layers import SeparableConv2D, DepthwiseConv2D
from tensorflow.python.keras.models import Model, load_model
from tensorflow.python.keras.layers import BatchNormalization, Activation, Flatten
from tensorflow.python.keras.optimizers import Adam
from keras.preprocessing.image import ImageDataGenerator
```

```
The default version of TensorFlow in Colab will soon switch to TensorFlow 2.x.
We recommend you upgrade now or ensure your notebook will continue to use TensorFlow 1.x via the %tensorflow_version 1.x magic: more info.
```

```
Using TensorFlow backend.
```

In [0]:

```
!pip install keras==2.0.3
```

```
Requirement already satisfied: keras==2.0.3 in /usr/local/lib/python3.6/dist-packages (2.0.3)
Requirement already satisfied: pyyaml in /usr/local/lib/python3.6/dist-packages (from
keras==2.0.3) (3.13)
Requirement already satisfied: theano in /usr/local/lib/python3.6/dist-packages (from
keras==2.0.3) (1.0.4)
Requirement already satisfied: six in /usr/local/lib/python3.6/dist-packages (from keras==2.0.3)
(1.12.0)
Requirement already satisfied: scipy>=0.14 in /usr/local/lib/python3.6/dist-packages (from theano-
>keras==2.0.3) (1.3.2)
Requirement already satisfied: numpy>=1.9.1 in /usr/local/lib/python3.6/dist-packages (from
```

```
theano->keras==2.0.3) (1.17.4)
```

Data Preprocessing

In [0]:

```
train_data = pd.read_json("/content/drive/My Drive/rcnn/training.json")
```

In [0]:

```
train_data.head()
```

Out[0]:

	image	objects
0	{'checksum': '676bb8e86fc2dbf05dd97d51a64ac0af...	[{'bounding_box': {'minimum': {'r': 1057, 'c':...
1	{'checksum': '1225a18efce159eddf7b0e80e0ea642c...	[{'bounding_box': {'minimum': {'r': 734, 'c': ...
2	{'checksum': '3eaf840523c30fdf38897ffa01e194eb...	[{'bounding_box': {'minimum': {'r': 724, 'c': ...
3	{'checksum': '8a111dffacfa433029492780b9535091...	[{'bounding_box': {'minimum': {'r': 563, 'c': ...
4	{'checksum': 'ccef403e971460b86444cca669e68ca1...	[{'bounding_box': {'minimum': {'r': 618, 'c': ...

In [0]:

```
train_data.shape
```

Out[0]:

```
(1208, 2)
```

In [0]:

```
#splitting into train and test
#https://stackoverflow.com/questions/24147278/how-do-i-create-test-and-train-samples-from-one-data
frame-with-pandas
msk = np.random.rand(len(train_data)) < 0.8

train = train_data[msk]

test = train_data[~msk]
```

In [0]:

```
train.reset_index(inplace=True)
test.reset_index(inplace=True)
```

In [0]:

```
train.head()
```

Out[0]:

	index	image	objects
0	1	{'checksum': '1225a18efce159eddf7b0e80e0ea642c...	[{'bounding_box': {'minimum': {'r': 734, 'c': ...
1	2	{'checksum': '3eaf840523c30fdf38897ffa01e194eb...	[{'bounding_box': {'minimum': {'r': 724, 'c': ...
2	3	{'checksum': '8a111dffacfa433029492780b9535091...	[{'bounding_box': {'minimum': {'r': 563, 'c': ...
3	4	{'checksum': 'ccef403e971460b86444cca669e68ca1...	[{'bounding_box': {'minimum': {'r': 618, 'c': ...
4	6	{'checksum': '36f63469b09e117ade01d97d3c7e2120...	[{'bounding_box': {'minimum': {'r': 124, 'c': ...

In [0]:

```
train.shape
```

Out[0]:

```
(959, 3)
```

In [0]:

```
test.shape
```

Out[0]:

```
(249, 3)
```

Data Format

- Given dataset is in the form of json file, this format is not feasible to create moels.
- So decided to create a dataframe with each bounding box of an image as a datapoint

In [0]:

```
# creating dataframe with each bounding box as datapoint
train_image_list = []
y_max = []
y_min = []
x_max = []
x_min = []
class_label = []
for i in range(0,train.shape[0]):

    for j in range(0,len(train["objects"][i])):
      train_image_list.append(train["image"][i]["pathname"])

      y_max.append(train["objects"][i][j]["bounding_box"]["maximum"]["r"])
      y_min.append(train["objects"][i][j]["bounding_box"]["minimum"]["r"])
      x_max.append(train["objects"][i][j]["bounding_box"]["maximum"]["c"])
      x_min.append(train["objects"][i][j]["bounding_box"]["minimum"]["c"])

      class_label.append(train["objects"][i][j]["category"])
```

In [0]:

```
train_df = pd.DataFrame()
```

In [0]:

```
train_df["image"] = train_image_list
train_df["y_max"] = y_max
train_df["y_min"] = y_min
train_df["x_max"] = x_max
train_df["x_min"] = x_min
train_df["class_label"] = class_label
```

In [0]:

```
train_df.head()
```

Out[0]:

	image	y_max	y_min	x_max	x_min	class_label
0	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	832	734	834	735	red blood cell
1	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	1039	939	1378	1283	red blood

	image	y_max	y_min	x_max	x_min	class_label
2	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	476	367	1235	1134	red blood cell
3	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	400	307	864	766	red blood cell
4	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	701	596	1556	1463	red blood cell

In [0]:

```
#### checking whether all images are available in the image folder
```

In [0]:

```
train_exist = []
for i in range(0,train_df.shape[0]):
  x = train_df["image"][i]
  train_exist.append(path.isfile("/content/drive/My Drive/rcnn" + x))
```

In [0]:

```
train_exist[0:5]
```

Out[0]:

```
[True, True, True, True, True]
```

In [0]:

```
train_df["avialability"] = train_exist
```

In [0]:

```
#Taking only available images
train_df = train_df[train_df["avialability"] == True]
```

In [0]:

```
train_df[train_df["avialability"] == False]
```

Out[0]:

	image	y_max	y_min	x_max	x_min	class_label	avialability

In [0]:

```
train_df["image"].nunique()
```

Out[0]:

```
959
```

Total we have 959 unique images are available for training

In [0]:

```
train_df.reset_index(inplace=True)
```

In [0]:

```
test_image_list = []
y_max = []
y_min = []
x_max = []
```

```
x_min = []
class_label = []
for i in range(0,test.shape[0]):

    for j in range(0,len(test["objects"][i])):
      test_image_list.append(test["image"][i]["pathname"])

      y_max.append(test["objects"][i][j]["bounding_box"]["maximum"]["r"])
      y_min.append(test["objects"][i][j]["bounding_box"]["minimum"]["r"])
      x_max.append(test["objects"][i][j]["bounding_box"]["maximum"]["c"])
      x_min.append(test["objects"][i][j]["bounding_box"]["minimum"]["c"])

      class_label.append(test["objects"][i][j]["category"])
```

In [0]:

```
test_df = pd.DataFrame()
```

In [0]:

```
test_df["image"] = test_image_list
test_df["y_max"] = y_max
test_df["y_min"] = y_min
test_df["x_max"] = x_max
test_df["x_min"] = x_min
test_df["class_label"] = class_label
```

In [0]:

```
test_df.head()
```

Out[0]:

	image	y_max	y_min	x_max	x_min	class_label
0	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	1158	1057	1540	1440	red blood cell
1	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	971	868	1403	1303	red blood cell
2	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	689	578	1008	900	red blood cell
3	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	408	304	713	611	red blood cell
4	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	312	198	1003	881	red blood cell

In [0]:

```
test_exist = []
for i in range(0,test_df.shape[0]):
  x = test_df["image"][i]
  test_exist.append(path.isfile("/content/drive/My Drive/rcnn" + x))
```

In [0]:

```
test_exist[0:5]
```

Out[0]:

```
[True, True, True, True, True]
```

In [0]:

```
test_df["avialability"] = test_exist
```

In [0]:

```
test_df = test_df[test_df["avialability"] == True]
```

In [0]:

```
test_df.head()
```

Out[0]:

	image	y_max	y_min	x_max	x_min	class_label	avialability
0	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	1158	1057	1540	1440	red blood cell	True
1	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	971	868	1403	1303	red blood cell	True
2	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	689	578	1008	900	red blood cell	True
3	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	408	304	713	611	red blood cell	True
4	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	312	198	1003	881	red blood cell	True

In [0]:

```
test_df[test_df["avialability"] == False]
```

Out[0]:

	image	y_max	y_min	x_max	x_min	class_label	avialability

In [0]:

```
test_df['image'].nunique()
```

Out[0]:

```
248
```

Total we have 248 unique images are available for testing

In [0]:

```
train_df.to_csv("/content/drive/My Drive/rcnn/train_df.csv",index = False)
test_df.to_csv("/content/drive/My Drive/rcnn/test_df.csv",index = False)
```

In [0]:

```
train_df['class_label'].value_counts()
```

Out[0]:

```
red blood cell    62875
trophozoite        1207
difficult           335
ring                281
schizont            142
gametocyte          113
leukocyte            85
Name: class_label, dtype: int64
```

- Our Dataset is greatly imbalanced

Creating annotation text file for training purpose

- It should be in the below form

- filename, x_min, y_min, x_max, y_max

In [0]:

```
data = pd.DataFrame()
data['format'] = train_df['image']
print(data.shape)
for i in range(data.shape[0]):
    data['format'][i] = '/content/drive/My Drive/rcnn' + data['format'][i]

f= open(f"/content/drive/My Drive/rcnn/annotate_train.txt","w+")
for i in range(data.shape[0]):
    data['format'][i] = data['format'][i] + ',' + str(train_df['x_min'][i]) + ',' + str(train_df['y_
min'][i]) + ',' + str(train_df['x_max'][i]) + ',' + str(train_df['y_max'][i])+ ',' +
train_df['class_label'][i]
    f.write(data['format'][i])
    f.write("\n")
f.close()
```

```
(65038, 1)
```

In [0]:

```
test_df.reset_index(inplace=True)
```

In [0]:

```
data = pd.DataFrame()
data['format'] = test_df['image']
for i in range(data.shape[0]):
    data['format'][i] = '/content/drive/My Drive/rcnn' + data['format'][i]

f= open(f"/content/drive/My Drive/rcnn/annotate_test.txt","w+")
for i in range(data.shape[0]):
    data['format'][i] = data['format'][i] + ',' + str(test_df['x_min'][i]) + ',' + str(test_df['y_m
n'][i]) + ',' + str(test_df['x_max'][i]) + ',' + str(test_df['y_max'][i])+ ',' +
test_df['class_label'][i]
    f.write(data['format'][i])
    f.write("\n")
f.close()
```

In [0]:

```
### Sample image with actual Bounding boxes
```

In [0]:

```
fig = plt.figure()

#add axes to the image
ax = fig.add_axes([0,0,1,1])

# read and plot the image
image = plt.imread('/content/drive/My Drive/rcnn/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png')
plt.imshow(image)

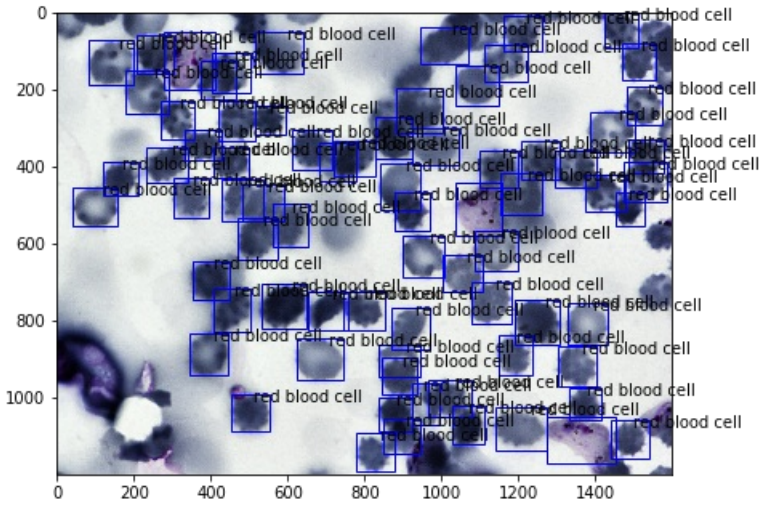

# iterating over the image for different objects
for _,row in test_df[test_df.image == "/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png"].iterrows
():
    xmin = row.x_min
    #print(xmin)
    xmax = row.x_max
    ymin = row.y_min
    ymax = row.y_max

    width = xmax - xmin
    height = ymax - ymin
    # assign different color to different classes of objects
    if row.class_label == 'ring':
        edgecolor = 'r'
        ax.annotate('ring', xy=(xmax-40,ymin+20))
```

```
    elif row.class_label == 'red blood cell':
        edgecolor = 'b'
        ax.annotate('red blood cell', xy=(xmax-40,ymin+20))

    # add bounding boxes to the image
    rect = patches.Rectangle((xmin,ymin), width, height, edgecolor = edgecolor, facecolor = 'none')

    ax.add_patch(rect)
```



Modeling with Faster RCNN

- For training our dataset I have decided to use Faster RCNN

How FasterRCNN works:

Faster-RCNN is composed of 3 neural networks — Feature Network, Region Proposal Network (RPN), Detection Network

Feature Network:
The Feature Network is usually a well known pre-trained image classification network such as VGG minus a few last/top layers. The function of this network is to generate good features from the images. The output of this network maintains the the shape and structure of the original image (i.e. still rectangular, pixels in the original image roughly gets mapped to corresponding feature “pixels”, etc.)

Region Proposal Network (RPN):
The RPN is usually a simple network with a 3 convolutional layers. There is one common layer which feeds into a two layers — one for classification and the other for bounding box regression. The purpose of RPN is to generate a number of bounding boxes called Region of Interests (ROIs) that has high probability of containing any object. The output from this network is a number of bounding boxes identified by the pixel co-ordinates of two diagonal corners, and a value (1, 0, or -1, indicating whether an object is in the bounding box or not or the box can be ignored respectively).

Detection Network:
The Detection Network (sometimes also called the RCNN network) takes input from both the Feature Network and RPN , and generates the final class and bounding box. It is normally composed of 4 Fully Connected or Dense layers. There are 2 stacked common layers shared by a classification layer and a bounding box regression layer. To help it classify only the inside of the bounding boxes, the features are cropped according to the bounding boxes.

- I have did necessary modification to this repo https://github.com/kbardool/keras-frcnn> and cloned here

In [0]:

In [0]:

```
%cd /content
```

```
/content
```

In [0]:

```
!rm -rf drive
```

```
rm: cannot remove 'drive/My Drive/netflix/data_folder/test.csv': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/data.csv': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/combined_data_4.txt': Operation not
permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/combined_data_3.txt': Operation not
permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/combined_data_1.txt': Operation not
permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/train.csv': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/images/arrow.jpg': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/images/data_c.jpg': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/images/data_sparse_c.jpg': Operation not per
mitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/images/models.jpg': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/images/netflix-q.jpg': Operation not
permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/small_sample_results.csv': Operation not per
mitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/sample_test_sparse_matrix.npz': Operation no
t permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/reg_train.csv': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/movie_titles.csv': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/combined_data_2.txt': Operation not
permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/reg_test.csv': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/trunc_sparse_matrix.npz': Operation not perm
itted
rm: cannot remove 'drive/My Drive/netflix/data_folder/m_m_sim_sparse.npz': Operation not permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/sample_train_sparse_matrix.npz': Operation n
ot permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/Netflix_Movie.ipynb': Operation not
permitted
rm: cannot remove 'drive/My Drive/netflix/data_folder/reg_train.gsheet': Operation not permitted
```

In [0]:

```
!git clone https://github.com/sandeepburra/keras-frcnn
```

```
Cloning into 'keras-frcnn'...
remote: Enumerating objects: 29, done.
remote: Counting objects: 100% (29/29), done.
remote: Compressing objects: 100% (29/29), done.
remote: Total 640 (delta 15), reused 0 (delta 0), pack-reused 611
Receiving objects: 100% (640/640), 194.05 KiB | 544.00 KiB/s, done.
Resolving deltas: 100% (431/431), done.
```

In [0]:

```
%cd keras-frcnn
```

```
/content/keras-frcnn
```

Training Parameters:

parser details:

- -p : path for annotation file
- config_filename : path to create configuration file
- output_weight_path : path to create output weight file

- result_path : path to save training loss details in a csv format--> this is file allow as to resume training which is very important as we are running this on Google Colab
- number of Echos : 1000 ##### Data Augumentation
- Horizontal Flip
- Vertical Flip
- rotation

- training logs are removed as they are very bigger

In [0]:

```
!python train_frcnn.py \
-o simple \
-p /content/drive/My\ Drive/rcnn/annotate_train.txt \
--config_filename /content/drive/My\ Drive/rcnn/Data_model/config.pickle \
--output_weight_path /content/drive/My\ Drive/rcnn/Data_model/model_frcnn.hdf5 \
--hf True \
--vf True \
--rot True \
--result_path /content/drive/My\ Drive/rcnn/Data_model/result_df.csv \
--num_epochs 1000
```

In [0]:

```
!python train_frcnn.py \
-o simple \
-p /content/drive/My\ Drive/rcnn/annotate_train.txt \
--config_filename /content/drive/My\ Drive/rcnn/Data_model/config.pickle \
--output_weight_path /content/drive/My\ Drive/rcnn/Data_model/model_frcnn.hdf5 \
--hf True \
--vf True \
--rot True \
--result_path /content/drive/My\ Drive/rcnn/Data_model/result_df.csv \
--input_weight_path /content/drive/My\ Drive/rcnn/Data_model/model_frcnn.hdf5 \
--num_epochs 1000
```

In [0]:

```
### Plotting all the losses During training
```

In [0]:

```
result = pd.read_csv("/content/drive/My Drive/rcnn/Data_model/result_df.csv")
```

In [0]:

```
result.shape
```

Out[0]:

```
(1000, 7)
```

In [0]:

```
result.head()
```

Out[0]:

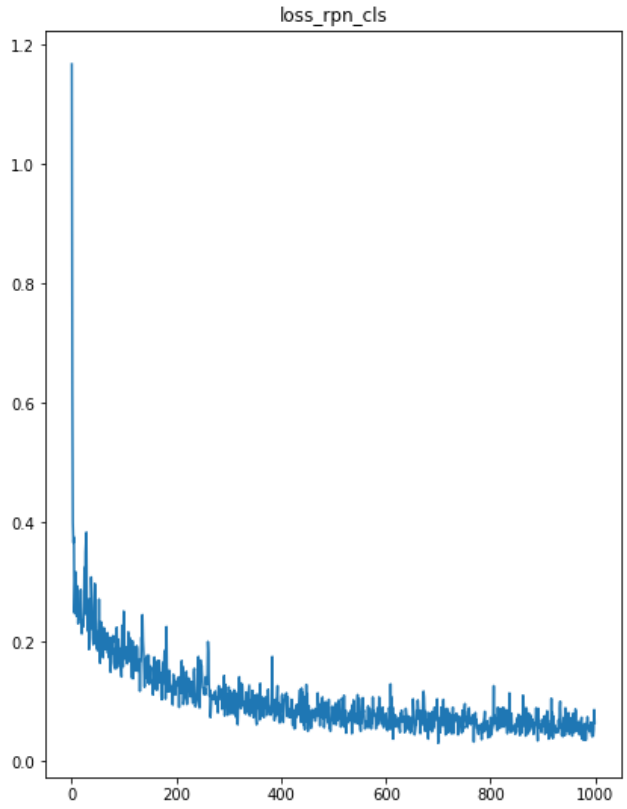
	mean_overlapping_bboxes	class_acc	loss_rpn_cls	loss_rpn_regr	loss_class_cls	loss_class_regr	curr_loss
0	2.0	0.838	1.167	1.386	1.022	0.471	4.045
1	2.7	0.916	0.621	0.975	0.645	0.541	2.781
2	15.6	0.716	0.400	0.773	0.837	0.368	2.378
3	22.7	0.416	0.366	0.614	1.077	0.333	2.391
4	42.1	0.500	0.375	0.482	0.856	0.356	2.070

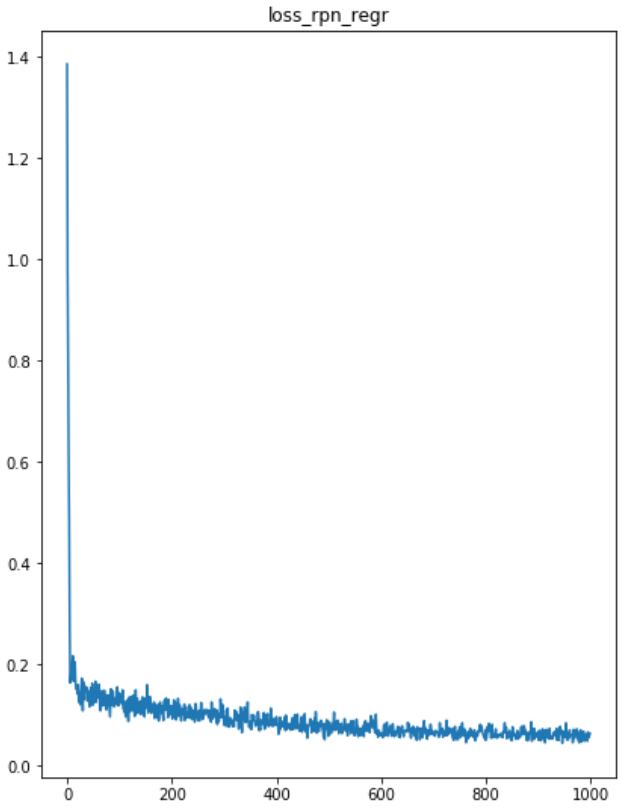
In [0]:

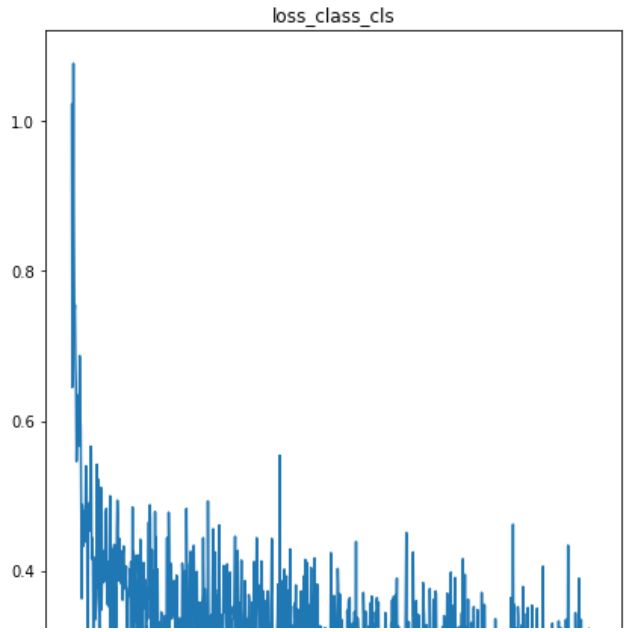
```
plt.figure(figsize=(15,20))
plt.subplot(2,2,1)
plt.plot(range(0, 1000), result['loss_rpn_cls'])
plt.title('loss_rpn_cls')
plt.subplot(2,2,2)
plt.plot(range(0, 1000), result['loss_rpn_regr'])
plt.title('loss_rpn_regr')

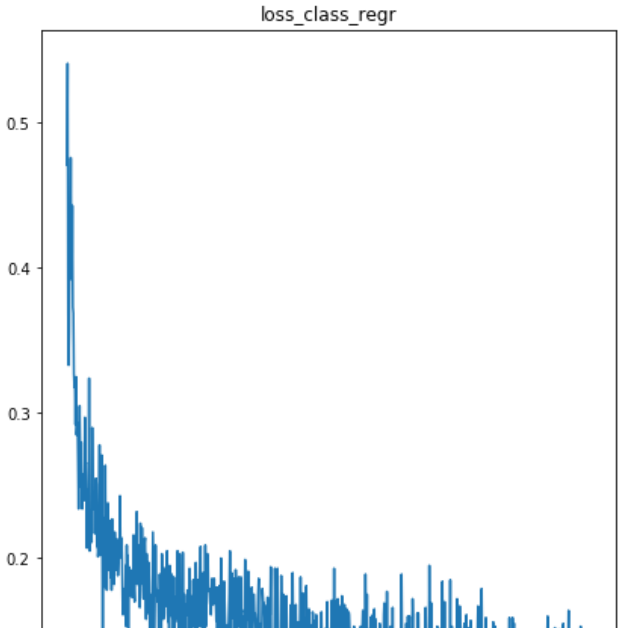
plt.subplot(2,2,3)
plt.plot(range(0, 1000), result['loss_class_cls'])
plt.title('loss_class_cls')
plt.subplot(2,2,4)
plt.plot(range(0, 1000), result['loss_class_regr'])
plt.title('loss_class_regr')

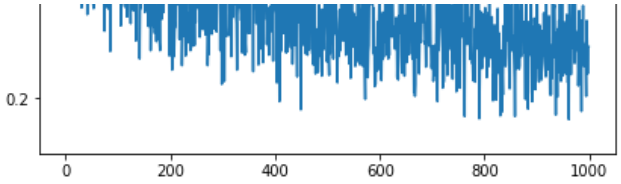
plt.show()
```

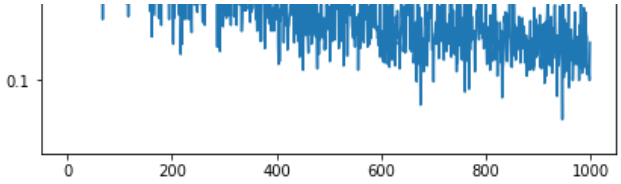












Testing

- -p: path for test image
- --result_path_2class : path to create prediction csv fie
- config_filename: path to config file name which was created during training

In [0]:

```
!python test_frcnn.py \
-p /content/drive/My\ Drive/rcnn/testing \
--result_path_2class /content/drive/My\ Drive/rcnn/Data_model/prediction_df.csv \
--config_filename /content/drive/My\ Drive/rcnn/Data_model/config.pickle
```

```
Using TensorFlow backend.
{0: 'red blood cell', 1: 'schizont', 2: 'difficult', 3: 'ring', 4: 'leukocyte', 5: 'gametocyte',
6: 'trophozoite', 7: 'bg'}
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:47: The name tf.get_default_graph is deprecated. Plea
se use tf.compat.v1.get_default_graph instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:351: The name tf.placeholder is deprecated. Please us
e tf.compat.v1.placeholder instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3176: The name tf.random_uniform is deprecated. Pleas
e use tf.random.uniform instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3043: The name tf.nn.max_pool is deprecated. Please u
se tf.nn.max_pool2d instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3153: The name tf.random_normal is deprecated. Please
use tf.random.normal instead.

WARNING:tensorflow:From /content/keras-frcnn/keras_frcnn/RoiPoolingConv.py:105: The name
tf.image.resize_images is deprecated. Please use tf.image.resize instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3045: The name tf.nn.avg_pool is deprecated. Please u
se tf.nn.avg_pool2d instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:1064: calling reduce_prod_v1 (from
tensorflow.python.ops.math_ops) with keep_dims is deprecated and will be removed in a future
version.
Instructions for updating:
keep_dims is deprecated, use keepdims instead
Loading weights from /content/drive/My Drive/rcnn/Data_model/model_frcnn.hdf5
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:141: The name tf.get_default_session is deprecated. P
lease use tf.compat.v1.get_default_session instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:146: The name tf.ConfigProto is deprecated. Please us
e tf.compat.v1.ConfigProto instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:151: The name tf.Session is deprecated. Please use tf
.compat.v1.Session instead.

2019-11-15 06:01:54.478321: I tensorflow/core/platform/profile_utils/cpu_utils.cc:94] CPU
Frequency: 2300000000 Hz
2019-11-15 06:01:54.478567: I tensorflow/compiler/xla/service/service.cc:168] XLA service
```

```
0x9314540 initialized for platform Host (this does not guarantee that XLA will be used). Devices:
2019-11-15 06:01:54.478605: I tensorflow/compiler/xla/service/service.cc:176]   StreamExecutor dev
ice (0): Host, Default Version
2019-11-15 06:01:54.480713: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcuda.so.1
2019-11-15 06:01:54.549027: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-15 06:01:54.549924: I tensorflow/compiler/xla/service/service.cc:168] XLA service
0x9314700 initialized for platform CUDA (this does not guarantee that XLA will be used). Devices:
2019-11-15 06:01:54.549958: I tensorflow/compiler/xla/service/service.cc:176]   StreamExecutor dev
ice (0): Tesla K80, Compute Capability 3.7
2019-11-15 06:01:54.550162: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-15 06:01:54.550892: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1618] Found device
0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
2019-11-15 06:01:54.551220: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudart.so.10.0
2019-11-15 06:01:54.552487: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcublas.so.10.0
2019-11-15 06:01:54.553610: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcufft.so.10.0
2019-11-15 06:01:54.554006: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcurand.so.10.0
2019-11-15 06:01:54.555782: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcusolver.so.10.0
2019-11-15 06:01:54.557093: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcusparse.so.10.0
2019-11-15 06:01:54.560582: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudnn.so.7
2019-11-15 06:01:54.560740: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-15 06:01:54.561564: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-15 06:01:54.562267: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1746] Adding
visible gpu devices: 0
2019-11-15 06:01:54.562347: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudart.so.10.0
2019-11-15 06:01:54.564032: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1159] Device
interconnect StreamExecutor with strength 1 edge matrix:
2019-11-15 06:01:54.564069: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1165]      0
2019-11-15 06:01:54.564087: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1178] 0:   N
2019-11-15 06:01:54.564266: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-15 06:01:54.565119: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-15 06:01:54.565862: W tensorflow/core/common_runtime/gpu/gpu_bfc_allocator.cc:39]
Overriding allow_growth setting because the TF_FORCE_GPU_ALLOW_GROWTH environment variable is set.
Original config value was 0.
2019-11-15 06:01:54.565920: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1304] Created
TensorFlow device (/job:localhost/replica:0/task:0/device:GPU:0 with 10805 MB memory) -> physical
GPU (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:300: The name tf.global_variables is deprecated. Plea
se use tf.compat.v1.global_variables instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:308: The name tf.variables_initializer is deprecated.
Please use tf.compat.v1.variables_initializer instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/optimizers.py:675: The name t
f.train.Optimizer is deprecated. Please use tf.compat.v1.train.Optimizer instead.

a9feccda-18f2-405e-9aa1-409fa1f49fe4.png
2019-11-15 06:01:57.993751: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudnn.so.7
2019-11-15 06:02:00.574833: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcublas.so.10.0
Elapsed time = 7.304379224777222
```

In [0]:

```
image = plt.imread('/content/drive/My Drive/rcnn/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png')
```

In [0]:

```
image.shape
```

Out[0]:

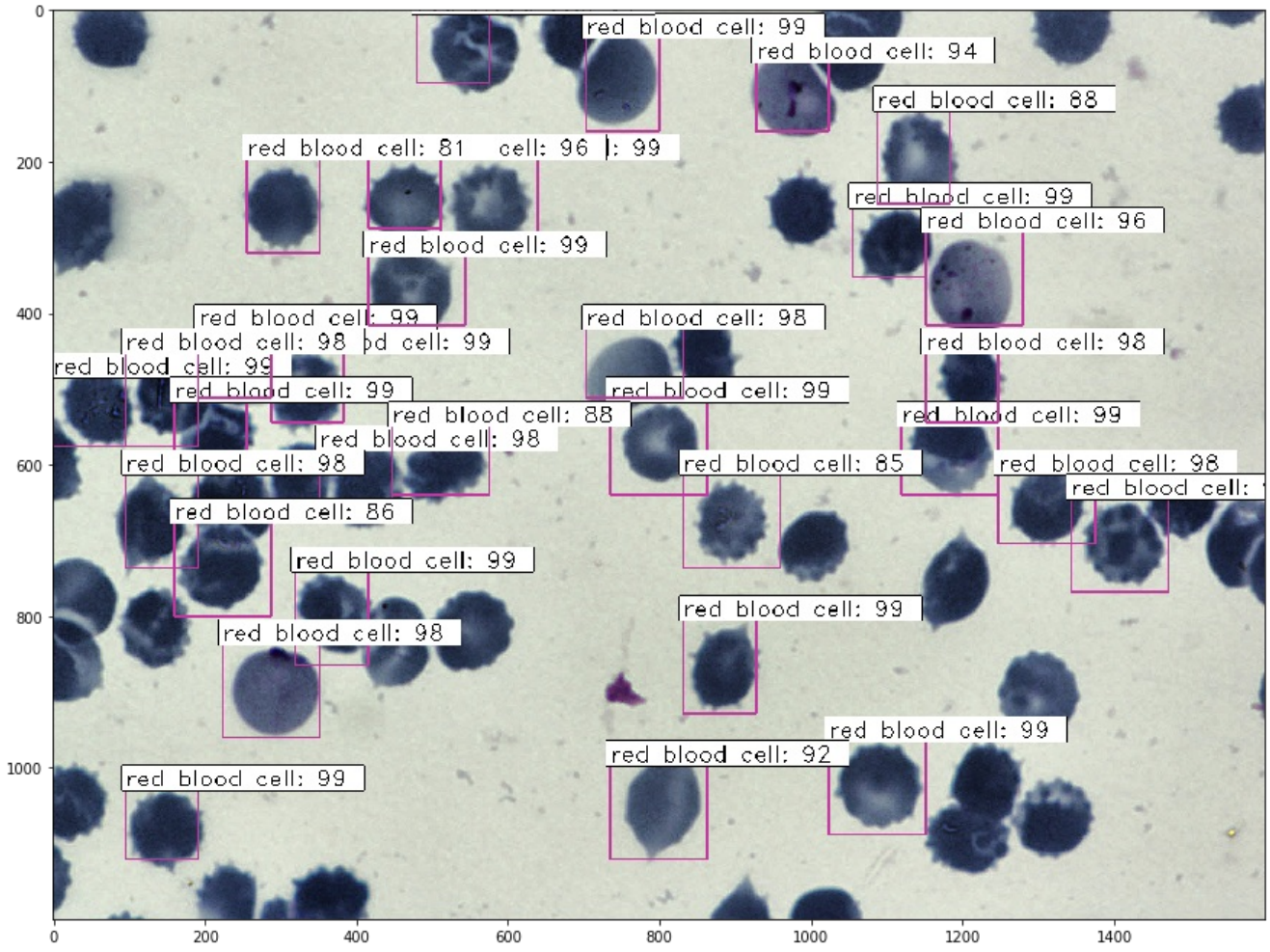
```
(1200, 1600, 3)
```

In [0]:

```
plt.figure(figsize=(15,20))
plt.imshow(image)
```

Out[0]:

```
<matplotlib.image.AxesImage at 0x7f787bb6b0f0>
```



In [0]:

```
result_df_2class = pd.read_csv("/content/drive/My Drive/rcnn/Data_model_2/result_df_2class.csv")
```

In [0]:

```
result_df_2class["label"].value_counts()
```

Out[0]:

```
RBC    65
Name: label, dtype: int64
```

In [0]:

```
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])

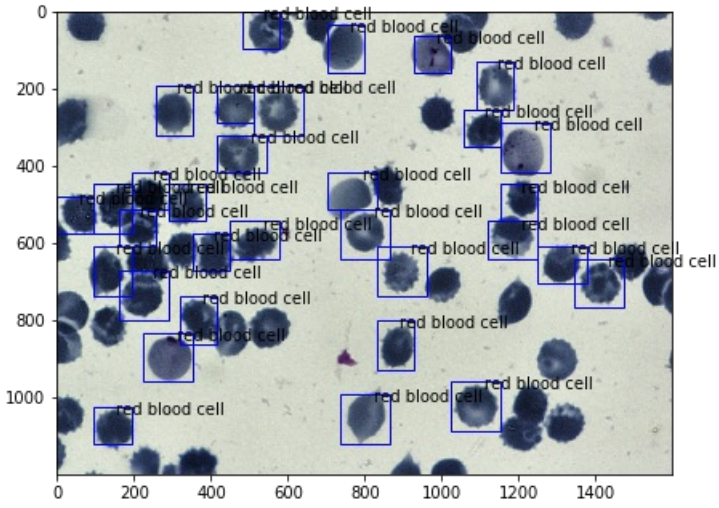
# read and plot the image
image = plt.imread('/content/drive/My Drive/rcnn/testing/a9feccda-18f2-405e-9aa1-409fa1f49fe4.png'
)
plt.imshow(image)


# iterating over the image for different objects
for _,row in result_df_2class.iterrows():
    xmin = row.x1
    #print(xmin)
    xmax = row.x2
    ymin = row.y1
    ymax = row.y2

    width = xmax - xmin
    height = ymax - ymin
    # assign different color to different classes of objects
    if row.label == 'ring':
        edgecolor = 'r'
        ax.annotate('ring', xy=(xmax-40,ymin+20))
    elif row.label == 'red blood cell':
        edgecolor = 'b'
        ax.annotate('red blood cell', xy=(xmax-40,ymin+20))

    # add bounding boxes to the image
    rect = patches.Rectangle((xmin,ymin), width, height, edgecolor = edgecolor, facecolor = 'none')

    ax.add_patch(rect)
```



Observations:

- As the datset is highly imbalanced, Red Blood cells will dominate over other classes.
- We cannot predict minor classes like leukocyte(count:85) against Major class Red Blood Cell(count:62875)
- So to make our model efficient we will devide our problem into two models

Procedure:

Model 1:

- First we will create dataset with two lables, RBC and other(all classes together except RBC)
- FRCNN model will be trined on this data, and will predict Bounding boxes and two class labels RBC and other

Model 2:

- we will crop the images with the bounding box dimensions other class(Except RBC).
- Train a densenet model on this cropped image,for all other classes.
- while testing we will take output of model 1 and feed to model 2

Data for first classifier(Object detection with Bounding Boxes)

In [0]:

```
import pandas as pd
```

In [0]:

```
train_df = pd.read_csv("/content/drive/My Drive/rcnn/train_df.csv")
test_df = pd.read_csv("/content/drive/My Drive/rcnn/test_df.csv")
```

In [0]:

```
train_df['class_label'].value_counts()
```

Out[0]:

```
red blood cell    62875
trophozoite        1207
difficult           335
ring                281
schizont            142
gametocyte          113
leukocyte            85
Name: class_label, dtype: int64
```

In [0]:

```
train_df_final = train_df.copy()
```

In [0]:

```
train_df_final.head()
```

Out[0]:

	index	image	y_max	y_min	x_max	x_min	class_label	avialability
0	0	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	832	734	834	735	red blood cell	True
1	1	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	1039	939	1378	1283	red blood cell	True
2	2	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	476	367	1235	1134	red blood cell	True
3	3	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	400	307	864	766	red blood cell	True
4	4	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	701	596	1556	1463	red blood cell	True

In [0]:

```
train_df_final['class_label'].value_counts()
```

Out[0]:

```
red blood cell    62875
trophozoite        1207
difficult           335
ring                281
schizont            142
gametocyte          113
```

```
leukocyte            85
Name: class_label, dtype: int64
```

In [0]:

```
train_df_final['class_label'].unique()
```

Out[0]:

```
array(['red blood cell', 'schizont', 'difficult', 'ring', 'leukocyte',
       'gametocyte', 'trophozoite'], dtype=object)
```

In [0]:

```
train_df_final["2class"] = train_df_final['class_label'].replace(['schizont', 'difficult', 'ring',
'leukocyte','gametocyte', 'trophozoite'],"other")
```

In [0]:

```
train_df_final.head()
```

Out[0]:

	index		image	y_max	y_min	x_max	x_min	class_label	avialability	2class
0	0	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	832	734	834	735	red blood cell	True	red blood cell
1	1	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	1039	939	1378	1283	red blood cell	True	red blood cell
2	2	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	476	367	1235	1134	red blood cell	True	red blood cell
3	3	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	400	307	864	766	red blood cell	True	red blood cell
4	4	/images/10be6380-cbbb-4886-8b9e-ff56b1710576.png	701	596	1556	1463	red blood cell	True	red blood cell

In [0]:

```
train_df_final['class_label'].replace("red blood cell", "RBC", inplace= True)
```

In [0]:

```
train_df_final['2class'].replace("red blood cell", "RBC", inplace= True)
```

In [0]:

```
data = pd.DataFrame()
data['format'] = train_df_final['image']
print(data.shape)
for i in range(data.shape[0]):
    data['format'][i] = '/content/drive/My Drive/rcnn' + data['format'][i]

f= open(f"/content/drive/My Drive/rcnn/annotate_train_2class.txt","w+")
for i in range(data.shape[0]):
    data['format'][i] = data['format'][i] + ',' + str(train_df_final['x_min'][i]) + ',' + str(train_
df_final['y_min'][i]) + ',' + str(train_df_final['x_max'][i]) + ',' + str(train_df_final['y_max'][i
])+ ',' + train_df_final['2class'][i]
    f.write(data['format'][i])
    f.write("\n")
f.close()
```

```
(65038, 1)
```

In [0]:

```
test_df_final = test_df.copy()
test_df_final["2class"] = test_df_final['class_label'].replace(['schizont', 'difficult', 'ring', 'l
```

```
eukocyte','gametocyte', 'trophozoite'],"other")
test_df_final['class_label'].replace("red blood cell", "RBC", inplace= True)
test_df_final['2class'].replace("red blood cell", "RBC", inplace= True)
```

In [0]:

```
test_df_final.reset_index(inplace=True)
```

In [0]:

```
data = pd.DataFrame()
data['format'] = test_df_final['image']
for i in range(data.shape[0]):
    data['format'][i] = '/content/drive/My Drive/rcnn' + data['format'][i]

f= open(f"/content/drive/My Drive/rcnn/annotate_test_2class.txt","w+")
for i in range(data.shape[0]):
    data['format'][i] = data['format'][i] + ',' + str(test_df_final['x_min'][i]) + ',' + str(test_d
_final['y_min'][i]) + ',' + str(test_df_final['x_max'][i]) + ',' + str(test_df_final['y_max'][i])+
',' + test_df_final['2class'][i]
    f.write(data['format'][i])
    f.write("\n")
f.close()
```

Data for Second classifier

In [0]:

```
other =train_df_final[train_df_final['2class']=="other"]
```

In [0]:

```
other.reset_index(inplace = True)
```

In [0]:

```
other.head()
```

Out[0]:

	level_0	index	image	y_max	y_min	x_max	x_min	class_label	avialability	2class
0	78	78	/images/6b14c855-8561-417c-97a4-63fa552842fd.png	219	76	626	482	schizont	True	other
1	79	79	/images/6b14c855-8561-417c-97a4-63fa552842fd.png	1143	1020	1314	1156	difficult	True	other
2	82	82	/images/13099edb-35d9-438f-b093-2cf2ebf9d255.png	337	208	446	324	ring	True	other
3	125	125	/images/2559636b-f01a-4414-93da-210c3b12d153.png	803	661	558	422	difficult	True	other
4	138	138	/images/2559636b-f01a-4414-93da-210c3b12d153.png	324	169	717	576	difficult	True	other

In [0]:

```
y = other["class_label"]
```

In [0]:

```
np.savez("/content/drive/My Drive/rcnn/train_image_array/y_target", y)
```

In [0]:

```
y_train = np.load("/content/drive/My Drive/rcnn/train_image_array/y_target.npz")
```

In [0]:

```
y_train["arr_0"].shape
```

Out[0]:

```
(2163,)
```

In [0]:

```
import cv2
x = []
y = []
WIDTH = 64
HEIGHT = 64

for i in tqdm(range(other.shape[0])):
  image = plt.imread('/content/drive/My Drive/rcnn/' + other["image"][i])
  image_crop = image[other["y_min"][i]:other["y_max"][i],other["x_min"][i]:other["x_max"][i]]
  x.append(cv2.resize(image_crop, (WIDTH,HEIGHT), interpolation=cv2.INTER_CUBIC))
```

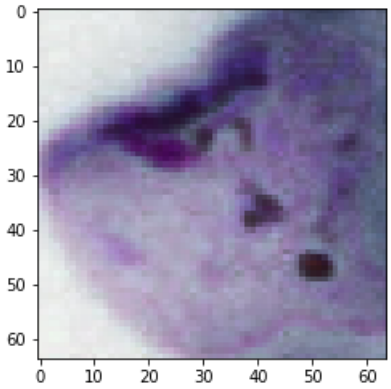
```
100%|██████████| 2163/2163 [05:49<00:00,  6.46it/s]
```

In [0]:

```
np.savez("/content/drive/My Drive/rcnn/train_image_array/x_train_images_arrays_64pix", x)
```

In [0]:

```
from matplotlib import pyplot as plt
plt.imshow(x_test["arr_0"][1], interpolation='nearest')
plt.show()
```



In [0]:

```
other_test =test_df_final[test_df_final['2class']=="other"]
```

In [0]:

```
other_test.reset_index(inplace = True)
```

In [0]:

```
other_test.head()
```

Out[0]:

	level_0	index	image	y_max	y_min	x_max	x_min	class_label	avialability	2class
0	54	54	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	200	52	409	279	trophozoite	True	other
1	61	61	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	578	441	1155	1037	trophozoite	True	other
2	62	62	/images/8d02117d-6c71-4e47-b50a-6cc8d5eb1d55.png	1172	1050	1454	1273	trophozoite	True	other
3	92	92	/images/0dcca702-a4ef-4fb3-a940-9c0c140b21c7.png	317	194	356	237	trophozoite	True	other
4	94	94	/images/0dcca702-a4ef-4fb3-a940-9c0c140b21c7.png	713	578	178	53	trophozoite	True	other

In [0]:

```
y_test = other_test["class_label"]
```

In [0]:

```
np.savez("/content/drive/My Drive/rcnn/test_image_array/y_target_test", y_test)
```

In [0]:

```
import cv2
x = []
y = []
WIDTH = 64
HEIGHT = 64

for i in tqdm(range(other_test.shape[0])):
  image = plt.imread('/content/drive/My Drive/rcnn/' + other_test["image"][i])
  image_crop = image[other_test["y_min"][i]:other_test["y_max"][i],other_test["x_min"][i]:other_tes
t["x_max"][i]]
  x.append(cv2.resize(image_crop, (WIDTH,HEIGHT), interpolation=cv2.INTER_CUBIC))
```

```
100%|██████████| 527/527 [03:26<00:00,  2.49it/s]
```

In [0]:

```
np.savez("/content/drive/My Drive/rcnn/test_image_array/x_images_arrays_test_64pix", x)
```

In [0]:

```
x_test = np.load("/content/drive/My Drive/rcnn/test_image_array/x_images_arrays_test_64pix.npz")
```

First level Classifer Training

Using weights from the model trained before

In [0]:

```
!python train_frcnn.py \
-o simple \
-p /content/drive/My\ Drive/rcnn/annotate_train_2class.txt \
--config_filename /content/drive/My\ Drive/rcnn/Data_model_2/config.pickle \
--output_weight_path /content/drive/My\ Drive/rcnn/Data_model_2/model_frcnn.hdf5 \
--hf True \
--vf True \
--rot True \
--result_path /content/drive/My\ Drive/rcnn/Data_model/result_df.csv \
--input_weight_path /content/drive/My\ Drive/rcnn/Data_model/model_frcnn.hdf5 \
--num_epochs 1000
```

```
Using TensorFlow backend.
Parsing annotation files
959
Training images per class:
{'RBC': 62875, 'bg': 0, 'other': 2163}
Num classes (including bg) = 3
Config has been written to /content/drive/My Drive/rcnn/Data_model_2/config.pickle, and can be loa
ded when testing to ensure correct results
Num train samples 795
Num val samples 164
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:47: The name tf.get_default_graph is deprecated. Plea
se use tf.compat.v1.get_default_graph instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:351: The name tf.placeholder is deprecated. Please us
```

```
e tf.compat.v1.placeholder instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3176: The name tf.random_uniform is deprecated. Pleas
e use tf.random.uniform instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3043: The name tf.nn.max_pool is deprecated. Please u
se tf.nn.max_pool2d instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3153: The name tf.random_normal is deprecated. Please
use tf.random.normal instead.

WARNING:tensorflow:From /content/keras-frcnn/keras_frcnn/RoiPoolingConv.py:105: The name
tf.image.resize_images is deprecated. Please use tf.image.resize instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3045: The name tf.nn.avg_pool is deprecated. Please u
se tf.nn.avg_pool2d instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:1064: calling reduce_prod_v1 (from
tensorflow.python.ops.math_ops) with keep_dims is deprecated and will be removed in a future
version.
Instructions for updating:
keep_dims is deprecated, use keepdims instead
loading weights from /content/drive/My Drive/rcnn/Data_model/model_frcnn.hdf5
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:141: The name tf.get_default_session is deprecated. P
lease use tf.compat.v1.get_default_session instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:146: The name tf.ConfigProto is deprecated. Please us
e tf.compat.v1.ConfigProto instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:151: The name tf.Session is deprecated. Please use tf
.compat.v1.Session instead.

2019-11-26 01:49:27.615781: I tensorflow/core/platform/profile_utils/cpu_utils.cc:94] CPU
Frequency: 2200000000 Hz
2019-11-26 01:49:27.616050: I tensorflow/compiler/xla/service/service.cc:168] XLA service
0x817c540 initialized for platform Host (this does not guarantee that XLA will be used). Devices:
2019-11-26 01:49:27.616085: I tensorflow/compiler/xla/service/service.cc:176]   StreamExecutor dev
ice (0): Host, Default Version
2019-11-26 01:49:27.618335: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcuda.so.1
2019-11-26 01:49:27.769229: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 01:49:27.770110: I tensorflow/compiler/xla/service/service.cc:168] XLA service
0x817c700 initialized for platform CUDA (this does not guarantee that XLA will be used). Devices:
2019-11-26 01:49:27.770145: I tensorflow/compiler/xla/service/service.cc:176]   StreamExecutor dev
ice (0): Tesla P100-PCIE-16GB, Compute Capability 6.0
2019-11-26 01:49:27.770388: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 01:49:27.770925: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1618] Found device
0 with properties:
name: Tesla P100-PCIE-16GB major: 6 minor: 0 memoryClockRate(GHz): 1.3285
pciBusID: 0000:00:04.0
2019-11-26 01:49:27.771319: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudart.so.10.1
2019-11-26 01:49:27.773084: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcublas.so.10
2019-11-26 01:49:27.775129: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcufft.so.10
2019-11-26 01:49:27.775557: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcurand.so.10
2019-11-26 01:49:27.777375: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcusolver.so.10
2019-11-26 01:49:27.778237: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcusparse.so.10
2019-11-26 01:49:27.781991: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudnn.so.7
2019-11-26 01:49:27.782120: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
```

```
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 01:49:27.782682: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 01:49:27.783163: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1746] Adding
visible gpu devices: 0
2019-11-26 01:49:27.783243: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudart.so.10.1
2019-11-26 01:49:27.784486: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1159] Device
interconnect StreamExecutor with strength 1 edge matrix:
2019-11-26 01:49:27.784513: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1165]      0
2019-11-26 01:49:27.784537: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1178] 0:   N
2019-11-26 01:49:27.784669: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 01:49:27.785198: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 01:49:27.785711: W tensorflow/core/common_runtime/gpu/gpu_bfc_allocator.cc:39]
Overriding allow_growth setting because the TF_FORCE_GPU_ALLOW_GROWTH environment variable is set.
Original config value was 0.
2019-11-26 01:49:27.785764: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1304] Created
TensorFlow device (/job:localhost/replica:0/task:0/device:GPU:0 with 15216 MB memory) -> physical
GPU (device: 0, name: Tesla P100-PCIE-16GB, pci bus id: 0000:00:04.0, compute capability: 6.0)
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:300: The name tf.global_variables is deprecated. Plea
se use tf.compat.v1.global_variables instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:308: The name tf.variables_initializer is deprecated.
Please use tf.compat.v1.variables_initializer instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/optimizers.py:675: The name t
f.train.Optimizer is deprecated. Please use tf.compat.v1.train.Optimizer instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:2642: The name tf.log is deprecated. Please use tf.ma
th.log instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/tensorflow_core/python/ops/nn_impl.py:183: where (from tensorflow.python.ops.array_ops) i
s deprecated and will be removed in a future version.
Instructions for updating:
Use tf.where in 2.0, which has the same broadcast rule as np.where
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:1046: calling reduce_sum_v1 (from
tensorflow.python.ops.math_ops) with keep_dims is deprecated and will be removed in a future
version.
Instructions for updating:
keep_dims is deprecated, use keepdims instead
Starting training
Epoch 1/1000
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:768: The name tf.assign_add is deprecated. Please use
tf.compat.v1.assign_add instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:521: calling Constant.__init__ (from
tensorflow.python.ops.init_ops) with dtype is deprecated and will be removed in a future version.
Instructions for updating:
Call initializer instance with the dtype argument instead of passing it to the constructor
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:764: The name tf.assign is deprecated. Please use tf.
compat.v1.assign instead.

2019-11-26 01:49:53.782728: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudnn.so.7
2019-11-26 01:49:54.981417: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcublas.so.10
10/10 [==============================] - 63s - rpn_cls: 0.0693 - rpn_regr: 0.0769 - detector_cls:
0.8073 - detector_regr: 0.3187
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.1
Classifier accuracy for bounding boxes from RPN: 0.771875
Loss RPN classifier: 0.06925069633871317
Loss RPN regression: 0.07691423743963241
Loss Detector classifier: 0.8072995007038116
```

```
Loss Detector regression: 0.3186818853020668
Elapsed time: 63.12841248512268
Total loss decreased from inf to 1.272146319784224, saving weights
```

In [0]:

```
!python train_frcnn.py \
-o simple \
-p /content/drive/My\ Drive/rcnn/annotate_train_2class.txt \
--config_filename /content/drive/My\ Drive/rcnn/Data_model_2/config.pickle \
--output_weight_path /content/drive/My\ Drive/rcnn/Data_model_2/model_frcnn.hdf5 \
--hf True \
--vf True \
--rot True \
--is_it_resume = True \
--result_path /content/drive/My\ Drive/rcnn/Data_model/result_df.csv \
--input_weight_path /content/drive/My\ Drive/rcnn/Data_model_2/model_frcnn.hdf5 \
--num_epochs 1000
```

```
Using TensorFlow backend.
Parsing annotation files
959
Training images per class:
{'RBC': 62875, 'bg': 0, 'other': 2163}
Num classes (including bg) = 3
Config has been written to /content/drive/My Drive/rcnn/Data_model_2/config.pickle, and can be loa
ded when testing to ensure correct results
Num train samples 824
Num val samples 135
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:47: The name tf.get_default_graph is deprecated. Plea
se use tf.compat.v1.get_default_graph instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:351: The name tf.placeholder is deprecated. Please us
e tf.compat.v1.placeholder instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3176: The name tf.random_uniform is deprecated. Pleas
e use tf.random.uniform instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3043: The name tf.nn.max_pool is deprecated. Please u
se tf.nn.max_pool2d instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3153: The name tf.random_normal is deprecated. Please
use tf.random.normal instead.

WARNING:tensorflow:From /content/keras-frcnn/keras_frcnn/RoiPoolingConv.py:105: The name
tf.image.resize_images is deprecated. Please use tf.image.resize instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:3045: The name tf.nn.avg_pool is deprecated. Please u
se tf.nn.avg_pool2d instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:1064: calling reduce_prod_v1 (from
tensorflow.python.ops.math_ops) with keep_dims is deprecated and will be removed in a future
version.
Instructions for updating:
keep_dims is deprecated, use keepdims instead
Continue training based on previous trained model
Loading weights from /content/drive/My Drive/rcnn/Data_model_2/model_frcnn.hdf5
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:141: The name tf.get_default_session is deprecated. P
lease use tf.compat.v1.get_default_session instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:146: The name tf.ConfigProto is deprecated. Please us
e tf.compat.v1.ConfigProto instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:151: The name tf.Session is deprecated. Please use tf
.compat.v1.Session instead.
```

```
2019-11-26 15:46:17.408237: I tensorflow/core/platform/profile_utils/cpu_utils.cc:94] CPU
Frequency: 2200000000 Hz
2019-11-26 15:46:17.410526: I tensorflow/compiler/xla/service/service.cc:168] XLA service
0x8f5e540 initialized for platform Host (this does not guarantee that XLA will be used). Devices:
2019-11-26 15:46:17.410559: I tensorflow/compiler/xla/service/service.cc:176]   StreamExecutor dev
ice (0): Host, Default Version
2019-11-26 15:46:17.417990: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcuda.so.1
2019-11-26 15:46:17.582028: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 15:46:17.582874: I tensorflow/compiler/xla/service/service.cc:168] XLA service
0x8f5e700 initialized for platform CUDA (this does not guarantee that XLA will be used). Devices:
2019-11-26 15:46:17.582921: I tensorflow/compiler/xla/service/service.cc:176]   StreamExecutor dev
ice (0): Tesla K80, Compute Capability 3.7
2019-11-26 15:46:17.584272: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 15:46:17.584977: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1618] Found device
0 with properties:
name: Tesla K80 major: 3 minor: 7 memoryClockRate(GHz): 0.8235
pciBusID: 0000:00:04.0
2019-11-26 15:46:17.610595: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudart.so.10.1
2019-11-26 15:46:17.867107: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcublas.so.10
2019-11-26 15:46:18.011457: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcufft.so.10
2019-11-26 15:46:18.040866: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcurand.so.10
2019-11-26 15:46:18.316853: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcusolver.so.10
2019-11-26 15:46:18.352949: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcusparse.so.10
2019-11-26 15:46:18.845265: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudnn.so.7
2019-11-26 15:46:18.845471: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 15:46:18.846293: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 15:46:18.846985: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1746] Adding
visible gpu devices: 0
2019-11-26 15:46:18.852147: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudart.so.10.1
2019-11-26 15:46:18.853892: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1159] Device
interconnect StreamExecutor with strength 1 edge matrix:
2019-11-26 15:46:18.853951: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1165]      0
2019-11-26 15:46:18.853969: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1178] 0:   N
2019-11-26 15:46:18.855266: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 15:46:18.856061: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:983] successful
NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so re
turning NUMA node zero
2019-11-26 15:46:18.856766: W tensorflow/core/common_runtime/gpu/gpu_bfc_allocator.cc:39]
Overriding allow_growth setting because the TF_FORCE_GPU_ALLOW_GROWTH environment variable is set.
Original config value was 0.
2019-11-26 15:46:18.856821: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1304] Created
TensorFlow device (/job:localhost/replica:0/task:0/device:GPU:0 with 10805 MB memory) -> physical
GPU (device: 0, name: Tesla K80, pci bus id: 0000:00:04.0, compute capability: 3.7)
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:300: The name tf.global_variables is deprecated. Plea
se use tf.compat.v1.global_variables instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:308: The name tf.variables_initializer is deprecated.
Please use tf.compat.v1.variables_initializer instead.

for 638 batches training already done
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/optimizers.py:675: The name t
f.train.Optimizer is deprecated. Please use tf.compat.v1.train.Optimizer instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:2642: The name tf.log is deprecated. Please use tf.ma
```

```
th.log instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/tensorflow_core/python/ops/nn_impl.py:183: where (from tensorflow.python.ops.array_ops) i
s deprecated and will be removed in a future version.
Instructions for updating:
Use tf.where in 2.0, which has the same broadcast rule as np.where
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:1046: calling reduce_sum_v1 (from
tensorflow.python.ops.math_ops) with keep_dims is deprecated and will be removed in a future
version.
Instructions for updating:
keep_dims is deprecated, use keepdims instead
Starting training
Epoch 639/1000
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:768: The name tf.assign_add is deprecated. Please use
tf.compat.v1.assign_add instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:521: calling Constant.__init__ (from
tensorflow.python.ops.init_ops) with dtype is deprecated and will be removed in a future version.
Instructions for updating:
Call initializer instance with the dtype argument instead of passing it to the constructor
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:764: The name tf.assign is deprecated. Please use tf.
compat.v1.assign instead.

2019-11-26 15:46:34.800018: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcudnn.so.7
2019-11-26 15:46:37.561162: I tensorflow/stream_executor/platform/default/dso_loader.cc:44]
Successfully opened dynamic library libcublas.so.10
10/10 [==============================] - 75s - rpn_cls: 0.0590 - rpn_regr: 0.0690 - detector_cls:
0.2145 - detector_regr: 0.1495
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.9
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.0590085431933403
Loss RPN regression: 0.06898028217256069
Loss Detector classifier: 0.2144749492406845
Loss Detector regression: 0.14951172694563866
Elapsed time: 75.71249151229858
Epoch 640/1000
Average number of overlapping bounding boxes from RPN = 55.9 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0512 - rpn_regr: 0.0468 - detector_cls:
0.1998 - detector_regr: 0.1142
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.7
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.05119566682260483
Loss RPN regression: 0.04681209363043308
Loss Detector classifier: 0.19977395609021187
Loss Detector regression: 0.1141920942813158
Elapsed time: 52.43154335021973
Epoch 641/1000
Average number of overlapping bounding boxes from RPN = 47.7 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0406 - rpn_regr: 0.0532 - detector_cls:
0.1808 - detector_regr: 0.1066
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.9
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.04064762368798256
Loss RPN regression: 0.0531753545626998
Loss Detector classifier: 0.1807691439986229
Loss Detector regression: 0.10661813952028751
Elapsed time: 53.84111452102661
Epoch 642/1000
Average number of overlapping bounding boxes from RPN = 51.9 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0400 - rpn_regr: 0.0559 - detector_cls:
0.2493 - detector_regr: 0.1348
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.8
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.039980470389127734
Loss RPN regression: 0.05589344250038266
Loss Detector classifier: 0.2493479423224926
Loss Detector regression: 0.13482510000467302
Elapsed time: 46.78916358947754
Epoch 643/1000
Average number of overlapping bounding boxes from RPN = 44.8 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0748 - rpn_regr: 0.0625 - detector_cls:
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0.2401 - detector_regr: 0.1213
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.2
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.07475192109122872
Loss RPN regression: 0.06250725984573365
Loss Detector classifier: 0.2400842897593975
Loss Detector regression: 0.12133177518844604
Elapsed time: 48.85868811607361
Epoch 644/1000
Average number of overlapping bounding boxes from RPN = 57.2 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0367 - rpn_regr: 0.0433 - detector_cls:
0.2446 - detector_regr: 0.0867
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.6
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.036732652597129344
Loss RPN regression: 0.043272065743803975
Loss Detector classifier: 0.24457948841154575
Loss Detector regression: 0.08674516528844833
Elapsed time: 50.907498836517334
Epoch 645/1000
Average number of overlapping bounding boxes from RPN = 48.6 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0297 - rpn_regr: 0.0496 - detector_cls:
0.1242 - detector_regr: 0.0933
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.8
Classifier accuracy for bounding boxes from RPN: 0.953125
Loss RPN classifier: 0.029715158604085447
Loss RPN regression: 0.04963621012866497
Loss Detector classifier: 0.12416816782206297
Loss Detector regression: 0.09327775724232197
Elapsed time: 54.285624742507935
Total loss decreased from 0.3 to 0.2967972937971354, saving weights
Epoch 646/1000
Average number of overlapping bounding boxes from RPN = 45.8 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0464 - rpn_regr: 0.0481 - detector_cls:
0.2535 - detector_regr: 0.1243
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.3
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.04643002764787525
Loss RPN regression: 0.04812058359384537
Loss Detector classifier: 0.25353268533945084
Loss Detector regression: 0.12429827898740768
Elapsed time: 69.68431758880615
Epoch 647/1000
Average number of overlapping bounding boxes from RPN = 51.3 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0612 - rpn_regr: 0.0664 - detector_cls:
0.2392 - detector_regr: 0.1142
Mean number of bounding boxes from RPN overlapping ground truth boxes: 39.3
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.06124768918380141
Loss RPN regression: 0.06642891205847264
Loss Detector classifier: 0.23920159339904784
Loss Detector regression: 0.11415575370192528
Elapsed time: 52.74235272407532
Epoch 648/1000
Average number of overlapping bounding boxes from RPN = 39.3 for 10 previous iterations
10/10 [==============================] - 66s - rpn_cls: 0.0555 - rpn_regr: 0.0655 - detector_cls:
0.2095 - detector_regr: 0.1099
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.9
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.05552452830597758
Loss RPN regression: 0.06552432663738728
Loss Detector classifier: 0.2094934344291687
Loss Detector regression: 0.1099365096539259
Elapsed time: 66.4827766418457
Epoch 649/1000
Average number of overlapping bounding boxes from RPN = 55.9 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0621 - rpn_regr: 0.0588 - detector_cls:
0.1754 - detector_regr: 0.1094
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.6
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.06209403201937676
Loss RPN regression: 0.058789499662816526
Loss Detector classifier: 0.17541761323809624
Loss Detector regression: 0.10939537957310677
Elapsed time: 47.36315703392029
Epoch 650/1000
Average number of overlapping bounding boxes from RPN = 45.6 for 10 previous iterations
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10/10 [==============================] - 53s - rpn_cls: 0.0688 - rpn_regr: 0.0550 - detector_cls:
0.1973 - detector_regr: 0.1197
Mean number of bounding boxes from RPN overlapping ground truth boxes: 62.8
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.06882168180309237
Loss RPN regression: 0.055014944076538085
Loss Detector classifier: 0.19729389101266862
Loss Detector regression: 0.11971673928201199
Elapsed time: 53.43024969100952
Epoch 651/1000
Average number of overlapping bounding boxes from RPN = 62.8 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0474 - rpn_regr: 0.0554 - detector_cls:
0.1952 - detector_regr: 0.1437
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.5
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.0473860340192914
Loss RPN regression: 0.0553880512714386
Loss Detector classifier: 0.19521675482392312
Loss Detector regression: 0.1437135711312294
Elapsed time: 50.58834648132324
Epoch 652/1000
Average number of overlapping bounding boxes from RPN = 55.5 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0428 - rpn_regr: 0.0448 - detector_cls:
0.2065 - detector_regr: 0.1009
Mean number of bounding boxes from RPN overlapping ground truth boxes: 42.6
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.04279338587075472
Loss RPN regression: 0.04484131261706352
Loss Detector classifier: 0.20651212334632874
Loss Detector regression: 0.1008868519216776
Elapsed time: 49.028931856155396
Epoch 653/1000
Average number of overlapping bounding boxes from RPN = 42.6 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0711 - rpn_regr: 0.0504 - detector_cls:
0.2020 - detector_regr: 0.1238
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.9
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.07107494380325079
Loss RPN regression: 0.050401298142969606
Loss Detector classifier: 0.20201117917895317
Loss Detector regression: 0.12377372048795224
Elapsed time: 43.48554515838623
Epoch 654/1000
Average number of overlapping bounding boxes from RPN = 53.9 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0595 - rpn_regr: 0.0587 - detector_cls:
0.2091 - detector_regr: 0.1273
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.9
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.0594542388105765
Loss RPN regression: 0.05869706925004721
Loss Detector classifier: 0.20911951065063478
Loss Detector regression: 0.12730808556079865
Elapsed time: 50.49088382720947
Epoch 655/1000
Average number of overlapping bounding boxes from RPN = 53.9 for 10 previous iterations
10/10 [==============================] - 76s - rpn_cls: 0.0690 - rpn_regr: 0.0607 - detector_cls:
0.1521 - detector_regr: 0.1334
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.2
Classifier accuracy for bounding boxes from RPN: 0.953125
Loss RPN classifier: 0.06903036599978804
Loss RPN regression: 0.06066077630966902
Loss Detector classifier: 0.1520920604467392
Loss Detector regression: 0.13339840061962605
Elapsed time: 76.59145188331604
Epoch 656/1000
Average number of overlapping bounding boxes from RPN = 59.2 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0876 - rpn_regr: 0.0452 - detector_cls:
0.2312 - detector_regr: 0.1071
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.2
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.08756183702498674
Loss RPN regression: 0.045159243047237396
Loss Detector classifier: 0.23121372759342193
Loss Detector regression: 0.10708675421774387
Elapsed time: 51.54957938194275
Epoch 657/1000
Average number of overlapping bounding boxes from RPN = 47.2 for 10 previous iterations
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10/10 [==============================] - 64s - rpn_cls: 0.0657 - rpn_regr: 0.0670 - detector_cls:
0.2102 - detector_regr: 0.1334
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.3
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.06572106694802642
Loss RPN regression: 0.06701905876398087
Loss Detector classifier: 0.21018886491656302
Loss Detector regression: 0.13343881219625472
Elapsed time: 64.59465909004211
Epoch 658/1000
Average number of overlapping bounding boxes from RPN = 59.3 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0758 - rpn_regr: 0.0696 - detector_cls:
0.2083 - detector_regr: 0.1216
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.0
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.07578743072226643
Loss RPN regression: 0.06962883211672306
Loss Detector classifier: 0.2083028480410576
Loss Detector regression: 0.12155016586184501
Elapsed time: 47.44895887374878
Epoch 659/1000
Average number of overlapping bounding boxes from RPN = 46.0 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0528 - rpn_regr: 0.0571 - detector_cls:
0.2281 - detector_regr: 0.1086
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.2
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.052778211794793604
Loss RPN regression: 0.05711888186633587
Loss Detector classifier: 0.22805655747652054
Loss Detector regression: 0.10864579118788242
Elapsed time: 59.36393356323242
Epoch 660/1000
Average number of overlapping bounding boxes from RPN = 57.2 for 10 previous iterations
10/10 [==============================] - 66s - rpn_cls: 0.0560 - rpn_regr: 0.0522 - detector_cls:
0.2436 - detector_regr: 0.1265
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.8
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.05600433491636068
Loss RPN regression: 0.05218547023832798
Loss Detector classifier: 0.2435937039554119
Loss Detector regression: 0.1264534592628479
Elapsed time: 66.69293355941772
Epoch 661/1000
Average number of overlapping bounding boxes from RPN = 51.8 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0309 - rpn_regr: 0.0443 - detector_cls:
0.1547 - detector_regr: 0.1122
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.7
Classifier accuracy for bounding boxes from RPN: 0.959375
Loss RPN classifier: 0.030903359549120067
Loss RPN regression: 0.044257388450205326
Loss Detector classifier: 0.15465038791298866
Loss Detector regression: 0.11223613359034061
Elapsed time: 45.71200180053711
Epoch 662/1000
Average number of overlapping bounding boxes from RPN = 47.7 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0515 - rpn_regr: 0.0679 - detector_cls:
0.2041 - detector_regr: 0.1479
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.9
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.05148451353888959
Loss RPN regression: 0.06792250238358974
Loss Detector classifier: 0.20412103980779647
Loss Detector regression: 0.1478625051677227
Elapsed time: 50.595303773880005
Epoch 663/1000
Average number of overlapping bounding boxes from RPN = 49.9 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0429 - rpn_regr: 0.0471 - detector_cls:
0.1883 - detector_regr: 0.1028
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.4
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.042897989298217
Loss RPN regression: 0.04706843700259924
Loss Detector classifier: 0.1883487068116665
Loss Detector regression: 0.10280811749398708
Elapsed time: 49.78872060775757
Epoch 664/1000
Average number of overlapping bounding boxes from RPN = 44.4 for 10 previous iterations
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10/10 [==============================] - 49s - rpn_cls: 0.0516 - rpn_regr: 0.0465 - detector_cls:
0.2241 - detector_regr: 0.0926
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.4
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.0515696725808084
Loss RPN regression: 0.046508082561194895
Loss Detector classifier: 0.22407477386295796
Loss Detector regression: 0.09258748143911362
Elapsed time: 49.1850950717926
Epoch 665/1000
Average number of overlapping bounding boxes from RPN = 54.4 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0632 - rpn_regr: 0.0592 - detector_cls:
0.2695 - detector_regr: 0.1361
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.7
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.06318703200668097
Loss RPN regression: 0.05923810601234436
Loss Detector classifier: 0.2694627016782761
Loss Detector regression: 0.13606801740825175
Elapsed time: 54.91986680030823
Epoch 666/1000
Average number of overlapping bounding boxes from RPN = 57.7 for 10 previous iterations
10/10 [==============================] - 71s - rpn_cls: 0.0507 - rpn_regr: 0.0669 - detector_cls:
0.2841 - detector_regr: 0.1453
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.6
Classifier accuracy for bounding boxes from RPN: 0.878125
Loss RPN classifier: 0.05066157463006675
Loss RPN regression: 0.0668539335951209
Loss Detector classifier: 0.28406869918107985
Loss Detector regression: 0.14526931345462799
Elapsed time: 71.97181963920593
Epoch 667/1000
Average number of overlapping bounding boxes from RPN = 46.6 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0474 - rpn_regr: 0.0557 - detector_cls:
0.1877 - detector_regr: 0.1378
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.8
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.047361532610375436
Loss RPN regression: 0.05565587095916271
Loss Detector classifier: 0.18772749453783036
Loss Detector regression: 0.1377542346715927
Elapsed time: 46.26276707649231
Epoch 668/1000
Average number of overlapping bounding boxes from RPN = 48.8 for 10 previous iterations
10/10 [==============================] - 77s - rpn_cls: 0.0313 - rpn_regr: 0.0421 - detector_cls:
0.2170 - detector_regr: 0.1121
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.0
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.031269254675135014
Loss RPN regression: 0.04208724796772003
Loss Detector classifier: 0.21702634692192077
Loss Detector regression: 0.11211919486522674
Elapsed time: 77.94978046417236
Epoch 669/1000
Average number of overlapping bounding boxes from RPN = 59.0 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0434 - rpn_regr: 0.0535 - detector_cls:
0.1856 - detector_regr: 0.1196
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.0
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.04342578044161201
Loss RPN regression: 0.05347722955048084
Loss Detector classifier: 0.18560592755675315
Loss Detector regression: 0.11963489428162574
Elapsed time: 51.157087326049805
Epoch 670/1000
Average number of overlapping bounding boxes from RPN = 54.0 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0563 - rpn_regr: 0.0457 - detector_cls:
0.1898 - detector_regr: 0.0944
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.7
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.056262388825416565
Loss RPN regression: 0.045686458703130484
Loss Detector classifier: 0.1898364879190922
Loss Detector regression: 0.09438346587121486
Elapsed time: 46.2079062461853
Epoch 671/1000
Average number of overlapping bounding boxes from RPN = 47.7 for 10 previous iterations
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10/10 [==============================] - 55s - rpn_cls: 0.0742 - rpn_regr: 0.0408 - detector_cls:
0.2530 - detector_regr: 0.1158
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.7
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.07416916145011783
Loss RPN regression: 0.040768014080822465
Loss Detector classifier: 0.25296511352062223
Loss Detector regression: 0.11575172916054725
Elapsed time: 55.75312829017639
Epoch 672/1000
Average number of overlapping bounding boxes from RPN = 52.7 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0606 - rpn_regr: 0.0552 - detector_cls:
0.2059 - detector_regr: 0.1349
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.0
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.060576807893812666
Loss RPN regression: 0.05521942209452391
Loss Detector classifier: 0.2059437043964863
Loss Detector regression: 0.13492288067936897
Elapsed time: 49.98382902145386
Epoch 673/1000
Average number of overlapping bounding boxes from RPN = 57.0 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0412 - rpn_regr: 0.0596 - detector_cls:
0.2292 - detector_regr: 0.1391
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.1
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.041224641166627406
Loss RPN regression: 0.05958160702139139
Loss Detector classifier: 0.2292248338460922
Loss Detector regression: 0.13908080607652665
Elapsed time: 47.894521951675415
Epoch 674/1000
Average number of overlapping bounding boxes from RPN = 48.1 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0831 - rpn_regr: 0.0598 - detector_cls:
0.2521 - detector_regr: 0.1329
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.2
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.08306622039526701
Loss RPN regression: 0.059750885143876074
Loss Detector classifier: 0.2521448813378811
Loss Detector regression: 0.13292311504483223
Elapsed time: 51.60185527801514
Epoch 675/1000
Average number of overlapping bounding boxes from RPN = 51.2 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0549 - rpn_regr: 0.0380 - detector_cls:
0.1765 - detector_regr: 0.0904
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.8
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.05491346586495638
Loss RPN regression: 0.03800294846296311
Loss Detector classifier: 0.17650039345026017
Loss Detector regression: 0.09038260355591773
Elapsed time: 45.494833707809445
Epoch 676/1000
Average number of overlapping bounding boxes from RPN = 51.8 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0773 - rpn_regr: 0.0621 - detector_cls:
0.2100 - detector_regr: 0.1224
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.7
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.07728251405060291
Loss RPN regression: 0.062074339389801024
Loss Detector classifier: 0.2100255586206913
Loss Detector regression: 0.1223984494805336
Elapsed time: 58.7004599571228
Epoch 677/1000
Average number of overlapping bounding boxes from RPN = 59.7 for 10 previous iterations
10/10 [==============================] - 39s - rpn_cls: 0.0550 - rpn_regr: 0.0538 - detector_cls:
0.2488 - detector_regr: 0.1236
Mean number of bounding boxes from RPN overlapping ground truth boxes: 43.5
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.054951688391156495
Loss RPN regression: 0.053756493143737316
Loss Detector classifier: 0.24879891201853752
Loss Detector regression: 0.12361745089292527
Elapsed time: 39.5863995552063
Epoch 678/1000
Average number of overlapping bounding boxes from RPN = 43.5 for 10 previous iterations
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10/10 [==============================] - 59s - rpn_cls: 0.0561 - rpn_regr: 0.0647 - detector_cls:
0.2151 - detector_regr: 0.1320
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.9
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.05605865186080337
Loss RPN regression: 0.06471434906125069
Loss Detector classifier: 0.2150598406791687
Loss Detector regression: 0.1319762844592333
Elapsed time: 59.722283124923706
Epoch 679/1000
Average number of overlapping bounding boxes from RPN = 49.9 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0533 - rpn_regr: 0.0541 - detector_cls:
0.2271 - detector_regr: 0.1425
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.0
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.05327541087754071
Loss RPN regression: 0.05411188676953316
Loss Detector classifier: 0.22709986418485642
Loss Detector regression: 0.14253904968500136
Elapsed time: 49.32029366493225
Epoch 680/1000
Average number of overlapping bounding boxes from RPN = 60.0 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0658 - rpn_regr: 0.0505 - detector_cls:
0.1786 - detector_regr: 0.1078
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.2
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.06580806174315512
Loss RPN regression: 0.0504775432869792
Loss Detector classifier: 0.17861011549830436
Loss Detector regression: 0.10777953118085862
Elapsed time: 44.113654375076294
Epoch 681/1000
Average number of overlapping bounding boxes from RPN = 49.2 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0266 - rpn_regr: 0.0482 - detector_cls:
0.1812 - detector_regr: 0.1220
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.0
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.02661114539951086
Loss RPN regression: 0.0482452591881156
Loss Detector classifier: 0.18118094950914382
Loss Detector regression: 0.12204863578081131
Elapsed time: 50.65207386016846
Epoch 682/1000
Average number of overlapping bounding boxes from RPN = 57.0 for 10 previous iterations
10/10 [==============================] - 38s - rpn_cls: 0.0520 - rpn_regr: 0.0385 - detector_cls:
0.1164 - detector_regr: 0.0756
Mean number of bounding boxes from RPN overlapping ground truth boxes: 40.6
Classifier accuracy for bounding boxes from RPN: 0.959375
Loss RPN classifier: 0.0519912526011467
Loss RPN regression: 0.03853098005056381
Loss Detector classifier: 0.11640476956963539
Loss Detector regression: 0.07562575936317444
Elapsed time: 38.29890441894531
Total loss decreased from 0.2967972937971354 to 0.2825527615845203, saving weights
Epoch 683/1000
Average number of overlapping bounding boxes from RPN = 40.6 for 10 previous iterations
10/10 [==============================] - 67s - rpn_cls: 0.0517 - rpn_regr: 0.0547 - detector_cls:
0.1788 - detector_regr: 0.1139
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.5
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.051672054710797964
Loss RPN regression: 0.054703539423644545
Loss Detector classifier: 0.17876306772232056
Loss Detector regression: 0.11387946158647537
Elapsed time: 70.34049272537231
Epoch 684/1000
Average number of overlapping bounding boxes from RPN = 54.5 for 10 previous iterations
10/10 [==============================] - 73s - rpn_cls: 0.0641 - rpn_regr: 0.0527 - detector_cls:
0.2508 - detector_regr: 0.1377
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.9
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.06414699563756585
Loss RPN regression: 0.05268515218049288
Loss Detector classifier: 0.25083102732896806
Loss Detector regression: 0.1376650147140026
Elapsed time: 73.54775857925415
Epoch 685/1000
```

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Average number of overlapping bounding boxes from RPN = 59.9 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0436 - rpn_regr: 0.0449 - detector_cls:
0.1795 - detector_regr: 0.1125
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.6
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.04356631617993116
Loss RPN regression: 0.044851438514888285
Loss Detector classifier: 0.1794600747525692
Loss Detector regression: 0.11253987550735474
Elapsed time: 47.13520097732544
Epoch 686/1000
Average number of overlapping bounding boxes from RPN = 53.6 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0519 - rpn_regr: 0.0453 - detector_cls:
0.2393 - detector_regr: 0.1118
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.1
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.051928464137017724
Loss RPN regression: 0.045296143554151055
Loss Detector classifier: 0.23930810391902924
Loss Detector regression: 0.11175096035003662
Elapsed time: 45.070717573165894
Epoch 687/1000
Average number of overlapping bounding boxes from RPN = 45.1 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0380 - rpn_regr: 0.0465 - detector_cls:
0.1395 - detector_regr: 0.1092
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.8
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.03797101397067308
Loss RPN regression: 0.046500241942703725
Loss Detector classifier: 0.13945010900497437
Loss Detector regression: 0.10919012650847434
Elapsed time: 54.66089582443237
Epoch 688/1000
Average number of overlapping bounding boxes from RPN = 53.8 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0628 - rpn_regr: 0.0422 - detector_cls:
0.2205 - detector_regr: 0.1414
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.0
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.06281771687790752
Loss RPN regression: 0.04215437835082412
Loss Detector classifier: 0.22047810181975364
Loss Detector regression: 0.14138349741697312
Elapsed time: 45.85800862312317
Epoch 689/1000
Average number of overlapping bounding boxes from RPN = 52.0 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0695 - rpn_regr: 0.0484 - detector_cls:
0.1751 - detector_regr: 0.1098
Mean number of bounding boxes from RPN overlapping ground truth boxes: 41.7
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.06946513955481351
Loss RPN regression: 0.048421171866357325
Loss Detector classifier: 0.17505379542708396
Loss Detector regression: 0.1097768485546112
Elapsed time: 43.07603478431702
Epoch 690/1000
Average number of overlapping bounding boxes from RPN = 41.7 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0621 - rpn_regr: 0.0510 - detector_cls:
0.2533 - detector_regr: 0.1140
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.3
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.06212879493832588
Loss RPN regression: 0.050952343828976156
Loss Detector classifier: 0.25331203565001487
Loss Detector regression: 0.11401130557060242
Elapsed time: 49.15837478637695
Epoch 691/1000
Average number of overlapping bounding boxes from RPN = 53.3 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0499 - rpn_regr: 0.0615 - detector_cls:
0.2095 - detector_regr: 0.1380
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.9
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.04990088138729334
Loss RPN regression: 0.0614622950553894
Loss Detector classifier: 0.2095460757613182
Loss Detector regression: 0.13795286044478416
Elapsed time: 54.41742181777954
Epoch 692/1000
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Average number of overlapping bounding boxes from RPN = 60.9 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0343 - rpn_regr: 0.0437 - detector_cls:
0.1795 - detector_regr: 0.1080
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.7
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.034267912479117514
Loss RPN regression: 0.04373351354151964
Loss Detector classifier: 0.17948597446084022
Loss Detector regression: 0.10796330943703651
Elapsed time: 41.03362536430359
Epoch 693/1000
Average number of overlapping bounding boxes from RPN = 51.7 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0428 - rpn_regr: 0.0536 - detector_cls:
0.2460 - detector_regr: 0.0995
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.2
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.042786980886012314
Loss RPN regression: 0.053642479702830315
Loss Detector classifier: 0.24599529057741165
Loss Detector regression: 0.09952486604452133
Elapsed time: 46.500229597091675
Epoch 694/1000
Average number of overlapping bounding boxes from RPN = 60.2 for 10 previous iterations
10/10 [==============================] - 37s - rpn_cls: 0.0385 - rpn_regr: 0.0368 - detector_cls:
0.2008 - detector_regr: 0.0803
Mean number of bounding boxes from RPN overlapping ground truth boxes: 42.1
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.03846449707634747
Loss RPN regression: 0.0367724634706974
Loss Detector classifier: 0.20079742446541787
Loss Detector regression: 0.08029945343732833
Elapsed time: 37.846985816955566
Epoch 695/1000
Average number of overlapping bounding boxes from RPN = 42.1 for 10 previous iterations
10/10 [==============================] - 63s - rpn_cls: 0.0451 - rpn_regr: 0.0558 - detector_cls:
0.1868 - detector_regr: 0.1349
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.7
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.0451019624248147
Loss RPN regression: 0.05583418942987919
Loss Detector classifier: 0.18684375658631325
Loss Detector regression: 0.13493469059467317
Elapsed time: 63.92430305480957
Epoch 696/1000
Average number of overlapping bounding boxes from RPN = 57.7 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0520 - rpn_regr: 0.0642 - detector_cls:
0.2291 - detector_regr: 0.1194
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.7
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.05199835831299424
Loss RPN regression: 0.06420668680220842
Loss Detector classifier: 0.22914879992604256
Loss Detector regression: 0.11937644965946674
Elapsed time: 45.455262184143066
Epoch 697/1000
Average number of overlapping bounding boxes from RPN = 49.7 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0540 - rpn_regr: 0.0566 - detector_cls:
0.2342 - detector_regr: 0.0933
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.4
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.05398735022172332
Loss RPN regression: 0.056630177423357964
Loss Detector classifier: 0.23419583663344384
Loss Detector regression: 0.09326990097761154
Elapsed time: 50.42919635772705
Epoch 698/1000
Average number of overlapping bounding boxes from RPN = 47.4 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0469 - rpn_regr: 0.0574 - detector_cls:
0.2412 - detector_regr: 0.1230
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.0
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.04692312804982066
Loss RPN regression: 0.05741751715540886
Loss Detector classifier: 0.24118071049451828
Loss Detector regression: 0.12302316650748253
Elapsed time: 60.16600847244263
Epoch 699/1000
```

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Average number of overlapping bounding boxes from RPN = 54.0 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0468 - rpn_regr: 0.0485 - detector_cls:
0.2065 - detector_regr: 0.1194
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.6
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.04676567050628364
Loss RPN regression: 0.04847640804946422
Loss Detector classifier: 0.20650952830910682
Loss Detector regression: 0.11939217373728753
Elapsed time: 44.24833273887634
Epoch 700/1000
Average number of overlapping bounding boxes from RPN = 54.6 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0404 - rpn_regr: 0.0523 - detector_cls:
0.2421 - detector_regr: 0.1195
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.9
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.04044815548695624
Loss RPN regression: 0.05226464383304119
Loss Detector classifier: 0.2420843191444874
Loss Detector regression: 0.11948810592293739
Elapsed time: 53.4064679145813
Epoch 701/1000
Average number of overlapping bounding boxes from RPN = 48.9 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0406 - rpn_regr: 0.0472 - detector_cls:
0.2582 - detector_regr: 0.1295
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.2
Classifier accuracy for bounding boxes from RPN: 0.884375
Loss RPN classifier: 0.04055724791251123
Loss RPN regression: 0.04719886798411608
Loss Detector classifier: 0.25819399394094944
Loss Detector regression: 0.12954116351902484
Elapsed time: 58.44582653045654
Epoch 702/1000
Average number of overlapping bounding boxes from RPN = 44.2 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0415 - rpn_regr: 0.0497 - detector_cls:
0.2307 - detector_regr: 0.1081
Mean number of bounding boxes from RPN overlapping ground truth boxes: 63.1
Classifier accuracy for bounding boxes from RPN: 0.8875
Loss RPN classifier: 0.04145038481801748
Loss RPN regression: 0.049672945588827136
Loss Detector classifier: 0.23065231069922448
Loss Detector regression: 0.10805097408592701
Elapsed time: 48.84888696670532
Epoch 703/1000
Average number of overlapping bounding boxes from RPN = 63.1 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0644 - rpn_regr: 0.0571 - detector_cls:
0.2151 - detector_regr: 0.1152
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.5
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.06444006687961519
Loss RPN regression: 0.057119757309556006
Loss Detector classifier: 0.21513192653656005
Loss Detector regression: 0.11522497460246087
Elapsed time: 46.599257707595825
Epoch 704/1000
Average number of overlapping bounding boxes from RPN = 51.5 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0540 - rpn_regr: 0.0496 - detector_cls:
0.1550 - detector_regr: 0.1063
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.4
Classifier accuracy for bounding boxes from RPN: 0.95
Loss RPN classifier: 0.053964072419330475
Loss RPN regression: 0.04961688034236431
Loss Detector classifier: 0.15496176853775978
Loss Detector regression: 0.10631025768816471
Elapsed time: 53.73038458824158
Epoch 705/1000
Average number of overlapping bounding boxes from RPN = 51.4 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0490 - rpn_regr: 0.0559 - detector_cls:
0.2388 - detector_regr: 0.1143
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.4
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.04899682505056262
Loss RPN regression: 0.05589842759072781
Loss Detector classifier: 0.23877907507121562
Loss Detector regression: 0.11429838612675666
Elapsed time: 45.54107999801636
Epoch 706/1000
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Average number of overlapping bounding boxes from RPN = 51.4 for 10 previous iterations
10/10 [==============================] - 72s - rpn_cls: 0.0748 - rpn_regr: 0.0533 - detector_cls: 0.1919 - detector_regr: 0.1171
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.8
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.07479929868131877
Loss RPN regression: 0.0533473651856184
Loss Detector classifier: 0.19191758781671525
Loss Detector regression: 0.11714466959238053
Elapsed time: 72.65153121948242
Epoch 707/1000
Average number of overlapping bounding boxes from RPN = 49.8 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0461 - rpn_regr: 0.0451 - detector_cls: 0.1787 - detector_regr: 0.0986
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.6
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.046051031863316896
Loss RPN regression: 0.04508402720093727
Loss Detector classifier: 0.17868141531944276
Loss Detector regression: 0.09862431213259697
Elapsed time: 52.403905391693115
Epoch 708/1000
Average number of overlapping bounding boxes from RPN = 51.6 for 10 previous iterations
10/10 [==============================] - 40s - rpn_cls: 0.0456 - rpn_regr: 0.0535 - detector_cls: 0.2148 - detector_regr: 0.1164
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.4
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.04555812245234847
Loss RPN regression: 0.053460132144391534
Loss Detector classifier: 0.21475460305809974
Loss Detector regression: 0.11637077704071999
Elapsed time: 40.90721893310547
Epoch 709/1000
Average number of overlapping bounding boxes from RPN = 50.4 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0359 - rpn_regr: 0.0618 - detector_cls: 0.2695 - detector_regr: 0.1359
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.0
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.03590234126895666
Loss RPN regression: 0.061845123395323755
Loss Detector classifier: 0.2695491909980774
Loss Detector regression: 0.13589320182800294
Elapsed time: 42.31138491630554
Epoch 710/1000
Average number of overlapping bounding boxes from RPN = 47.0 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0557 - rpn_regr: 0.0742 - detector_cls: 0.2335 - detector_regr: 0.1026
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.1
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.055650381930172445
Loss RPN regression: 0.07417175509035587
Loss Detector classifier: 0.2335385039448738
Loss Detector regression: 0.10257113799452781
Elapsed time: 51.077192068099976
Epoch 711/1000
Average number of overlapping bounding boxes from RPN = 56.1 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0380 - rpn_regr: 0.0496 - detector_cls: 0.1940 - detector_regr: 0.1030
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.0
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.038026409782469274
Loss RPN regression: 0.04960080198943615
Loss Detector classifier: 0.19403668101876975
Loss Detector regression: 0.1029788065701723
Elapsed time: 54.537619829177856
Epoch 712/1000
Average number of overlapping bounding boxes from RPN = 53.0 for 10 previous iterations
10/10 [==============================] - 73s - rpn_cls: 0.0486 - rpn_regr: 0.0513 - detector_cls: 0.2181 - detector_regr: 0.1267
Mean number of bounding boxes from RPN overlapping ground truth boxes: 63.1
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.04862960632890463
Loss RPN regression: 0.05125025287270546
Loss Detector classifier: 0.21809221282601357
Loss Detector regression: 0.1267101489007473
Elapsed time: 73.91569447517395
Epoch 713/1000

Epoch 713/1000
Average number of overlapping bounding boxes from RPN = 63.1 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0422 - rpn_regr: 0.0490 - detector_cls: 0.2452 - detector_regr: 0.1080
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.8
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.04219116186723113
Loss RPN regression: 0.049041159264743325
Loss Detector classifier: 0.24522272795438765
Loss Detector regression: 0.10803960151970386
Elapsed time: 47.18515372276306
Epoch 714/1000
Average number of overlapping bounding boxes from RPN = 51.8 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0536 - rpn_regr: 0.0500 - detector_cls: 0.1948 - detector_regr: 0.0972
Mean number of bounding boxes from RPN overlapping ground truth boxes: 63.1
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.05358394952490926
Loss RPN regression: 0.049992940947413446
Loss Detector classifier: 0.19483115896582603
Loss Detector regression: 0.09719001427292824
Elapsed time: 60.65434265136719
Epoch 715/1000
Average number of overlapping bounding boxes from RPN = 63.1 for 10 previous iterations
10/10 [==============================] - 68s - rpn_cls: 0.0625 - rpn_regr: 0.0543 - detector_cls: 0.2070 - detector_regr: 0.1334
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.3
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.0625365094281733
Loss RPN regression: 0.054283310659229755
Loss Detector classifier: 0.2070428855717182
Loss Detector regression: 0.13335292786359787
Elapsed time: 69.0054063796997
Epoch 716/1000
Average number of overlapping bounding boxes from RPN = 54.3 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0605 - rpn_regr: 0.0640 - detector_cls: 0.2044 - detector_regr: 0.1535
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.0
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.060466352244839074
Loss RPN regression: 0.06401534173637628
Loss Detector classifier: 0.20438691191375255
Loss Detector regression: 0.1534613087773323
Elapsed time: 53.54753041267395
Epoch 717/1000
Average number of overlapping bounding boxes from RPN = 54.0 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0540 - rpn_regr: 0.0526 - detector_cls: 0.1854 - detector_regr: 0.1291
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.0
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.054047191701829436
Loss RPN regression: 0.05264121368527412
Loss Detector classifier: 0.18540628477931023
Loss Detector regression: 0.129129122197628
Elapsed time: 54.37830114364624
Epoch 718/1000
Average number of overlapping bounding boxes from RPN = 53.0 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0658 - rpn_regr: 0.0587 - detector_cls: 0.1344 - detector_regr: 0.1097
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.2
Classifier accuracy for bounding boxes from RPN: 0.9625
Loss RPN classifier: 0.06580221075564623
Loss RPN regression: 0.058739621005952355
Loss Detector classifier: 0.13444857969880103
Loss Detector regression: 0.10970948114991189
Elapsed time: 55.15483474731445
Epoch 719/1000
Average number of overlapping bounding boxes from RPN = 55.2 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0319 - rpn_regr: 0.0573 - detector_cls: 0.1969 - detector_regr: 0.1123
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.7
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.03194192140363157
Loss RPN regression: 0.05725074131041765
Loss Detector classifier: 0.19690162241458892
Loss Detector regression: 0.1122673012316227
Elapsed time: 47.836583852767944
Epoch 720/1000

Epoch 720/1000
Average number of overlapping bounding boxes from RPN = 57.7 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0335 - rpn_regr: 0.0446 - detector_cls: 0.2187 - detector_regr: 0.0930
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.8
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.0335351062938571
Loss RPN regression: 0.04458975829184055
Loss Detector classifier: 0.21871771588921546
Loss Detector regression: 0.09296766445040702
Elapsed time: 48.675854444503784
Epoch 721/1000
Average number of overlapping bounding boxes from RPN = 47.8 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0379 - rpn_regr: 0.0503 - detector_cls: 0.1967 - detector_regr: 0.1243
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.7
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.037914916733279826
Loss RPN regression: 0.05027637593448162
Loss Detector classifier: 0.19667706415057182
Loss Detector regression: 0.12434394657611847
Elapsed time: 54.9142541885376
Epoch 722/1000
Average number of overlapping bounding boxes from RPN = 49.7 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0550 - rpn_regr: 0.0622 - detector_cls: 0.1730 - detector_regr: 0.1128
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.4
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.054994428623467685
Loss RPN regression: 0.06216703578829765
Loss Detector classifier: 0.1730220139026642
Loss Detector regression: 0.11275615021586419
Elapsed time: 49.89659571647644
Epoch 723/1000
Average number of overlapping bounding boxes from RPN = 58.4 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0410 - rpn_regr: 0.0439 - detector_cls: 0.1899 - detector_regr: 0.1223
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.8
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.04104592949151993
Loss RPN regression: 0.043906102702021596
Loss Detector classifier: 0.18993000611662864
Loss Detector regression: 0.12233667597174644
Elapsed time: 45.95660948753357
Epoch 724/1000
Average number of overlapping bounding boxes from RPN = 48.8 for 10 previous iterations
10/10 [==============================] - 34s - rpn_cls: 0.0371 - rpn_regr: 0.0523 - detector_cls: 0.1628 - detector_regr: 0.1094
Mean number of bounding boxes from RPN overlapping ground truth boxes: 35.2
Classifier accuracy for bounding boxes from RPN: 0.95
Loss RPN classifier: 0.0371416941517964
Loss RPN regression: 0.052268723398447035
Loss Detector classifier: 0.1628013603389263
Loss Detector regression: 0.1094061441719532
Elapsed time: 34.594468116760254
Epoch 725/1000
Average number of overlapping bounding boxes from RPN = 35.2 for 10 previous iterations
10/10 [==============================] - 39s - rpn_cls: 0.0438 - rpn_regr: 0.0522 - detector_cls: 0.1617 - detector_regr: 0.0990
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.8
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.04381146831437945
Loss RPN regression: 0.052188362926244736
Loss Detector classifier: 0.16167341396212578
Loss Detector regression: 0.09903473295271396
Elapsed time: 39.58289957046509
Epoch 726/1000
Average number of overlapping bounding boxes from RPN = 49.8 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0386 - rpn_regr: 0.0480 - detector_cls: 0.1393 - detector_regr: 0.1038
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.8
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.03855720688588917
Loss RPN regression: 0.048007074184715746
Loss Detector classifier: 0.1393280103802681
Loss Detector regression: 0.10380081348121166
Elapsed time: 52.726627588272095
Epoch 727/1000

Epoch 727/1000
Average number of overlapping bounding boxes from RPN = 52.8 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0513 - rpn_regr: 0.0458 - detector_cls: 0.2740 - detector_regr: 0.1004
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.7
Classifier accuracy for bounding boxes from RPN: 0.8875
Loss RPN classifier: 0.05129273836500943
Loss RPN regression: 0.04582966696470976
Loss Detector classifier: 0.27395442873239517
Loss Detector regression: 0.10036366134881973
Elapsed time: 48.234352827072144
Epoch 728/1000
Average number of overlapping bounding boxes from RPN = 60.7 for 10 previous iterations
10/10 [==============================] - 64s - rpn_cls: 0.0488 - rpn_regr: 0.0483 - detector_cls: 0.2183 - detector_regr: 0.1053
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.0
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.048770273383706805
Loss RPN regression: 0.04830063283443451
Loss Detector classifier: 0.21833811923861504
Loss Detector regression: 0.10531822890043259
Elapsed time: 64.31623387336731
Epoch 729/1000
Average number of overlapping bounding boxes from RPN = 59.0 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0509 - rpn_regr: 0.0514 - detector_cls: 0.1571 - detector_regr: 0.0973
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.7
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.05091848876327276
Loss RPN regression: 0.05135675147175789
Loss Detector classifier: 0.1570750754326582
Loss Detector regression: 0.0973414270207286
Elapsed time: 60.55554676055908
Epoch 730/1000
Average number of overlapping bounding boxes from RPN = 58.7 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0475 - rpn_regr: 0.0639 - detector_cls: 0.2176 - detector_regr: 0.1099
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.9
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.04752162215299904
Loss RPN regression: 0.06385448314249516
Loss Detector classifier: 0.21763967610895635
Loss Detector regression: 0.109851436316967
Elapsed time: 49.30816459655762
Epoch 731/1000
Average number of overlapping bounding boxes from RPN = 59.9 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0642 - rpn_regr: 0.0581 - detector_cls: 0.2732 - detector_regr: 0.1290
Mean number of bounding boxes from RPN overlapping ground truth boxes: 62.8
Classifier accuracy for bounding boxes from RPN: 0.871875
Loss RPN classifier: 0.06423812779830769
Loss RPN regression: 0.05809279289096594
Loss Detector classifier: 0.27319501265883445
Loss Detector regression: 0.1290407817810774
Elapsed time: 59.076422691345215
Epoch 732/1000
Average number of overlapping bounding boxes from RPN = 62.8 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0519 - rpn_regr: 0.0536 - detector_cls: 0.2008 - detector_regr: 0.0953
Mean number of bounding boxes from RPN overlapping ground truth boxes: 43.7
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.05189427677541971
Loss RPN regression: 0.053559070266783235
Loss Detector classifier: 0.20077719166874886
Loss Detector regression: 0.09531586356461048
Elapsed time: 42.94982051849365
Epoch 733/1000
Average number of overlapping bounding boxes from RPN = 43.7 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0401 - rpn_regr: 0.0458 - detector_cls: 0.2399 - detector_regr: 0.1128
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.5
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.040075068827718496
Loss RPN regression: 0.04578093700110912
Loss Detector classifier: 0.23989671245217323
Loss Detector regression: 0.11284250244498253
Elapsed time: 52.71514272689819
Epoch 734/1000

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Epoch 734/1000
Average number of overlapping bounding boxes from RPN = 47.5 for 10 previous iterations
10/10 [==============================] - 63s - rpn_cls: 0.0645 - rpn_regr: 0.0575 - detector_cls:
0.2361 - detector_regr: 0.1450
Mean number of bounding boxes from RPN overlapping ground truth boxes: 63.0
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.06451468938030303
Loss RPN regression: 0.05746260397136212
Loss Detector classifier: 0.23613094314932823
Loss Detector regression: 0.14496880620718003
Elapsed time: 63.80489444732666
Epoch 735/1000
Average number of overlapping bounding boxes from RPN = 63.0 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0386 - rpn_regr: 0.0420 - detector_cls:
0.1977 - detector_regr: 0.1156
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.5
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.038648156356066464
Loss RPN regression: 0.04204660356044769
Loss Detector classifier: 0.19772187620401382
Loss Detector regression: 0.11558006405830383
Elapsed time: 43.199440479278564
Epoch 736/1000
Average number of overlapping bounding boxes from RPN = 47.5 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0361 - rpn_regr: 0.0482 - detector_cls:
0.2171 - detector_regr: 0.1119
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.3
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.03609198818448931
Loss RPN regression: 0.04816807210445404
Loss Detector classifier: 0.21714355796575546
Loss Detector regression: 0.11186288967728615
Elapsed time: 55.906238079071045
Epoch 737/1000
Average number of overlapping bounding boxes from RPN = 46.3 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0476 - rpn_regr: 0.0637 - detector_cls:
0.2456 - detector_regr: 0.1393
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.1
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.047569458070211111
Loss RPN regression: 0.06371919251978397
Loss Detector classifier: 0.2455979362130165
Loss Detector regression: 0.1392805978655815
Elapsed time: 49.4358549118042
Epoch 738/1000
Average number of overlapping bounding boxes from RPN = 58.1 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0605 - rpn_regr: 0.0592 - detector_cls:
0.2594 - detector_regr: 0.1157
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.8
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.060481413593515755
Loss RPN regression: 0.059245625510811806
Loss Detector classifier: 0.25935457870364187
Loss Detector regression: 0.1156504925340414
Elapsed time: 46.74052333831787
Epoch 739/1000
Average number of overlapping bounding boxes from RPN = 53.8 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0517 - rpn_regr: 0.0616 - detector_cls:
0.1909 - detector_regr: 0.1200
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.9
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.051692985184490683
Loss RPN regression: 0.061558361165225506
Loss Detector classifier: 0.1908658280968666
Loss Detector regression: 0.12002498358488083
Elapsed time: 60.00296378135681
Epoch 740/1000
Average number of overlapping bounding boxes from RPN = 59.9 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0781 - rpn_regr: 0.0594 - detector_cls:
0.1954 - detector_regr: 0.1169
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.5
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.07810733560472727
Loss RPN regression: 0.05944235287606716
Loss Detector classifier: 0.19541733264923095
Loss Detector regression: 0.11687075830996037
Elapsed time: 47.711498737335205
Epoch 741/1000
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Epoch 741/1000
Average number of overlapping bounding boxes from RPN = 55.5 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0618 - rpn_regr: 0.0467 - detector_cls:
0.1980 - detector_regr: 0.1099
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.2
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.061835718271322546
Loss RPN regression: 0.046738180331885815
Loss Detector classifier: 0.19802046939730644
Loss Detector regression: 0.1098863858729601
Elapsed time: 44.34076976776123
Epoch 742/1000
Average number of overlapping bounding boxes from RPN = 60.2 for 10 previous iterations
10/10 [==============================] - 66s - rpn_cls: 0.0441 - rpn_regr: 0.0613 - detector_cls:
0.2579 - detector_regr: 0.1350
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.5
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.044088691007345915
Loss RPN regression: 0.06129997596144676
Loss Detector classifier: 0.25793370306491853
Loss Detector regression: 0.1349631704390049
Elapsed time: 66.21413445472717
Epoch 743/1000
Average number of overlapping bounding boxes from RPN = 54.5 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0414 - rpn_regr: 0.0514 - detector_cls:
0.2039 - detector_regr: 0.1217
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.2
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.04136050851084292
Loss RPN regression: 0.05141801461577415
Loss Detector classifier: 0.20386666879057885
Loss Detector regression: 0.12173268683254719
Elapsed time: 49.83864784240723
Epoch 744/1000
Average number of overlapping bounding boxes from RPN = 52.2 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0409 - rpn_regr: 0.0633 - detector_cls:
0.1914 - detector_regr: 0.1004
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.0
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.040892049996182324
Loss RPN regression: 0.06325744390487671
Loss Detector classifier: 0.19139134027063848
Loss Detector regression: 0.1004395067691803
Elapsed time: 49.37933659553528
Epoch 745/1000
Average number of overlapping bounding boxes from RPN = 50.0 for 10 previous iterations
10/10 [==============================] - 65s - rpn_cls: 0.0497 - rpn_regr: 0.0570 - detector_cls:
0.2050 - detector_regr: 0.1081
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.0
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.04972466630861163
Loss RPN regression: 0.057020168751478195
Loss Detector classifier: 0.20499591771513223
Loss Detector regression: 0.10807252004742622
Elapsed time: 65.87989068031311
Epoch 746/1000
Average number of overlapping bounding boxes from RPN = 52.0 for 10 previous iterations
10/10 [==============================] - 70s - rpn_cls: 0.0437 - rpn_regr: 0.0509 - detector_cls:
0.1971 - detector_regr: 0.1226
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.1
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.043664106912910935
Loss RPN regression: 0.05087057650089264
Loss Detector classifier: 0.19712570421397685
Loss Detector regression: 0.12259508371353149
Elapsed time: 70.52069187164307
Epoch 747/1000
Average number of overlapping bounding boxes from RPN = 54.1 for 10 previous iterations
10/10 [==============================] - 68s - rpn_cls: 0.0611 - rpn_regr: 0.0605 - detector_cls:
0.2388 - detector_regr: 0.1352
Mean number of bounding boxes from RPN overlapping ground truth boxes: 61.1
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.06105992989614606
Loss RPN regression: 0.060522401705384254
Loss Detector classifier: 0.23881494849920273
Loss Detector regression: 0.13519015684723854
Elapsed time: 68.29356384277344
Epoch 748/1000
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Epoch 748/1000
Average number of overlapping bounding boxes from RPN = 61.1 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0423 - rpn_regr: 0.0555 - detector_cls:
0.1843 - detector_regr: 0.0977
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.4
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.04226277060806751
Loss RPN regression: 0.055530980601906775
Loss Detector classifier: 0.18427384942770003
Loss Detector regression: 0.09768584966659546
Elapsed time: 61.095399379730225
Epoch 749/1000
Average number of overlapping bounding boxes from RPN = 49.4 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0418 - rpn_regr: 0.0444 - detector_cls:
0.2004 - detector_regr: 0.1163
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.9
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.04180448660627008
Loss RPN regression: 0.04437257573008537
Loss Detector classifier: 0.20037125125527383
Loss Detector regression: 0.11630504578351974
Elapsed time: 44.617868185043335
Epoch 750/1000
Average number of overlapping bounding boxes from RPN = 48.9 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0581 - rpn_regr: 0.0454 - detector_cls:
0.1755 - detector_regr: 0.0910
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.5
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.05812265397980809
Loss RPN regression: 0.04541137982159853
Loss Detector classifier: 0.17552416697144507
Loss Detector regression: 0.09099431615322828
Elapsed time: 43.69623875617981
Epoch 751/1000
Average number of overlapping bounding boxes from RPN = 45.5 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0537 - rpn_regr: 0.0432 - detector_cls:
0.2101 - detector_regr: 0.1058
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.3
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.05372297689318657
Loss RPN regression: 0.04323082398623228
Loss Detector classifier: 0.2101144701242447
Loss Detector regression: 0.10579849854111671
Elapsed time: 52.37638282775879
Epoch 752/1000
Average number of overlapping bounding boxes from RPN = 51.3 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0481 - rpn_regr: 0.0548 - detector_cls:
0.1393 - detector_regr: 0.1204
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.1
Classifier accuracy for bounding boxes from RPN: 0.946875
Loss RPN classifier: 0.04808816080912948
Loss RPN regression: 0.05480201281607151
Loss Detector classifier: 0.13925859406590463
Loss Detector regression: 0.12036367803812027
Elapsed time: 49.45905613899231
Epoch 753/1000
Average number of overlapping bounding boxes from RPN = 53.1 for 10 previous iterations
10/10 [==============================] - 73s - rpn_cls: 0.0700 - rpn_regr: 0.0502 - detector_cls:
0.1781 - detector_regr: 0.1128
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.3
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.0700170156545937
Loss RPN regression: 0.05024274364113808
Loss Detector classifier: 0.17813806235790253
Loss Detector regression: 0.11281060129404068
Elapsed time: 73.15308022499084
Epoch 754/1000
Average number of overlapping bounding boxes from RPN = 57.3 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0540 - rpn_regr: 0.0526 - detector_cls:
0.1487 - detector_regr: 0.1086
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.8
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.053976448532193896
Loss RPN regression: 0.052564813382923604
Loss Detector classifier: 0.14869698509573936
Loss Detector regression: 0.10856380742043256
Elapsed time: 46.065680503845215
Epoch 755/1000
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Epoch 755/1000
Average number of overlapping bounding boxes from RPN = 54.8 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0436 - rpn_regr: 0.0468 - detector_cls:
0.1725 - detector_regr: 0.1088
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.4
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.043610029108822235
Loss RPN regression: 0.046770930476486686
Loss Detector classifier: 0.1725064005702734
Loss Detector regression: 0.10884692873805761
Elapsed time: 48.721410036087036
Epoch 756/1000
Average number of overlapping bounding boxes from RPN = 55.4 for 10 previous iterations
10/10 [==============================] - 39s - rpn_cls: 0.0396 - rpn_regr: 0.0408 - detector_cls:
0.1661 - detector_regr: 0.1065
Mean number of bounding boxes from RPN overlapping ground truth boxes: 41.8
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.039646534528583285
Loss RPN regression: 0.04082044996321201
Loss Detector classifier: 0.16608647741377353
Loss Detector regression: 0.10649815015494823
Elapsed time: 39.326122760772705
Epoch 757/1000
Average number of overlapping bounding boxes from RPN = 41.8 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0327 - rpn_regr: 0.0502 - detector_cls:
0.2269 - detector_regr: 0.1115
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.3
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.032710822345688936
Loss RPN regression: 0.05020572151988745
Loss Detector classifier: 0.22685638889670373
Loss Detector regression: 0.11151622086763383
Elapsed time: 43.96577072143555
Epoch 758/1000
Average number of overlapping bounding boxes from RPN = 54.3 for 10 previous iterations
10/10 [==============================] - 84s - rpn_cls: 0.0442 - rpn_regr: 0.0554 - detector_cls:
0.1712 - detector_regr: 0.1111
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.9
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.04422048225533217
Loss RPN regression: 0.055352747067809106
Loss Detector classifier: 0.1712169605307281
Loss Detector regression: 0.11114945728331804
Elapsed time: 84.5297749042511
Epoch 759/1000
Average number of overlapping bounding boxes from RPN = 52.9 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0391 - rpn_regr: 0.0453 - detector_cls:
0.2153 - detector_regr: 0.1055
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.3
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.03907153075560928
Loss RPN regression: 0.04525636602193117
Loss Detector classifier: 0.21531727090477942
Loss Detector regression: 0.1054941862821579
Elapsed time: 50.256476402282715
Epoch 760/1000
Average number of overlapping bounding boxes from RPN = 56.3 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0529 - rpn_regr: 0.0517 - detector_cls:
0.2232 - detector_regr: 0.1066
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.9
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.05291319070383906
Loss RPN regression: 0.051651508919894694
Loss Detector classifier: 0.2231676958501339
Loss Detector regression: 0.106553116440773
Elapsed time: 49.7573184967041
Epoch 761/1000
Average number of overlapping bounding boxes from RPN = 59.9 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0418 - rpn_regr: 0.0487 - detector_cls:
0.1359 - detector_regr: 0.0852
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.6
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.04178545065224171
Loss RPN regression: 0.04873865395784378
Loss Detector classifier: 0.13592039048671722
Loss Detector regression: 0.08522759452462196
Elapsed time: 45.588618516922
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Epoch 762/1000
Average number of overlapping bounding boxes from RPN = 45.6 for 10 previous iterations
10/10 [==============================] - 68s - rpn_cls: 0.0515 - rpn_regr: 0.0474 - detector_cls:
0.2266 - detector_regr: 0.1111
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.5
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.05145938396453857
Loss RPN regression: 0.04742094185203314
Loss Detector classifier: 0.22662546038627623
Loss Detector regression: 0.1110922235995531
Elapsed time: 68.32590293884277
Epoch 763/1000
Average number of overlapping bounding boxes from RPN = 59.5 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0774 - rpn_regr: 0.0540 - detector_cls:
0.2067 - detector_regr: 0.0905
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.3
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.0774157359264791
Loss RPN regression: 0.05400898773223162
Loss Detector classifier: 0.206743598356843
Loss Detector regression: 0.09051302783191204
Elapsed time: 43.97794723510742
Epoch 764/1000
Average number of overlapping bounding boxes from RPN = 48.3 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0307 - rpn_regr: 0.0454 - detector_cls:
0.2013 - detector_regr: 0.0864
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.5
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.03071920732036233
Loss RPN regression: 0.04541522413492203
Loss Detector classifier: 0.20134086795151235
Loss Detector regression: 0.08639438599348068
Elapsed time: 43.89443039894104
Epoch 765/1000
Average number of overlapping bounding boxes from RPN = 53.5 for 10 previous iterations
10/10 [==============================] - 40s - rpn_cls: 0.0411 - rpn_regr: 0.0477 - detector_cls:
0.1914 - detector_regr: 0.1040
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.5
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.04109888020902872
Loss RPN regression: 0.047671548649668695
Loss Detector classifier: 0.19136512726545335
Loss Detector regression: 0.104005266726017
Elapsed time: 40.05825757980347
Epoch 766/1000
Average number of overlapping bounding boxes from RPN = 47.5 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0479 - rpn_regr: 0.0493 - detector_cls:
0.2049 - detector_regr: 0.1154
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.3
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.04789602847304195
Loss RPN regression: 0.0492979034781456
Loss Detector classifier: 0.20489809662103653
Loss Detector regression: 0.11536098867654801
Elapsed time: 49.21137237548828
Epoch 767/1000
Average number of overlapping bounding boxes from RPN = 56.3 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0637 - rpn_regr: 0.0649 - detector_cls:
0.2132 - detector_regr: 0.0974
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.2
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.06374606471508741
Loss RPN regression: 0.06485591549426317
Loss Detector classifier: 0.21316266506910325
Loss Detector regression: 0.09738163650035858
Elapsed time: 53.799601316452026
Epoch 768/1000
Average number of overlapping bounding boxes from RPN = 52.2 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0546 - rpn_regr: 0.0497 - detector_cls:
0.2316 - detector_regr: 0.1092
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.4
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.054645274952054027
Loss RPN regression: 0.04973412249237299
Loss Detector classifier: 0.2315984360873699
Loss Detector regression: 0.10918736532330513
Elapsed time: 50.265337228775024
```

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Epoch 769/1000
Average number of overlapping bounding boxes from RPN = 60.4 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0585 - rpn_regr: 0.0622 - detector_cls:
0.2102 - detector_regr: 0.1226
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.6
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.058536292985081 67
Loss RPN regression: 0.062183980271220206
Loss Detector classifier: 0.2102285586297512
Loss Detector regression: 0.12258622795343399
Elapsed time: 52.7553391456604
Epoch 770/1000
Average number of overlapping bounding boxes from RPN = 57.6 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0544 - rpn_regr: 0.0432 - detector_cls:
0.2692 - detector_regr: 0.1030
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.6
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.054435872053727505
Loss RPN regression: 0.04323847834020853
Loss Detector classifier: 0.2691783607006073
Loss Detector regression: 0.10296449176967144
Elapsed time: 53.88821482658386
Epoch 771/1000
Average number of overlapping bounding boxes from RPN = 57.6 for 10 previous iterations
10/10 [==============================] - 71s - rpn_cls: 0.0506 - rpn_regr: 0.0547 - detector_cls:
0.1930 - detector_regr: 0.0999
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.4
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.050618632882833484
Loss RPN regression: 0.0546590507030487
Loss Detector classifier: 0.19304344356060027
Loss Detector regression: 0.09993702732026577
Elapsed time: 71.46231508255005
Epoch 772/1000
Average number of overlapping bounding boxes from RPN = 53.4 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0390 - rpn_regr: 0.0515 - detector_cls:
0.2209 - detector_regr: 0.1115
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.6
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.038957381760701536
Loss RPN regression: 0.05150373186916113
Loss Detector classifier: 0.22089551761746407
Loss Detector regression: 0.11150898970663548
Elapsed time: 52.520660638809204
Epoch 773/1000
Average number of overlapping bounding boxes from RPN = 46.6 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0359 - rpn_regr: 0.0402 - detector_cls:
0.1361 - detector_regr: 0.0946
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.5
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.035937176831066606
Loss RPN regression: 0.04020379111170769
Loss Detector classifier: 0.13611776381731033
Loss Detector regression: 0.09464585892856121
Elapsed time: 45.929404497146606
Epoch 774/1000
Average number of overlapping bounding boxes from RPN = 57.5 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0261 - rpn_regr: 0.0459 - detector_cls:
0.2307 - detector_regr: 0.1126
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.5
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.026068120345007627
Loss RPN regression: 0.04589072689414024
Loss Detector classifier: 0.2306663490831852
Loss Detector regression: 0.1126277856528759
Elapsed time: 55.509565591812134
Epoch 775/1000
Average number of overlapping bounding boxes from RPN = 52.5 for 10 previous iterations
10/10 [==============================] - 65s - rpn_cls: 0.0523 - rpn_regr: 0.0499 - detector_cls:
0.2003 - detector_regr: 0.1006
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.1
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.05227220114320517
Loss RPN regression: 0.04987745136022568
Loss Detector classifier: 0.2003139302134514
Loss Detector regression: 0.10062063485383987
Elapsed time: 65.20057082176208
```

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Epoch 776/1000
Average number of overlapping bounding boxes from RPN = 52.1 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0410 - rpn_regr: 0.0531 - detector_cls:
0.2367 - detector_regr: 0.1012
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.7
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.040987166669219734
Loss RPN regression: 0.05313460938632488
Loss Detector classifier: 0.23671759590506553
Loss Detector regression: 0.10124326869845390
Elapsed time: 45.810784339904785
Epoch 777/1000
Average number of overlapping bounding boxes from RPN = 49.7 for 10 previous iterations
10/10 [==============================] - 62s - rpn_cls: 0.0790 - rpn_regr: 0.0521 - detector_cls:
0.2173 - detector_regr: 0.1011
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.1
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.0789780345512554
Loss RPN regression: 0.052081891708076
Loss Detector classifier: 0.21725355461239815
Loss Detector regression: 0.10113029070198536
Elapsed time: 62.232691287994385
Epoch 778/1000
Average number of overlapping bounding boxes from RPN = 52.1 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0501 - rpn_regr: 0.0557 - detector_cls:
0.2159 - detector_regr: 0.1445
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.9
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.05008469619788229
Loss RPN regression: 0.05565375946462155
Loss Detector classifier: 0.21591142416000367
Loss Detector regression: 0.14451264813542367
Elapsed time: 51.13071274757385
Epoch 779/1000
Average number of overlapping bounding boxes from RPN = 56.9 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0557 - rpn_regr: 0.0539 - detector_cls:
0.1882 - detector_regr: 0.1125
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.5
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.05571891414001584
Loss RPN regression: 0.053891432285308835
Loss Detector classifier: 0.1881603442132473
Loss Detector regression: 0.11251618489623069
Elapsed time: 54.7675461769104
Epoch 780/1000
Average number of overlapping bounding boxes from RPN = 50.5 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0440 - rpn_regr: 0.0531 - detector_cls:
0.1830 - detector_regr: 0.1209
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.6
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.04402867609169334
Loss RPN regression: 0.053099128790199755
Loss Detector classifier: 0.18296875804662704
Loss Detector regression: 0.12086640745401382
Elapsed time: 51.1646249294281
Epoch 781/1000
Average number of overlapping bounding boxes from RPN = 56.6 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0636 - rpn_regr: 0.0514 - detector_cls:
0.1931 - detector_regr: 0.0891
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.4
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.06362089049071074
Loss RPN regression: 0.05143136568367481
Loss Detector classifier: 0.19307997524738313
Loss Detector regression: 0.08910340294241906
Elapsed time: 56.15362858772278
Epoch 782/1000
Average number of overlapping bounding boxes from RPN = 55.4 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0591 - rpn_regr: 0.0461 - detector_cls:
0.1714 - detector_regr: 0.0887
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.3
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.0591238034889102
Loss RPN regression: 0.046071058697998525
Loss Detector classifier: 0.17139262072741984
Loss Detector regression: 0.0887359332293272
Elapsed time: 54.176894664764404
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Epoch 783/1000
Average number of overlapping bounding boxes from RPN = 53.3 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0662 - rpn_regr: 0.0612 - detector_cls:
0.2484 - detector_regr: 0.1346
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.5
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.06624652203172446
Loss RPN regression: 0.06116560194641352
Loss Detector classifier: 0.24843704774975778
Loss Detector regression: 0.13457524552941322
Elapsed time: 58.656492710113525
Epoch 784/1000
Average number of overlapping bounding boxes from RPN = 60.5 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0469 - rpn_regr: 0.0521 - detector_cls:
0.1665 - detector_regr: 0.0901
Mean number of bounding boxes from RPN overlapping ground truth boxes: 39.1
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.04685406470671296
Loss RPN regression: 0.052143729850649835
Loss Detector classifier: 0.1665064737200737
Loss Detector regression: 0.09005403108894824
Elapsed time: 60.03270101547241
Epoch 785/1000
Average number of overlapping bounding boxes from RPN = 39.1 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0728 - rpn_regr: 0.0613 - detector_cls:
0.2133 - detector_regr: 0.1187
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.1
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.07277731546200812
Loss RPN regression: 0.061316164769232274
Loss Detector classifier: 0.21334069296717645
Loss Detector regression: 0.11871127188205718
Elapsed time: 43.340675592422485
Epoch 786/1000
Average number of overlapping bounding boxes from RPN = 56.1 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0336 - rpn_regr: 0.0530 - detector_cls:
0.3051 - detector_regr: 0.1058
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.6
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.033624934917315843
Loss RPN regression: 0.052958807721734044
Loss Detector classifier: 0.30505126491189005
Loss Detector regression: 0.10576750002801419
Elapsed time: 55.00413990020752
Epoch 787/1000
Average number of overlapping bounding boxes from RPN = 50.6 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0586 - rpn_regr: 0.0568 - detector_cls:
0.2371 - detector_regr: 0.1326
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.6
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.058605401404201986
Loss RPN regression: 0.056837739795446394
Loss Detector classifier: 0.23712202534079552
Loss Detector regression: 0.13256665952503682
Elapsed time: 47.868882179260254
Epoch 788/1000
Average number of overlapping bounding boxes from RPN = 54.6 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0508 - rpn_regr: 0.0574 - detector_cls:
0.2129 - detector_regr: 0.1012
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.2
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.05079879146069288
Loss RPN regression: 0.057403364963829515
Loss Detector classifier: 0.21285368017852307
Loss Detector regression: 0.10119129046797752
Elapsed time: 45.35894703865051
Epoch 789/1000
Average number of overlapping bounding boxes from RPN = 49.2 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0542 - rpn_regr: 0.0591 - detector_cls:
0.2108 - detector_regr: 0.1286
Mean number of bounding boxes from RPN overlapping ground truth boxes: 62.3
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.05420766472816467
Loss RPN regression: 0.05906931143254042
Loss Detector classifier: 0.21080624386668206
Loss Detector regression: 0.12856698110699655
Elapsed time: 48.02517747879028
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Epoch 790/1000
Average number of overlapping bounding boxes from RPN = 62.3 for 10 previous iterations
10/10 [==============================] - 67s - rpn_cls: 0.0489 - rpn_regr: 0.0671 - detector_cls:
0.2651 - detector_regr: 0.1136
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.1
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.04888934001792222
Loss RPN regression: 0.06712424010038376
Loss Detector classifier: 0.26511816009879113
Loss Detector regression: 0.11364962495863437
Elapsed time: 67.66612577438354
Epoch 791/1000
Average number of overlapping bounding boxes from RPN = 60.1 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0457 - rpn_regr: 0.0509 - detector_cls:
0.1935 - detector_regr: 0.1231
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.7
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.045686361170373856
Loss RPN regression: 0.05094683412462473
Loss Detector classifier: 0.19347054325044155
Loss Detector regression: 0.1230540007352829
Elapsed time: 48.14524698257446
Epoch 792/1000
Average number of overlapping bounding boxes from RPN = 50.7 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0581 - rpn_regr: 0.0412 - detector_cls:
0.1400 - detector_regr: 0.0947
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.2
Classifier accuracy for bounding boxes from RPN: 0.946875
Loss RPN classifier: 0.0580846989993006
Loss RPN regression: 0.04121816465631127
Loss Detector classifier: 0.1399865746498108
Loss Detector regression: 0.09466760158538819
Elapsed time: 45.5757896900177
Epoch 793/1000
Average number of overlapping bounding boxes from RPN = 49.2 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0500 - rpn_regr: 0.0493 - detector_cls:
0.2348 - detector_regr: 0.1059
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.7
Classifier accuracy for bounding boxes from RPN: 0.8875
Loss RPN classifier: 0.05001766975037754
Loss RPN regression: 0.04933752752840519
Loss Detector classifier: 0.23479948192834854
Loss Detector regression: 0.10586613155901432
Elapsed time: 56.63302826881409
Epoch 794/1000
Average number of overlapping bounding boxes from RPN = 59.7 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0452 - rpn_regr: 0.0480 - detector_cls:
0.2616 - detector_regr: 0.1291
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.5
Classifier accuracy for bounding boxes from RPN: 0.875
Loss RPN classifier: 0.04519466538913548
Loss RPN regression: 0.04798820894211531
Loss Detector classifier: 0.26156625896692276
Loss Detector regression: 0.1291192803531885
Elapsed time: 42.61839270591736
Epoch 795/1000
Average number of overlapping bounding boxes from RPN = 48.5 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0358 - rpn_regr: 0.0422 - detector_cls:
0.1835 - detector_regr: 0.0825
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.3
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.03577973044011742
Loss RPN regression: 0.042184746265411376
Loss Detector classifier: 0.18350448086857796
Loss Detector regression: 0.08252418264746667
Elapsed time: 52.63460564613342
Epoch 796/1000
Average number of overlapping bounding boxes from RPN = 50.3 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0447 - rpn_regr: 0.0467 - detector_cls:
0.1806 - detector_regr: 0.1072
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.9
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.04468658501282334
Loss RPN regression: 0.04667289666831494
Loss Detector classifier: 0.18063053600490092
Loss Detector regression: 0.10719381794333457
Elapsed time: 47.48011898994446
```

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Epoch 797/1000
Average number of overlapping bounding boxes from RPN = 55.9 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0648 - rpn_regr: 0.0573 - detector_cls:
0.2331 - detector_regr: 0.0935
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.9
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.06477512773126363
Loss RPN regression: 0.05725912358611822
Loss Detector classifier: 0.23308538794517517
Loss Detector regression: 0.09346652328968048
Elapsed time: 49.59183716773987
Epoch 798/1000
Average number of overlapping bounding boxes from RPN = 52.9 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0501 - rpn_regr: 0.0511 - detector_cls:
0.1833 - detector_regr: 0.1122
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.1
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.050094248703680934
Loss RPN regression: 0.051115385442972186
Loss Detector classifier: 0.1832513079047203
Loss Detector regression: 0.11219737380743026
Elapsed time: 52.72256875038147
Epoch 799/1000
Average number of overlapping bounding boxes from RPN = 50.1 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0519 - rpn_regr: 0.0515 - detector_cls:
0.2264 - detector_regr: 0.1115
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.0
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.051931190537288785
Loss RPN regression: 0.05147347077727318
Loss Detector classifier: 0.22644418179988862
Loss Detector regression: 0.11148336343467236
Elapsed time: 50.18979597091675
Epoch 800/1000
Average number of overlapping bounding boxes from RPN = 56.0 for 10 previous iterations
10/10 [==============================] - 38s - rpn_cls: 0.0422 - rpn_regr: 0.0509 - detector_cls:
0.1877 - detector_regr: 0.0919
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.8
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.04215715494938195
Loss RPN regression: 0.05092378184199333
Loss Detector classifier: 0.1877496436238289
Loss Detector regression: 0.09187662601470947
Elapsed time: 38.791563987731934
Epoch 801/1000
Average number of overlapping bounding boxes from RPN = 46.8 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0699 - rpn_regr: 0.0459 - detector_cls:
0.2160 - detector_regr: 0.1200
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.8
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.06991935316473245
Loss RPN regression: 0.045874124579131606
Loss Detector classifier: 0.21598368529230355
Loss Detector regression: 0.11996229495853186
Elapsed time: 46.529985427856445
Epoch 802/1000
Average number of overlapping bounding boxes from RPN = 50.8 for 10 previous iterations
10/10 [==============================] - 38s - rpn_cls: 0.0299 - rpn_regr: 0.0435 - detector_cls:
0.1837 - detector_regr: 0.1042
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.0
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.02988404226489365
Loss RPN regression: 0.0435357004404068
Loss Detector classifier: 0.18373627476394178
Loss Detector regression: 0.10423098914325238
Elapsed time: 38.80238199234009
Epoch 803/1000
Average number of overlapping bounding boxes from RPN = 47.0 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0287 - rpn_regr: 0.0481 - detector_cls:
0.2233 - detector_regr: 0.1116
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.7
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.028714026394300162
Loss RPN regression: 0.04810254909098148
Loss Detector classifier: 0.22326276004314421
Loss Detector regression: 0.11155347973108291
Elapsed time: 42.126174449920654
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Epoch 804/1000
Average number of overlapping bounding boxes from RPN = 55.7 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0441 - rpn_regr: 0.0406 - detector_cls:
0.1828 - detector_regr: 0.0744
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.7
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.044137851195409895
Loss RPN regression: 0.040551931969821 45
Loss Detector classifier: 0.18275497816503047
Loss Detector regression: 0.07443411014974118
Elapsed time: 50.68190264701843
Epoch 805/1000
Average number of overlapping bounding boxes from RPN = 44.7 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0584 - rpn_regr: 0.0500 - detector_cls:
0.2397 - detector_regr: 0.1091
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.6
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.05840580500662327
Loss RPN regression: 0.049955424107611 18
Loss Detector classifier: 0.23973342776298523
Loss Detector regression: 0.10907220095396042
Elapsed time: 46.504802942276
Epoch 806/1000
Average number of overlapping bounding boxes from RPN = 46.6 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0386 - rpn_regr: 0.0493 - detector_cls:
0.2111 - detector_regr: 0.0863
Mean number of bounding boxes from RPN overlapping ground truth boxes: 42.1
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.03855435124132782
Loss RPN regression: 0.049324662052094 94
Loss Detector classifier: 0.21114612743258476
Loss Detector regression: 0.08625830672681331
Elapsed time: 41.31912136077881
Epoch 807/1000
Average number of overlapping bounding boxes from RPN = 42.1 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0550 - rpn_regr: 0.0481 - detector_cls:
0.2554 - detector_regr: 0.1134
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.2
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.05504931453615427
Loss RPN regression: 0.048133052513003 35
Loss Detector classifier: 0.25542051866650584
Loss Detector regression: 0.11343700997531414
Elapsed time: 61.94990801811218
Epoch 808/1000
Average number of overlapping bounding boxes from RPN = 58.2 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0516 - rpn_regr: 0.0598 - detector_cls:
0.2512 - detector_regr: 0.1242
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.5
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.05155217908322811
Loss RPN regression: 0.059797861427068 71
Loss Detector classifier: 0.25120813995599744
Loss Detector regression: 0.12422925308346748
Elapsed time: 51.69658899307251
Epoch 809/1000
Average number of overlapping bounding boxes from RPN = 58.5 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0479 - rpn_regr: 0.0505 - detector_cls:
0.1807 - detector_regr: 0.1351
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.4
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.04789253575727344
Loss RPN regression: 0.050525005348026 75
Loss Detector classifier: 0.18065562024712561
Loss Detector regression: 0.13508067578077315
Elapsed time: 49.240896224975586
Epoch 810/1000
Average number of overlapping bounding boxes from RPN = 59.4 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0413 - rpn_regr: 0.0702 - detector_cls:
0.3331 - detector_regr: 0.1175
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.2
Classifier accuracy for bounding boxes from RPN: 0.865625
Loss RPN classifier: 0.04132608165964484
Loss RPN regression: 0.070204827934503 56
Loss Detector classifier: 0.3330708064138889
Loss Detector regression: 0.11748842373490334
Elapsed time: 49.153271436691284
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Epoch 811/1000
Average number of overlapping bounding boxes from RPN = 48.2 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0457 - rpn_regr: 0.0433 - detector_cls:
0.1686 - detector_regr: 0.1224
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.9
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.04566490887664258
Loss RPN regression: 0.04329764246940613
Loss Detector classifier: 0.16855115965008735
Loss Detector regression: 0.1223938599228859
Elapsed time: 45.57781147956848
Epoch 812/1000
Average number of overlapping bounding boxes from RPN = 50.9 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0575 - rpn_regr: 0.0637 - detector_cls:
0.2258 - detector_regr: 0.1200
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.9
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.057476567849516866
Loss RPN regression: 0.06374442335218192
Loss Detector classifier: 0.22584391832351686
Loss Detector regression: 0.1200281672179699
Elapsed time: 51.09095120429993
Epoch 813/1000
Average number of overlapping bounding boxes from RPN = 49.9 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0443 - rpn_regr: 0.0390 - detector_cls:
0.1602 - detector_regr: 0.0921
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.4
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.044297073339112106
Loss RPN regression: 0.03900972008705139
Loss Detector classifier: 0.16023389175534247
Loss Detector regression: 0.09205542840063571
Elapsed time: 49.00447201728821
Epoch 814/1000
Average number of overlapping bounding boxes from RPN = 44.4 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0423 - rpn_regr: 0.0405 - detector_cls:
0.2111 - detector_regr: 0.0920
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.2
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.042259031580761074
Loss RPN regression: 0.04052928201854229
Loss Detector classifier: 0.21107659563422204
Loss Detector regression: 0.09204081706702709
Elapsed time: 56.646053314208984
Epoch 815/1000
Average number of overlapping bounding boxes from RPN = 57.2 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0635 - rpn_regr: 0.0500 - detector_cls:
0.1927 - detector_regr: 0.1042
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.2
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.06346989814192057
Loss RPN regression: 0.049981382489204404
Loss Detector classifier: 0.1926931358873844
Loss Detector regression: 0.1042453732341528
Elapsed time: 51.10065054893494
Epoch 816/1000
Average number of overlapping bounding boxes from RPN = 56.2 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0414 - rpn_regr: 0.0525 - detector_cls:
0.2694 - detector_regr: 0.1125
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.7
Classifier accuracy for bounding boxes from RPN: 0.8875
Loss RPN classifier: 0.04138242276385427
Loss RPN regression: 0.05249751731753349
Loss Detector classifier: 0.26940892934799193
Loss Detector regression: 0.11249605976045132
Elapsed time: 41.18094611167908
Epoch 817/1000
Average number of overlapping bounding boxes from RPN = 51.7 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0466 - rpn_regr: 0.0421 - detector_cls:
0.1925 - detector_regr: 0.1009
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.2
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.046573044441174716
Loss RPN regression: 0.04206788074225187
Loss Detector classifier: 0.19252693355083467
Loss Detector regression: 0.10093848612159491
Elapsed time: 59.82335638999939
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Epoch 818/1000
Average number of overlapping bounding boxes from RPN = 57.2 for 10 previous iterations
10/10 [==============================] - 79s - rpn_cls: 0.0343 - rpn_regr: 0.0441 - detector_cls:
0.1973 - detector_regr: 0.0884
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.2
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.034293615538626906
Loss RPN regression: 0.044066640362143514
Loss Detector classifier: 0.19727506283670665
Loss Detector regression: 0.08843360170722007
Elapsed time: 79.49616575241089
Epoch 819/1000
Average number of overlapping bounding boxes from RPN = 53.2 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0389 - rpn_regr: 0.0519 - detector_cls:
0.2227 - detector_regr: 0.1251
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.5
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.03893846194259822
Loss RPN regression: 0.051881159842014316
Loss Detector classifier: 0.22268926054239274
Loss Detector regression: 0.12509708162397146
Elapsed time: 52.72405290603638
Epoch 820/1000
Average number of overlapping bounding boxes from RPN = 58.5 for 10 previous iterations
10/10 [==============================] - 79s - rpn_cls: 0.0543 - rpn_regr: 0.0561 - detector_cls:
0.2429 - detector_regr: 0.1343
Mean number of bounding boxes from RPN overlapping ground truth boxes: 65.1
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.054274935834109785
Loss RPN regression: 0.05607277862727642
Loss Detector classifier: 0.24293114095926285
Loss Detector regression: 0.13430075906217098
Elapsed time: 80.00255155563354
Epoch 821/1000
Average number of overlapping bounding boxes from RPN = 65.1 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0578 - rpn_regr: 0.0562 - detector_cls:
0.1853 - detector_regr: 0.1151
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.2
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.057804798963479696
Loss RPN regression: 0.056209768354892733
Loss Detector classifier: 0.18533324524760247
Loss Detector regression: 0.11513441689312458
Elapsed time: 59.27885413169861
Epoch 822/1000
Average number of overlapping bounding boxes from RPN = 52.2 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0536 - rpn_regr: 0.0525 - detector_cls:
0.1891 - detector_regr: 0.0973
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.4
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.05360422639641911
Loss RPN regression: 0.05245324671268463
Loss Detector classifier: 0.1890503816306591
Loss Detector regression: 0.09732425510883332
Elapsed time: 47.9576370716095
Epoch 823/1000
Average number of overlapping bounding boxes from RPN = 55.4 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0373 - rpn_regr: 0.0611 - detector_cls:
0.2256 - detector_regr: 0.1082
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.4
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.03725610300898552
Loss RPN regression: 0.061137448996305466
Loss Detector classifier: 0.22555591948330403
Loss Detector regression: 0.1081519540399313
Elapsed time: 56.80705523490906
Epoch 824/1000
Average number of overlapping bounding boxes from RPN = 54.4 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0534 - rpn_regr: 0.0559 - detector_cls:
0.1787 - detector_regr: 0.1278
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.7
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.053361985739320515
Loss RPN regression: 0.055925271846354006
Loss Detector classifier: 0.17871836125850676
Loss Detector regression: 0.12783191129565238
Elapsed time: 52.326520681381226
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Epoch 825/1000
Average number of overlapping bounding boxes from RPN = 52.7 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0569 - rpn_regr: 0.0548 - detector_cls: 0.1818 - detector_regr: 0.1033
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.0
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.05694057857617736
Loss RPN regression: 0.054802028462290764
Loss Detector classifier: 0.1818456918001175
Loss Detector regression: 0.10328711830079555
Elapsed time: 47.66138553619385
Epoch 826/1000
Average number of overlapping bounding boxes from RPN = 54.0 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0435 - rpn_regr: 0.0449 - detector_cls: 0.1580 - detector_regr: 0.1144
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.2
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.043489981861785 06
Loss RPN regression: 0.044894551299512385
Loss Detector classifier: 0.15799999684095384
Loss Detector regression: 0.11443951427936554
Elapsed time: 60.47726273536682
Epoch 827/1000
Average number of overlapping bounding boxes from RPN = 47.2 for 10 previous iterations
10/10 [==============================] - 62s - rpn_cls: 0.0460 - rpn_regr: 0.0563 - detector_cls: 0.2507 - detector_regr: 0.1417
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.6
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.04602541751228273
Loss RPN regression: 0.05626456364989281
Loss Detector classifier: 0.2507490158081055
Loss Detector regression: 0.14166400842368604
Elapsed time: 62.4042809009552
Epoch 828/1000
Average number of overlapping bounding boxes from RPN = 50.6 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0798 - rpn_regr: 0.0439 - detector_cls: 0.1681 - detector_regr: 0.1075
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.8
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.07983420500531793
Loss RPN regression: 0.04386472152546048
Loss Detector classifier: 0.16812703311443328
Loss Detector regression: 0.10753969997167587
Elapsed time: 48.777353286743164
Epoch 829/1000
Average number of overlapping bounding boxes from RPN = 56.8 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0660 - rpn_regr: 0.0474 - detector_cls: 0.2758 - detector_regr: 0.0997
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.3
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.06597217041999101
Loss RPN regression: 0.04742152951657772
Loss Detector classifier: 0.27581167221069336
Loss Detector regression: 0.09967251420021057
Elapsed time: 56.80654430389404
Epoch 830/1000
Average number of overlapping bounding boxes from RPN = 47.3 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0463 - rpn_regr: 0.0504 - detector_cls: 0.2099 - detector_regr: 0.1163
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.1
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.046281081531196 83
Loss RPN regression: 0.05041766557842493
Loss Detector classifier: 0.20992954075336456
Loss Detector regression: 0.11634355150163174
Elapsed time: 60.677258014678955
Epoch 831/1000
Average number of overlapping bounding boxes from RPN = 55.1 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0374 - rpn_regr: 0.0561 - detector_cls: 0.1503 - detector_regr: 0.1021
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.5
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.037432439438998696
Loss RPN regression: 0.056078674644231795
Loss Detector classifier: 0.1503363374620676
Loss Detector regression: 0.10208173356950283
Elapsed time: 54.318474531173706

Epoch 832/1000
Average number of overlapping bounding boxes from RPN = 47.5 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0580 - rpn_regr: 0.0506 - detector_cls: 0.2150 - detector_regr: 0.1058
Mean number of bounding boxes from RPN overlapping ground truth boxes: 61.4
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.05795109272003174
Loss RPN regression: 0.0505822894629091
Loss Detector classifier: 0.21497860699892044
Loss Detector regression: 0.10578327290713788
Elapsed time: 53.376882553100586
Epoch 833/1000
Average number of overlapping bounding boxes from RPN = 61.4 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0613 - rpn_regr: 0.0503 - detector_cls: 0.2927 - detector_regr: 0.1182
Mean number of bounding boxes from RPN overlapping ground truth boxes: 61.8
Classifier accuracy for bounding boxes from RPN: 0.871875
Loss RPN classifier: 0.06129494230262935
Loss RPN regression: 0.050260181166231634
Loss Detector classifier: 0.29272560179233553
Loss Detector regression: 0.11822551153600216
Elapsed time: 55.77530264854431
Epoch 834/1000
Average number of overlapping bounding boxes from RPN = 61.8 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0510 - rpn_regr: 0.0616 - detector_cls: 0.2573 - detector_regr: 0.1272
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.4
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.051026825699955224
Loss RPN regression: 0.06160518266260624
Loss Detector classifier: 0.2572918325662613
Loss Detector regression: 0.1271514855325222
Elapsed time: 55.41529655456543
Epoch 835/1000
Average number of overlapping bounding boxes from RPN = 59.4 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0606 - rpn_regr: 0.0410 - detector_cls: 0.1686 - detector_regr: 0.0813
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.3
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.06063420083373785
Loss RPN regression: 0.040951084904372693
Loss Detector classifier: 0.16855517104268075
Loss Detector regression: 0.08125492706894874
Elapsed time: 54.41540026664734
Epoch 836/1000
Average number of overlapping bounding boxes from RPN = 50.3 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0561 - rpn_regr: 0.0454 - detector_cls: 0.2067 - detector_regr: 0.0845
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.9
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.056059314217418 43
Loss RPN regression: 0.04535742476582527
Loss Detector classifier: 0.2067243166267872
Loss Detector regression: 0.08447666317224503
Elapsed time: 54.04715657234192
Epoch 837/1000
Average number of overlapping bounding boxes from RPN = 49.9 for 10 previous iterations
10/10 [==============================] - 69s - rpn_cls: 0.0523 - rpn_regr: 0.0440 - detector_cls: 0.2039 - detector_regr: 0.1060
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.0
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.05230909599922597
Loss RPN regression: 0.04397134128957987
Loss Detector classifier: 0.2039398394525051
Loss Detector regression: 0.10599663630127906
Elapsed time: 69.78123736381531
Epoch 838/1000
Average number of overlapping bounding boxes from RPN = 49.0 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0564 - rpn_regr: 0.0396 - detector_cls: 0.1960 - detector_regr: 0.1240
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.6
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.05639252569526434
Loss RPN regression: 0.039636333286762235
Loss Detector classifier: 0.19600150138139724
Loss Detector regression: 0.1239928886294365
Elapsed time: 41.348552942276

Elapsed time: 41.5400829124451
Epoch 839/1000
Average number of overlapping bounding boxes from RPN = 50.6 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0530 - rpn_regr: 0.0503 - detector_cls: 0.2250 - detector_regr: 0.1277
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.9
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.052998882718384266
Loss RPN regression: 0.05029400587081909
Loss Detector classifier: 0.22504963744431733
Loss Detector regression: 0.1276647701859474
Elapsed time: 49.95143103599548
Epoch 840/1000
Average number of overlapping bounding boxes from RPN = 54.9 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0303 - rpn_regr: 0.0421 - detector_cls: 0.1946 - detector_regr: 0.1032
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.3
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.030318254372105002
Loss RPN regression: 0.04214208070188761
Loss Detector classifier: 0.19458502233028413
Loss Detector regression: 0.10316028725355864
Elapsed time: 58.3415310382843
Epoch 841/1000
Average number of overlapping bounding boxes from RPN = 54.3 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0522 - rpn_regr: 0.0577 - detector_cls: 0.2170 - detector_regr: 0.1239
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.8
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.05215046056546271
Loss RPN regression: 0.05771941561251879
Loss Detector classifier: 0.21698700413107871
Loss Detector regression: 0.12391159832477569
Elapsed time: 60.7349693775177
Epoch 842/1000
Average number of overlapping bounding boxes from RPN = 52.8 for 10 previous iterations
10/10 [==============================] - 63s - rpn_cls: 0.0401 - rpn_regr: 0.0510 - detector_cls: 0.2013 - detector_regr: 0.0961
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.1
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.040085679036565125
Loss RPN regression: 0.050999103114008904
Loss Detector classifier: 0.20130960159003736
Loss Detector regression: 0.09614032171666623
Elapsed time: 63.86605095863342
Epoch 843/1000
Average number of overlapping bounding boxes from RPN = 49.1 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0386 - rpn_regr: 0.0584 - detector_cls: 0.1873 - detector_regr: 0.1173
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.9
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.038606695085763934
Loss RPN regression: 0.058414180763065815
Loss Detector classifier: 0.18734322786331176
Loss Detector regression: 0.11726284846663475
Elapsed time: 45.795018911361694
Epoch 844/1000
Average number of overlapping bounding boxes from RPN = 50.9 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0466 - rpn_regr: 0.0515 - detector_cls: 0.2091 - detector_regr: 0.1253
Mean number of bounding boxes from RPN overlapping ground truth boxes: 62.7
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.04663708442822099
Loss RPN regression: 0.05153336934745312
Loss Detector classifier: 0.20906191617250441
Loss Detector regression: 0.12532846257090569
Elapsed time: 59.37802028656006
Epoch 845/1000
Average number of overlapping bounding boxes from RPN = 62.7 for 10 previous iterations
10/10 [==============================] - 64s - rpn_cls: 0.0413 - rpn_regr: 0.0443 - detector_cls: 0.2393 - detector_regr: 0.1363
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.0
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.041329861246049406
Loss RPN regression: 0.04430883228778839
Loss Detector classifier: 0.23932484462857245
Loss Detector regression: 0.13629281409084798
Elapsed time: 64.39574074745178

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Elapsed time: 64.59574074745178
Epoch 846/1000
Average number of overlapping bounding boxes from RPN = 59.0 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0627 - rpn_regr: 0.0511 - detector_cls:
0.2713 - detector_regr: 0.1248
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.9
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.06271421238780021
Loss RPN regression: 0.051104530692100525
Loss Detector classifier: 0.271284868568182
Loss Detector regression: 0.1248246468603611
Elapsed time: 52.50395750999451
Epoch 847/1000
Average number of overlapping bounding boxes from RPN = 48.9 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0670 - rpn_regr: 0.0523 - detector_cls:
0.2141 - detector_regr: 0.1042
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.9
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.0670435399748385
Loss RPN regression: 0.052322125248610976
Loss Detector classifier: 0.21410858035087585
Loss Detector regression: 0.1042183443903923
Elapsed time: 47.92431426048279
Epoch 848/1000
Average number of overlapping bounding boxes from RPN = 54.9 for 10 previous iterations
10/10 [==============================] - 65s - rpn_cls: 0.0616 - rpn_regr: 0.0502 - detector_cls:
0.1639 - detector_regr: 0.1119
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.2
Classifier accuracy for bounding boxes from RPN: 0.946875
Loss RPN classifier: 0.061625882796943185
Loss RPN regression: 0.05016908943653107
Loss Detector classifier: 0.16387229450047017
Loss Detector regression: 0.11186525970697403
Elapsed time: 65.46934723854065
Epoch 849/1000
Average number of overlapping bounding boxes from RPN = 55.2 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0699 - rpn_regr: 0.0584 - detector_cls:
0.2123 - detector_regr: 0.1216
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.4
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.06987687349319457
Loss RPN regression: 0.05837400779128075
Loss Detector classifier: 0.21231130734086037
Loss Detector regression: 0.12158064655959606
Elapsed time: 51.513512134552
Epoch 850/1000
Average number of overlapping bounding boxes from RPN = 51.4 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0517 - rpn_regr: 0.0486 - detector_cls:
0.2385 - detector_regr: 0.1389
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.6
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.05173109769821167
Loss RPN regression: 0.04857308603823185
Loss Detector classifier: 0.2384714663028717
Loss Detector regression: 0.138896381855011
Elapsed time: 61.42672514915466
Epoch 851/1000
Average number of overlapping bounding boxes from RPN = 54.6 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0438 - rpn_regr: 0.0565 - detector_cls:
0.2677 - detector_regr: 0.1282
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.2
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.043839090317487714
Loss RPN regression: 0.05650409311056137
Loss Detector classifier: 0.26774443686008453
Loss Detector regression: 0.12824881300330163
Elapsed time: 61.64684987068176
Epoch 852/1000
Average number of overlapping bounding boxes from RPN = 57.2 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0356 - rpn_regr: 0.0501 - detector_cls:
0.2206 - detector_regr: 0.1217
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.6
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.035627797991037366
Loss RPN regression: 0.05010996758937836
Loss Detector classifier: 0.22059070095419883
Loss Detector regression: 0.12174808531999588
Elapsed time: 54.932687282562256
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Elapsed time: 54.952667262502256
Epoch 853/1000
Average number of overlapping bounding boxes from RPN = 53.6 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0238 - rpn_regr: 0.0387 - detector_cls:
0.1791 - detector_regr: 0.0973
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.3
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.023765887867193 67
Loss RPN regression: 0.038683999143540856
Loss Detector classifier: 0.17909908592700957
Loss Detector regression: 0.09730663038790226
Elapsed time: 48.444045543670654
Epoch 854/1000
Average number of overlapping bounding boxes from RPN = 44.3 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0514 - rpn_regr: 0.0639 - detector_cls:
0.2496 - detector_regr: 0.1262
Mean number of bounding boxes from RPN overlapping ground truth boxes: 43.2
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.05141728236339986
Loss RPN regression: 0.06388141214847565
Loss Detector classifier: 0.24958804808557034
Loss Detector regression: 0.12620621025562287
Elapsed time: 56.372368812561035
Epoch 855/1000
Average number of overlapping bounding boxes from RPN = 43.2 for 10 previous iterations
10/10 [==============================] - 38s - rpn_cls: 0.0475 - rpn_regr: 0.0599 - detector_cls:
0.2130 - detector_regr: 0.1039
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.6
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.047530479775741694
Loss RPN regression: 0.05987544097006321
Loss Detector classifier: 0.21302858740091324
Loss Detector regression: 0.1038836095482111
Elapsed time: 38.30721068382263
Epoch 856/1000
Average number of overlapping bounding boxes from RPN = 47.6 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0447 - rpn_regr: 0.0447 - detector_cls:
0.1914 - detector_regr: 0.0928
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.7
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.044723208784125744
Loss RPN regression: 0.04472044780850411
Loss Detector classifier: 0.19143413677811622
Loss Detector regression: 0.09281177222728729
Elapsed time: 56.21176218986511
Epoch 857/1000
Average number of overlapping bounding boxes from RPN = 52.7 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0446 - rpn_regr: 0.0489 - detector_cls:
0.1780 - detector_regr: 0.0940
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.6
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.044581898185424504
Loss RPN regression: 0.04887208314612508
Loss Detector classifier: 0.17804857194423676
Loss Detector regression: 0.09402729198336601
Elapsed time: 41.588653564453125
Epoch 858/1000
Average number of overlapping bounding boxes from RPN = 44.6 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0449 - rpn_regr: 0.0524 - detector_cls:
0.2061 - detector_regr: 0.0969
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.7
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.04492581989616155
Loss RPN regression: 0.05236852709203958
Loss Detector classifier: 0.20606746152043343
Loss Detector regression: 0.09688512422144413
Elapsed time: 56.25615167617798
Epoch 859/1000
Average number of overlapping bounding boxes from RPN = 50.7 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0302 - rpn_regr: 0.0514 - detector_cls:
0.2099 - detector_regr: 0.1105
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.0
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.030199391883797944
Loss RPN regression: 0.0514437222853303
Loss Detector classifier: 0.20988552197813987
Loss Detector regression: 0.11051557660102844
Elapsed time: 52.51020860671997
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Elapsed time: 52.51020860671997
Epoch 860/1000
Average number of overlapping bounding boxes from RPN = 52.0 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0720 - rpn_regr: 0.0469 - detector_cls:
0.1978 - detector_regr: 0.1111
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.0
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.07203329093754292
Loss RPN regression: 0.04693576078861952
Loss Detector classifier: 0.19782408326864243
Loss Detector regression: 0.11111589446663857
Elapsed time: 48.18702220916748
Epoch 861/1000
Average number of overlapping bounding boxes from RPN = 58.0 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0492 - rpn_regr: 0.0555 - detector_cls:
0.2199 - detector_regr: 0.1043
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.4
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.049163583759218456
Loss RPN regression: 0.05546171236783266
Loss Detector classifier: 0.21988682001829146
Loss Detector regression: 0.10426579564809799
Elapsed time: 48.779306173324585
Epoch 862/1000
Average number of overlapping bounding boxes from RPN = 54.4 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0466 - rpn_regr: 0.0479 - detector_cls:
0.1874 - detector_regr: 0.1081
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.4
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.04660509303212166
Loss RPN regression: 0.04793465789407492
Loss Detector classifier: 0.1874382123351097
Loss Detector regression: 0.10814101509749889
Elapsed time: 55.52869367599487
Epoch 863/1000
Average number of overlapping bounding boxes from RPN = 60.4 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0428 - rpn_regr: 0.0509 - detector_cls:
0.2008 - detector_regr: 0.1129
Mean number of bounding boxes from RPN overlapping ground truth boxes: 65.4
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.04280723514966667
Loss RPN regression: 0.050860271975398066
Loss Detector classifier: 0.20077251717448236
Loss Detector regression: 0.11289018355309963
Elapsed time: 55.04469180107117
Epoch 864/1000
Average number of overlapping bounding boxes from RPN = 65.4 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0658 - rpn_regr: 0.0479 - detector_cls:
0.1746 - detector_regr: 0.1050
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.0
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.06578877922147512
Loss RPN regression: 0.04786672368645668
Loss Detector classifier: 0.17463535703718663
Loss Detector regression: 0.10497442819178104
Elapsed time: 41.535380601882935
Epoch 865/1000
Average number of overlapping bounding boxes from RPN = 46.0 for 10 previous iterations
10/10 [==============================] - 69s - rpn_cls: 0.0317 - rpn_regr: 0.0442 - detector_cls:
0.1608 - detector_regr: 0.0833
Mean number of bounding boxes from RPN overlapping ground truth boxes: 43.7
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.031672950554639104
Loss RPN regression: 0.044230046682059765
Loss Detector classifier: 0.16077451631426812
Loss Detector regression: 0.08334179855883121
Elapsed time: 69.63361859321594
Epoch 866/1000
Average number of overlapping bounding boxes from RPN = 43.7 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0509 - rpn_regr: 0.0528 - detector_cls:
0.2307 - detector_regr: 0.1179
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.1
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.05085847610607743
Loss RPN regression: 0.052803286164999005
Loss Detector classifier: 0.23074026629328728
Loss Detector regression: 0.1178753949701786
Elapsed time: 52.01752829551697
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Elapsed time: 52.01752829551697
Epoch 867/1000
Average number of overlapping bounding boxes from RPN = 56.1 for 10 previous iterations
10/10 [==============================] - 40s - rpn_cls: 0.0416 - rpn_regr: 0.0488 - detector_cls:
0.2205 - detector_regr: 0.1168
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.4
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.04158813827671111
Loss RPN regression: 0.04883005041629076
Loss Detector classifier: 0.22048910111188888
Loss Detector regression: 0.11681904941797257
Elapsed time: 40.832801818847656
Epoch 868/1000
Average number of overlapping bounding boxes from RPN = 50.4 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0572 - rpn_regr: 0.0487 - detector_cls:
0.2341 - detector_regr: 0.1214
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.0
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.057201203610748055
Loss RPN regression: 0.04869164172559977
Loss Detector classifier: 0.2341320902109146
Loss Detector regression: 0.12138818353414535
Elapsed time: 46.952924966812134
Epoch 869/1000
Average number of overlapping bounding boxes from RPN = 52.0 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0503 - rpn_regr: 0.0653 - detector_cls:
0.2633 - detector_regr: 0.1154
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.6
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.050314531289041044
Loss RPN regression: 0.06531987152993679
Loss Detector classifier: 0.26328383237123487
Loss Detector regression: 0.1153502281755209
Elapsed time: 51.17962384223938
Epoch 870/1000
Average number of overlapping bounding boxes from RPN = 51.6 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0372 - rpn_regr: 0.0521 - detector_cls:
0.2087 - detector_regr: 0.1259
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.3
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.03724171258509159
Loss RPN regression: 0.05209615044295788
Loss Detector classifier: 0.20866496711969376
Loss Detector regression: 0.1259275831282139
Elapsed time: 42.912036418914795
Epoch 871/1000
Average number of overlapping bounding boxes from RPN = 57.3 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0373 - rpn_regr: 0.0425 - detector_cls:
0.2157 - detector_regr: 0.1228
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.2
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.03730887526180595
Loss RPN regression: 0.042515961639583114
Loss Detector classifier: 0.21570612192153932
Loss Detector regression: 0.1228397473692894
Elapsed time: 61.090065002441406
Epoch 872/1000
Average number of overlapping bounding boxes from RPN = 55.2 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0426 - rpn_regr: 0.0494 - detector_cls:
0.2082 - detector_regr: 0.1123
Mean number of bounding boxes from RPN overlapping ground truth boxes: 64.9
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.04260561577975575
Loss RPN regression: 0.04939144030213356
Loss Detector classifier: 0.20823810398578643
Loss Detector regression: 0.11232517696917058
Elapsed time: 50.51283001899719
Epoch 873/1000
Average number of overlapping bounding boxes from RPN = 64.9 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0653 - rpn_regr: 0.0592 - detector_cls:
0.2089 - detector_regr: 0.1286
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.2
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.06529892683029175
Loss RPN regression: 0.05922919698059559
Loss Detector classifier: 0.20892677903175355
Loss Detector regression: 0.1286381021142006
Elapsed time: 58.06077170085156
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Elapsed time: 58.86097717285156
Epoch 874/1000
Average number of overlapping bounding boxes from RPN = 46.2 for 10 previous iterations
10/10 [==============================] - 65s - rpn_cls: 0.0483 - rpn_regr: 0.0555 - detector_cls:
0.2184 - detector_regr: 0.0986
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.9
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.04827817697077989
Loss RPN regression: 0.05547816678881645
Loss Detector classifier: 0.21837625056505203
Loss Detector regression: 0.09863748922944068
Elapsed time: 65.2443335056305
Epoch 875/1000
Average number of overlapping bounding boxes from RPN = 57.9 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0484 - rpn_regr: 0.0444 - detector_cls:
0.2211 - detector_regr: 0.1006
Mean number of bounding boxes from RPN overlapping ground truth boxes: 42.1
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.04839900494553149
Loss RPN regression: 0.04435933418571949
Loss Detector classifier: 0.2210821747779846
Loss Detector regression: 0.10063287429511547
Elapsed time: 43.15395140647888
Epoch 876/1000
Average number of overlapping bounding boxes from RPN = 42.1 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0390 - rpn_regr: 0.0540 - detector_cls:
0.1631 - detector_regr: 0.1060
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.4
Classifier accuracy for bounding boxes from RPN: 0.946875
Loss RPN classifier: 0.0390163098461926
Loss RPN regression: 0.053978082910180095
Loss Detector classifier: 0.16306452937424182
Loss Detector regression: 0.10598689280450344
Elapsed time: 45.50022912025452
Epoch 877/1000
Average number of overlapping bounding boxes from RPN = 52.4 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0519 - rpn_regr: 0.0571 - detector_cls:
0.2448 - detector_regr: 0.1180
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.5
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.05188558865338564
Loss RPN regression: 0.05709620285779238
Loss Detector classifier: 0.24483248889446257
Loss Detector regression: 0.11800356023013592
Elapsed time: 52.40679907798767
Epoch 878/1000
Average number of overlapping bounding boxes from RPN = 58.5 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0382 - rpn_regr: 0.0455 - detector_cls:
0.2096 - detector_regr: 0.1241
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.5
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.03816606281325221
Loss RPN regression: 0.04548567663878202
Loss Detector classifier: 0.20958343595266343
Loss Detector regression: 0.12411722280085087
Elapsed time: 42.32863998413086
Epoch 879/1000
Average number of overlapping bounding boxes from RPN = 52.5 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0390 - rpn_regr: 0.0488 - detector_cls:
0.2279 - detector_regr: 0.1108
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.6
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.039016814436763525
Loss RPN regression: 0.04882796220481396
Loss Detector classifier: 0.22793762236833573
Loss Detector regression: 0.11076011285185813
Elapsed time: 51.6818733215332
Epoch 880/1000
Average number of overlapping bounding boxes from RPN = 58.6 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0444 - rpn_regr: 0.0479 - detector_cls:
0.2181 - detector_regr: 0.1289
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.6
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.04442369854077697
Loss RPN regression: 0.04788979217410087
Loss Detector classifier: 0.21812800765037538
Loss Detector regression: 0.1289449743926525
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Elapsed time: 48.10702180862427
Epoch 881/1000
Average number of overlapping bounding boxes from RPN = 50.6 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0519 - rpn_regr: 0.0471 - detector_cls:
0.2416 - detector_regr: 0.1095
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.8
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.05191454757004976
Loss RPN regression: 0.047076514922082424
Loss Detector classifier: 0.24158710539340972
Loss Detector regression: 0.1094980288296938
Elapsed time: 58.3845272064209
Epoch 882/1000
Average number of overlapping bounding boxes from RPN = 56.8 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0508 - rpn_regr: 0.0480 - detector_cls:
0.2210 - detector_regr: 0.0948
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.2
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.0508344650734216
Loss RPN regression: 0.0479692691937089
Loss Detector classifier: 0.2210301138460636
Loss Detector regression: 0.09477936699986458
Elapsed time: 45.76307249069214
Epoch 883/1000
Average number of overlapping bounding boxes from RPN = 50.2 for 10 previous iterations
10/10 [==============================] - 67s - rpn_cls: 0.0367 - rpn_regr: 0.0521 - detector_cls:
0.1381 - detector_regr: 0.0987
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.9
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.036708541307598354
Loss RPN regression: 0.05207634940743446
Loss Detector classifier: 0.13814039900898933
Loss Detector regression: 0.09870329014956951
Elapsed time: 67.21500515937805
Epoch 884/1000
Average number of overlapping bounding boxes from RPN = 54.9 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0569 - rpn_regr: 0.0461 - detector_cls:
0.1638 - detector_regr: 0.0976
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.3
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.056851804023608565
Loss RPN regression: 0.046113797649741176
Loss Detector classifier: 0.163750084862113
Loss Detector regression: 0.0976031593978405
Elapsed time: 53.11220693588257
Epoch 885/1000
Average number of overlapping bounding boxes from RPN = 46.3 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0379 - rpn_regr: 0.0387 - detector_cls:
0.1660 - detector_regr: 0.0836
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.9
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.037937844078987835
Loss RPN regression: 0.038705034926533696
Loss Detector classifier: 0.16600431352853776
Loss Detector regression: 0.08356232717633247
Elapsed time: 42.678706884384155
Epoch 886/1000
Average number of overlapping bounding boxes from RPN = 53.9 for 10 previous iterations
10/10 [==============================] - 57s - rpn_cls: 0.0386 - rpn_regr: 0.0606 - detector_cls:
0.1975 - detector_regr: 0.1192
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.7
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.038601617375388874
Loss RPN regression: 0.06064281705766916
Loss Detector classifier: 0.19751621633768082
Loss Detector regression: 0.11919242329895496
Elapsed time: 57.593037843704224
Epoch 887/1000
Average number of overlapping bounding boxes from RPN = 51.7 for 10 previous iterations
10/10 [==============================] - 69s - rpn_cls: 0.0641 - rpn_regr: 0.0478 - detector_cls:
0.1990 - detector_regr: 0.1083
Mean number of bounding boxes from RPN overlapping ground truth boxes: 64.2
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.06413183314725757
Loss RPN regression: 0.0478293526917696
Loss Detector classifier: 0.1989906206727028
Loss Detector regression: 0.10827768817543984
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Elapsed time: 69.93905115127563
Epoch 888/1000
Average number of overlapping bounding boxes from RPN = 64.2 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0492 - rpn_regr: 0.0408 - detector_cls:
0.2195 - detector_regr: 0.0974
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.2
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.04920798373641446
Loss RPN regression: 0.04076638892292976
Loss Detector classifier: 0.2194595977663994
Loss Detector regression: 0.09739542454481125
Elapsed time: 56.789055824279785
Epoch 889/1000
Average number of overlapping bounding boxes from RPN = 53.2 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0656 - rpn_regr: 0.0584 - detector_cls:
0.2826 - detector_regr: 0.1347
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.1
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.06556450969073921
Loss RPN regression: 0.058351768925786016
Loss Detector classifier: 0.2826251298189163
Loss Detector regression: 0.13472885340452195
Elapsed time: 53.29320287704468
Epoch 890/1000
Average number of overlapping bounding boxes from RPN = 55.1 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0350 - rpn_regr: 0.0442 - detector_cls:
0.1542 - detector_regr: 0.1157
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.9
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.03501227768138051
Loss RPN regression: 0.044202938489615914
Loss Detector classifier: 0.15423672497272492
Loss Detector regression: 0.11572443470358848
Elapsed time: 43.45302391052246
Epoch 891/1000
Average number of overlapping bounding boxes from RPN = 50.9 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0597 - rpn_regr: 0.0530 - detector_cls:
0.2715 - detector_regr: 0.1471
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.0
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.059711783099919556
Loss RPN regression: 0.0529775507748127
Loss Detector classifier: 0.2714952573180199
Loss Detector regression: 0.14711032658815384
Elapsed time: 58.41800808906555
Epoch 892/1000
Average number of overlapping bounding boxes from RPN = 56.0 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0612 - rpn_regr: 0.0550 - detector_cls:
0.2201 - detector_regr: 0.1140
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.2
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.061225424706935885
Loss RPN regression: 0.054951397329568864
Loss Detector classifier: 0.22011649310588838
Loss Detector regression: 0.11400173902511597
Elapsed time: 52.28911900520325
Epoch 893/1000
Average number of overlapping bounding boxes from RPN = 56.2 for 10 previous iterations
10/10 [==============================] - 73s - rpn_cls: 0.0622 - rpn_regr: 0.0565 - detector_cls:
0.1893 - detector_regr: 0.1290
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.0
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.06215957636013627
Loss RPN regression: 0.05648645460605621
Loss Detector classifier: 0.18928161449730396
Loss Detector regression: 0.12903414890170098
Elapsed time: 73.3966498374939
Epoch 894/1000
Average number of overlapping bounding boxes from RPN = 59.0 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0453 - rpn_regr: 0.0443 - detector_cls:
0.2306 - detector_regr: 0.1068
Mean number of bounding boxes from RPN overlapping ground truth boxes: 37.5
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.045253163855522874
Loss RPN regression: 0.0443457268178463
Loss Detector classifier: 0.23058354817330837
Loss Detector regression: 0.10682866349816322
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Elapsed time: 42.90639138221741
Epoch 895/1000
Average number of overlapping bounding boxes from RPN = 37.5 for 10 previous iterations
10/10 [==============================] - 39s - rpn_cls: 0.0423 - rpn_regr: 0.0447 - detector_cls:
0.1393 - detector_regr: 0.0978
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.5
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.042303902469575404
Loss RPN regression: 0.044704041071236135
Loss Detector classifier: 0.1393462408334017
Loss Detector regression: 0.09776823185384273
Elapsed time: 39.401569843292236
Epoch 896/1000
Average number of overlapping bounding boxes from RPN = 47.5 for 10 previous iterations
10/10 [==============================] - 63s - rpn_cls: 0.0518 - rpn_regr: 0.0523 - detector_cls:
0.2359 - detector_regr: 0.1215
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.0
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.05182986548170447
Loss RPN regression: 0.052327700145542624
Loss Detector classifier: 0.2359260380268097
Loss Detector regression: 0.12153852954506875
Elapsed time: 63.16161632537842
Epoch 897/1000
Average number of overlapping bounding boxes from RPN = 54.0 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0340 - rpn_regr: 0.0390 - detector_cls:
0.1744 - detector_regr: 0.0743
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.6
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.03402379078324884
Loss RPN regression: 0.03903058096766472
Loss Detector classifier: 0.17444476932287217
Loss Detector regression: 0.07426722310483455
Elapsed time: 56.70299482345581
Epoch 898/1000
Average number of overlapping bounding boxes from RPN = 53.6 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0468 - rpn_regr: 0.0494 - detector_cls:
0.1215 - detector_regr: 0.0920
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.4
Classifier accuracy for bounding boxes from RPN: 0.96875
Loss RPN classifier: 0.046762735256925224
Loss RPN regression: 0.04939223118126392
Loss Detector classifier: 0.12153530344367028
Loss Detector regression: 0.09202592205256224
Elapsed time: 47.551119565963745
Epoch 899/1000
Average number of overlapping bounding boxes from RPN = 56.4 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0595 - rpn_regr: 0.0564 - detector_cls:
0.2157 - detector_regr: 0.1036
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.9
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.05951859443448484
Loss RPN regression: 0.0563699521124363
Loss Detector classifier: 0.215675051510334
Loss Detector regression: 0.10362935997545719
Elapsed time: 43.756083965301514
Epoch 900/1000
Average number of overlapping bounding boxes from RPN = 51.9 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0402 - rpn_regr: 0.0673 - detector_cls:
0.2486 - detector_regr: 0.1208
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.2
Classifier accuracy for bounding boxes from RPN: 0.89375
Loss RPN classifier: 0.04022505301982164
Loss RPN regression: 0.06729377619922161
Loss Detector classifier: 0.24856856018304824
Loss Detector regression: 0.12080382592976094
Elapsed time: 50.89739751815796
Epoch 901/1000
Average number of overlapping bounding boxes from RPN = 52.2 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0352 - rpn_regr: 0.0517 - detector_cls:
0.1980 - detector_regr: 0.1091
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.8
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.035229103593155744
Loss RPN regression: 0.05173604134470224
Loss Detector classifier: 0.19797925278544426
Loss Detector regression: 0.109102251380682
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Elapsed time: 51.56587767601013
Epoch 902/1000
Average number of overlapping bounding boxes from RPN = 49.8 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0520 - rpn_regr: 0.0485 - detector_cls:
0.2272 - detector_regr: 0.1063
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.6
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.052039551362395284
Loss RPN regression: 0.04850945305079222
Loss Detector classifier: 0.22718870900571347
Loss Detector regression: 0.10634834766387939
Elapsed time: 47.262394428253174
Epoch 903/1000
Average number of overlapping bounding boxes from RPN = 55.6 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0650 - rpn_regr: 0.0531 - detector_cls:
0.2029 - detector_regr: 0.1079
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.5
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.06497273499844596
Loss RPN regression: 0.05306966193020344
Loss Detector classifier: 0.20290397182106973
Loss Detector regression: 0.10787679292261601
Elapsed time: 58.79066872596741
Epoch 904/1000
Average number of overlapping bounding boxes from RPN = 57.5 for 10 previous iterations
10/10 [==============================] - 62s - rpn_cls: 0.0483 - rpn_regr: 0.0428 - detector_cls:
0.1773 - detector_regr: 0.1024
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.4
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.048330134712159634
Loss RPN regression: 0.04277288019657135
Loss Detector classifier: 0.177322818338871
Loss Detector regression: 0.10237603522837162
Elapsed time: 62.49124264717102
Epoch 905/1000
Average number of overlapping bounding boxes from RPN = 56.4 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0672 - rpn_regr: 0.0503 - detector_cls:
0.1919 - detector_regr: 0.1376
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.9
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.06722939119208604
Loss RPN regression: 0.05034764688462019
Loss Detector classifier: 0.19193097874522208
Loss Detector regression: 0.1375881128013134
Elapsed time: 47.38091230392456
Epoch 906/1000
Average number of overlapping bounding boxes from RPN = 56.9 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0483 - rpn_regr: 0.0514 - detector_cls:
0.2514 - detector_regr: 0.1168
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.6
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.048259520437568426
Loss RPN regression: 0.05141471326351166
Loss Detector classifier: 0.2513651214540005
Loss Detector regression: 0.11675637923181056
Elapsed time: 49.649131774902344
Epoch 907/1000
Average number of overlapping bounding boxes from RPN = 50.6 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0441 - rpn_regr: 0.0586 - detector_cls:
0.2755 - detector_regr: 0.1493
Mean number of bounding boxes from RPN overlapping ground truth boxes: 61.5
Classifier accuracy for bounding boxes from RPN: 0.884375
Loss RPN classifier: 0.04406157217454165
Loss RPN regression: 0.058601094596087935
Loss Detector classifier: 0.2755053423345089
Loss Detector regression: 0.1492567092180252
Elapsed time: 55.12934923171997
Epoch 908/1000
Average number of overlapping bounding boxes from RPN = 61.5 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0358 - rpn_regr: 0.0442 - detector_cls:
0.1658 - detector_regr: 0.0815
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.0
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.03576347006019205
Loss RPN regression: 0.0442379517480731
Loss Detector classifier: 0.16580515056848527
Loss Detector regression: 0.08148209489881993
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Elapsed time: 42.628228187561035
Epoch 909/1000
Average number of overlapping bounding boxes from RPN = 52.0 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0579 - rpn_regr: 0.0490 - detector_cls:
0.2025 - detector_regr: 0.1223
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.3
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.057885115244425835
Loss RPN regression: 0.04899873342365026
Loss Detector classifier: 0.20246866568922997
Loss Detector regression: 0.122262067720294
Elapsed time: 61.145405530929565
Epoch 910/1000
Average number of overlapping bounding boxes from RPN = 45.3 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0454 - rpn_regr: 0.0504 - detector_cls:
0.1538 - detector_regr: 0.0964
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.0
Classifier accuracy for bounding boxes from RPN: 0.95
Loss RPN classifier: 0.04543477352708578
Loss RPN regression: 0.05043815262615681
Loss Detector classifier: 0.15376126132905482
Loss Detector regression: 0.09639501348137855
Elapsed time: 45.447829723358154
Epoch 911/1000
Average number of overlapping bounding boxes from RPN = 57.0 for 10 previous iterations
10/10 [==============================] - 57s - rpn_cls: 0.0565 - rpn_regr: 0.0565 - detector_cls:
0.2685 - detector_regr: 0.1301
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.3
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.05647638998925686
Loss RPN regression: 0.05645422078669071
Loss Detector classifier: 0.2684702709317207
Loss Detector regression: 0.13006461076438428
Elapsed time: 57.12996578216553
Epoch 912/1000
Average number of overlapping bounding boxes from RPN = 55.3 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0653 - rpn_regr: 0.0526 - detector_cls:
0.2455 - detector_regr: 0.1064
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.8
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.06531382836401463
Loss RPN regression: 0.052612202055752275
Loss Detector classifier: 0.24551046043634414
Loss Detector regression: 0.10636599622666836
Elapsed time: 53.727604389190674
Epoch 913/1000
Average number of overlapping bounding boxes from RPN = 54.8 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0518 - rpn_regr: 0.0417 - detector_cls:
0.1608 - detector_regr: 0.1129
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.4
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.05180028062313795
Loss RPN regression: 0.04173977375030517
Loss Detector classifier: 0.16078810915350913
Loss Detector regression: 0.11294768899679183
Elapsed time: 46.829174518585205
Epoch 914/1000
Average number of overlapping bounding boxes from RPN = 50.4 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0282 - rpn_regr: 0.0458 - detector_cls:
0.2439 - detector_regr: 0.0951
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.6
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.02821453628130257
Loss RPN regression: 0.04580927528440952
Loss Detector classifier: 0.24393284618854522
Loss Detector regression: 0.09506973251700401
Elapsed time: 55.00700879096985
Epoch 915/1000
Average number of overlapping bounding boxes from RPN = 51.6 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0503 - rpn_regr: 0.0611 - detector_cls:
0.2238 - detector_regr: 0.1354
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.1
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.0502556110965088
Loss RPN regression: 0.06114570870995521
Loss Detector classifier: 0.22381720021367074
Loss Detector regression: 0.1354075100272894
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Elapsed time: 59.366756200790405
Epoch 916/1000
Average number of overlapping bounding boxes from RPN = 54.1 for 10 previous iterations
10/10 [==============================] - 80s - rpn_cls: 0.0662 - rpn_regr: 0.0541 - detector_cls:
0.2083 - detector_regr: 0.1230
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.1
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.06624625772237777
Loss RPN regression: 0.05406927168369293
Loss Detector classifier: 0.20833624005317689
Loss Detector regression: 0.12303818874061108
Elapsed time: 80.65140104293823
Epoch 917/1000
Average number of overlapping bounding boxes from RPN = 56.1 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0590 - rpn_regr: 0.0465 - detector_cls:
0.2337 - detector_regr: 0.1339
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.7
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.05900156619027257
Loss RPN regression: 0.046466753259301184
Loss Detector classifier: 0.233687175065279
Loss Detector regression: 0.1339070864021778
Elapsed time: 56.887348890304565
Epoch 918/1000
Average number of overlapping bounding boxes from RPN = 50.7 for 10 previous iterations
10/10 [==============================] - 63s - rpn_cls: 0.0712 - rpn_regr: 0.0491 - detector_cls:
0.2217 - detector_regr: 0.1071
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.5
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.07116190791130066
Loss RPN regression: 0.04910021107643843
Loss Detector classifier: 0.22171987667679788
Loss Detector regression: 0.10708446502685547
Elapsed time: 63.43649339675903
Epoch 919/1000
Average number of overlapping bounding boxes from RPN = 58.5 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0701 - rpn_regr: 0.0538 - detector_cls:
0.2654 - detector_regr: 0.1250
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.6
Classifier accuracy for bounding boxes from RPN: 0.878125
Loss RPN classifier: 0.07012348524294794
Loss RPN regression: 0.05383739396929741
Loss Detector classifier: 0.2653695188462734
Loss Detector regression: 0.12495416328310967
Elapsed time: 60.602372884750366
Epoch 920/1000
Average number of overlapping bounding boxes from RPN = 59.6 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0488 - rpn_regr: 0.0459 - detector_cls:
0.1807 - detector_regr: 0.1247
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.1
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.048808754328638314
Loss RPN regression: 0.04590585418045521
Loss Detector classifier: 0.18071128576993942
Loss Detector regression: 0.12474040500819683
Elapsed time: 49.18293333053589
Epoch 921/1000
Average number of overlapping bounding boxes from RPN = 49.1 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0575 - rpn_regr: 0.0437 - detector_cls:
0.2205 - detector_regr: 0.1028
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.2
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.05752727426588535
Loss RPN regression: 0.04373564012348652
Loss Detector classifier: 0.22048208266496658
Loss Detector regression: 0.10278464294970036
Elapsed time: 59.11797475814819
Epoch 922/1000
Average number of overlapping bounding boxes from RPN = 59.2 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0569 - rpn_regr: 0.0516 - detector_cls:
0.2075 - detector_regr: 0.1346
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.7
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.05691849257564172
Loss RPN regression: 0.05160982701927423
Loss Detector classifier: 0.2075177151709795
Loss Detector regression: 0.13460638597607613
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Elapsed time: 56.24067974090576
Epoch 923/1000
Average number of overlapping bounding boxes from RPN = 47.7 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0653 - rpn_regr: 0.0472 - detector_cls:
0.2396 - detector_regr: 0.1084
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.0
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.06529002891620621
Loss RPN regression: 0.047176146693527696
Loss Detector classifier: 0.23963000290095807
Loss Detector regression: 0.10844044778496027
Elapsed time: 50.06467819213867
Epoch 924/1000
Average number of overlapping bounding boxes from RPN = 59.0 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0231 - rpn_regr: 0.0369 - detector_cls:
0.1362 - detector_regr: 0.1012
Mean number of bounding boxes from RPN overlapping ground truth boxes: 39.5
Classifier accuracy for bounding boxes from RPN: 0.953125
Loss RPN classifier: 0.023076644726097585
Loss RPN regression: 0.03693111632019282
Loss Detector classifier: 0.13623478598892688
Loss Detector regression: 0.10124544315040111
Elapsed time: 42.29126024246216
Epoch 925/1000
Average number of overlapping bounding boxes from RPN = 39.5 for 10 previous iterations
10/10 [==============================] - 64s - rpn_cls: 0.0376 - rpn_regr: 0.0358 - detector_cls:
0.1974 - detector_regr: 0.0885
Mean number of bounding boxes from RPN overlapping ground truth boxes: 43.0
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.037553809746168 55
Loss RPN regression: 0.03577392306178808
Loss Detector classifier: 0.19736776128411293
Loss Detector regression: 0.08847409412264824
Elapsed time: 64.14943051338196
Epoch 926/1000
Average number of overlapping bounding boxes from RPN = 43.0 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0485 - rpn_regr: 0.0477 - detector_cls:
0.2417 - detector_regr: 0.0930
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.6
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.048544248659163715
Loss RPN regression: 0.04769082814455032
Loss Detector classifier: 0.24171126261353493
Loss Detector regression: 0.09302222616970539
Elapsed time: 49.0962975025177
Epoch 927/1000
Average number of overlapping bounding boxes from RPN = 49.6 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0665 - rpn_regr: 0.0512 - detector_cls:
0.1837 - detector_regr: 0.1141
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.4
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.06650264956988394
Loss RPN regression: 0.05124787669628859
Loss Detector classifier: 0.18371870443224908
Loss Detector regression: 0.11406919434666633
Elapsed time: 47.508784770965576
Epoch 928/1000
Average number of overlapping bounding boxes from RPN = 56.4 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0452 - rpn_regr: 0.0549 - detector_cls:
0.1814 - detector_regr: 0.1144
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.4
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.04518056896049529
Loss RPN regression: 0.054855779744684696
Loss Detector classifier: 0.18135784827172757
Loss Detector regression: 0.11435509026050568
Elapsed time: 42.24149227142334
Epoch 929/1000
Average number of overlapping bounding boxes from RPN = 48.4 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0430 - rpn_regr: 0.0550 - detector_cls:
0.1463 - detector_regr: 0.1043
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.3
Classifier accuracy for bounding boxes from RPN: 0.95
Loss RPN classifier: 0.04296039203181863
Loss RPN regression: 0.054953303374350074
Loss Detector classifier: 0.14629476889967918
Loss Detector regression: 0.10432409942150116
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Elapsed time: 55.55634808540344
Epoch 930/1000
Average number of overlapping bounding boxes from RPN = 58.3 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0509 - rpn_regr: 0.0595 - detector_cls:
0.2188 - detector_regr: 0.1163
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.3
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.05093498816713691
Loss RPN regression: 0.059472573921084404
Loss Detector classifier: 0.21882705613970757
Loss Detector regression: 0.1163265448063612
Elapsed time: 52.618154525756836
Epoch 931/1000
Average number of overlapping bounding boxes from RPN = 56.3 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0369 - rpn_regr: 0.0470 - detector_cls:
0.2436 - detector_regr: 0.1024
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.1
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.036876450106501577
Loss RPN regression: 0.0469620019197464
Loss Detector classifier: 0.24362433552742005
Loss Detector regression: 0.10240502208471298
Elapsed time: 44.433738708496094
Epoch 932/1000
Average number of overlapping bounding boxes from RPN = 50.1 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0490 - rpn_regr: 0.0459 - detector_cls:
0.1948 - detector_regr: 0.1029
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.6
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.04901292659342289
Loss RPN regression: 0.04591491054743528
Loss Detector classifier: 0.19476353451609613
Loss Detector regression: 0.1028628632426262
Elapsed time: 56.449076414108276
Epoch 933/1000
Average number of overlapping bounding boxes from RPN = 51.6 for 10 previous iterations
10/10 [==============================] - 39s - rpn_cls: 0.0349 - rpn_regr: 0.0419 - detector_cls:
0.2303 - detector_regr: 0.1055
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.5
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.034913674998097124
Loss RPN regression: 0.04190717414021492
Loss Detector classifier: 0.23030934780836104
Loss Detector regression: 0.10553637258708477
Elapsed time: 39.890769481658936
Epoch 934/1000
Average number of overlapping bounding boxes from RPN = 48.5 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0537 - rpn_regr: 0.0529 - detector_cls:
0.1665 - detector_regr: 0.0980
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.1
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.05374140162020922
Loss RPN regression: 0.052892284188419 58
Loss Detector classifier: 0.166514628008008
Loss Detector regression: 0.09804697781801223
Elapsed time: 48.625986099243164
Epoch 935/1000
Average number of overlapping bounding boxes from RPN = 54.1 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0489 - rpn_regr: 0.0356 - detector_cls:
0.2014 - detector_regr: 0.0980
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.2
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.048925901344045994
Loss RPN regression: 0.03563094809651375
Loss Detector classifier: 0.2014228280633688
Loss Detector regression: 0.09803641140460968
Elapsed time: 48.71918773651123
Epoch 936/1000
Average number of overlapping bounding boxes from RPN = 46.2 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0589 - rpn_regr: 0.0513 - detector_cls:
0.1994 - detector_regr: 0.0991
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.1
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.058875248208642005
Loss RPN regression: 0.05133102126419544
Loss Detector classifier: 0.19944024458527565
Loss Detector regression: 0.09910158328711986
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Elapsed time: 52.10378837585449
Epoch 937/1000
Average number of overlapping bounding boxes from RPN = 59.1 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0398 - rpn_regr: 0.0384 - detector_cls:
0.1842 - detector_regr: 0.0991
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.0
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.039775447361171244
Loss RPN regression: 0.03842451311647892
Loss Detector classifier: 0.1841624915599823
Loss Detector regression: 0.09910938218235969
Elapsed time: 59.092219829559326
Epoch 938/1000
Average number of overlapping bounding boxes from RPN = 55.0 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0232 - rpn_regr: 0.0505 - detector_cls:
0.2268 - detector_regr: 0.0876
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.7
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.023202592693269252
Loss RPN regression: 0.050484496913850305
Loss Detector classifier: 0.22682213559746742
Loss Detector regression: 0.08756621070206165
Elapsed time: 53.86168885231018
Epoch 939/1000
Average number of overlapping bounding boxes from RPN = 54.7 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0602 - rpn_regr: 0.0429 - detector_cls:
0.2405 - detector_regr: 0.0989
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.5
Classifier accuracy for bounding boxes from RPN: 0.8875
Loss RPN classifier: 0.06018038764595986
Loss RPN regression: 0.04294869266450405
Loss Detector classifier: 0.24049085676670073
Loss Detector regression: 0.09887603111565113
Elapsed time: 44.52135872840881
Epoch 940/1000
Average number of overlapping bounding boxes from RPN = 50.5 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0433 - rpn_regr: 0.0560 - detector_cls:
0.1702 - detector_regr: 0.1001
Mean number of bounding boxes from RPN overlapping ground truth boxes: 51.4
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.04334785519167781
Loss RPN regression: 0.05596712082624435
Loss Detector classifier: 0.17016418129205704
Loss Detector regression: 0.10014770440757274
Elapsed time: 58.51582217216492
Epoch 941/1000
Average number of overlapping bounding boxes from RPN = 51.4 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0461 - rpn_regr: 0.0513 - detector_cls:
0.1431 - detector_regr: 0.0932
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.6
Classifier accuracy for bounding boxes from RPN: 0.953125
Loss RPN classifier: 0.046099683619104326
Loss RPN regression: 0.05129450904205442
Loss Detector classifier: 0.14310366827994586
Loss Detector regression: 0.09323574155569077
Elapsed time: 44.34395980834961
Epoch 942/1000
Average number of overlapping bounding boxes from RPN = 54.6 for 10 previous iterations
10/10 [==============================] - 57s - rpn_cls: 0.0664 - rpn_regr: 0.0676 - detector_cls:
0.3178 - detector_regr: 0.1279
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.6
Classifier accuracy for bounding boxes from RPN: 0.884375
Loss RPN classifier: 0.06641522743739188
Loss RPN regression: 0.06757433414459228
Loss Detector classifier: 0.3178271144628525
Loss Detector regression: 0.12791866436600685
Elapsed time: 57.50858426094055
Epoch 943/1000
Average number of overlapping bounding boxes from RPN = 55.6 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0658 - rpn_regr: 0.0635 - detector_cls:
0.2370 - detector_regr: 0.1118
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.1
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.06576643232256174
Loss RPN regression: 0.06354226097464562
Loss Detector classifier: 0.23703587502241136
Loss Detector regression: 0.11183022148907185
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Elapsed time: 59.10327911376953
Epoch 944/1000
Average number of overlapping bounding boxes from RPN = 54.1 for 10 previous iterations
10/10 [==============================] - 63s - rpn_cls: 0.0497 - rpn_regr: 0.0572 - detector_cls: 0.1845 - detector_regr: 0.1224
Mean number of bounding boxes from RPN overlapping ground truth boxes: 53.5
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.04974745512008667
Loss RPN regression: 0.05722368992865086
Loss Detector classifier: 0.18448506891727448
Loss Detector regression: 0.12242665924131871
Elapsed time: 63.60227394104004
Epoch 945/1000
Average number of overlapping bounding boxes from RPN = 53.5 for 10 previous iterations
10/10 [==============================] - 38s - rpn_cls: 0.0266 - rpn_regr: 0.0437 - detector_cls: 0.2282 - detector_regr: 0.0939
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.9
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.026577043021097778
Loss RPN regression: 0.04368610382080078
Loss Detector classifier: 0.22819873988628386
Loss Detector regression: 0.09394171498715878
Elapsed time: 38.70194602012634
Epoch 946/1000
Average number of overlapping bounding boxes from RPN = 46.9 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0393 - rpn_regr: 0.0543 - detector_cls: 0.2551 - detector_regr: 0.0938
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.5
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.0392605418805033
Loss RPN regression: 0.0543491804972291
Loss Detector classifier: 0.2551244989037514
Loss Detector regression: 0.09377557188272476
Elapsed time: 47.58283257484436
Epoch 947/1000
Average number of overlapping bounding boxes from RPN = 52.5 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0477 - rpn_regr: 0.0493 - detector_cls: 0.2189 - detector_regr: 0.0876
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.0
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.047651509568095204
Loss RPN regression: 0.04934711549431085
Loss Detector classifier: 0.2188610166311264
Loss Detector regression: 0.08763065375387669
Elapsed time: 46.99471092224121
Epoch 948/1000
Average number of overlapping bounding boxes from RPN = 54.0 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0707 - rpn_regr: 0.0513 - detector_cls: 0.1991 - detector_regr: 0.1439
Mean number of bounding boxes from RPN overlapping ground truth boxes: 69.1
Classifier accuracy for bounding boxes from RPN: 0.946875
Loss RPN classifier: 0.07073191944509745
Loss RPN regression: 0.0512941163033247
Loss Detector classifier: 0.19914325289428234
Loss Detector regression: 0.14394736737012864
Elapsed time: 61.83835530281067
Epoch 949/1000
Average number of overlapping bounding boxes from RPN = 69.1 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0521 - rpn_regr: 0.0568 - detector_cls: 0.1858 - detector_regr: 0.1151
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.6
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.052143702656030654
Loss RPN regression: 0.05683065764605999
Loss Detector classifier: 0.18575234115123748
Loss Detector regression: 0.11506358496844768
Elapsed time: 50.95508694648743
Epoch 950/1000
Average number of overlapping bounding boxes from RPN = 45.6 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0450 - rpn_regr: 0.0521 - detector_cls: 0.2254 - detector_regr: 0.1261
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.5
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.04495756558608264
Loss RPN regression: 0.052067391388118264
Loss Detector classifier: 0.2254285892471671
Loss Detector regression: 0.12607088424265384

Elapsed time: 53.566970109939575
Epoch 951/1000
Average number of overlapping bounding boxes from RPN = 49.5 for 10 previous iterations
10/10 [==============================] - 70s - rpn_cls: 0.0357 - rpn_regr: 0.0541 - detector_cls: 0.2013 - detector_regr: 0.1067
Mean number of bounding boxes from RPN overlapping ground truth boxes: 60.7
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.03571159178391099
Loss RPN regression: 0.054135614261031154
Loss Detector classifier: 0.20133024752140044
Loss Detector regression: 0.10674611404538155
Elapsed time: 70.49467515945435
Epoch 952/1000
Average number of overlapping bounding boxes from RPN = 60.7 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0591 - rpn_regr: 0.0651 - detector_cls: 0.2197 - detector_regr: 0.1137
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.8
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.059056208748370406
Loss RPN regression: 0.0651362169533968
Loss Detector classifier: 0.2196650005877018
Loss Detector regression: 0.1136528380215168
Elapsed time: 50.73330736160278
Epoch 953/1000
Average number of overlapping bounding boxes from RPN = 48.8 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0433 - rpn_regr: 0.0441 - detector_cls: 0.1604 - detector_regr: 0.1185
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.7
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.04330504983663559
Loss RPN regression: 0.044115610606968406
Loss Detector classifier: 0.16039720997214318
Loss Detector regression: 0.11849391758441925
Elapsed time: 53.9616436958313
Epoch 954/1000
Average number of overlapping bounding boxes from RPN = 59.7 for 10 previous iterations
10/10 [==============================] - 63s - rpn_cls: 0.0473 - rpn_regr: 0.0571 - detector_cls: 0.2044 - detector_regr: 0.1224
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.2
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.04731716057285666
Loss RPN regression: 0.05707700066268444
Loss Detector classifier: 0.20444089621305467
Loss Detector regression: 0.12242919802665711
Elapsed time: 63.49724340438843
Epoch 955/1000
Average number of overlapping bounding boxes from RPN = 58.2 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0482 - rpn_regr: 0.0545 - detector_cls: 0.2315 - detector_regr: 0.1151
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.9
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.04816007507033646
Loss RPN regression: 0.05447003841400146
Loss Detector classifier: 0.23149485066533088
Loss Detector regression: 0.11507215164601803
Elapsed time: 50.61172866821289
Epoch 956/1000
Average number of overlapping bounding boxes from RPN = 56.9 for 10 previous iterations
10/10 [==============================] - 42s - rpn_cls: 0.0501 - rpn_regr: 0.0464 - detector_cls: 0.2216 - detector_regr: 0.1079
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.3
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.05010184990242124
Loss RPN regression: 0.04642724581062794
Loss Detector classifier: 0.22160591036081315
Loss Detector regression: 0.10793197490274906
Elapsed time: 42.34747314453125
Epoch 957/1000
Average number of overlapping bounding boxes from RPN = 52.3 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0461 - rpn_regr: 0.0497 - detector_cls: 0.1458 - detector_regr: 0.1189
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.3
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.04612837897147983
Loss RPN regression: 0.04970745164901018
Loss Detector classifier: 0.14575243555009365
Loss Detector regression: 0.11888228580355645

Loss Detector regression: 0.11100220000000045
Elapsed time: 49.93918800354004
Epoch 958/1000
Average number of overlapping bounding boxes from RPN = 58.3 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0588 - rpn_regr: 0.0456 - detector_cls: 0.1961 - detector_regr: 0.1146
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.7
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.05876975967548788
Loss RPN regression: 0.04557815678417683
Loss Detector classifier: 0.19610153511166573
Loss Detector regression: 0.11456145439296961
Elapsed time: 56.63097429275513
Epoch 959/1000
Average number of overlapping bounding boxes from RPN = 52.7 for 10 previous iterations
10/10 [==============================] - 37s - rpn_cls: 0.0348 - rpn_regr: 0.0411 - detector_cls: 0.1902 - detector_regr: 0.0932
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.2
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.034822803363204
Loss RPN regression: 0.041050012968480584
Loss Detector classifier: 0.1901996687054634
Loss Detector regression: 0.093174934014678
Elapsed time: 37.44358468055725
Epoch 960/1000
Average number of overlapping bounding boxes from RPN = 46.2 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0459 - rpn_regr: 0.0522 - detector_cls: 0.1689 - detector_regr: 0.1152
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.9
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.045899809524416926
Loss RPN regression: 0.052193168364465234
Loss Detector classifier: 0.16891624107956887
Loss Detector regression: 0.11519326008856297
Elapsed time: 56.01097917556763
Epoch 961/1000
Average number of overlapping bounding boxes from RPN = 47.9 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0395 - rpn_regr: 0.0440 - detector_cls: 0.1274 - detector_regr: 0.0887
Mean number of bounding boxes from RPN overlapping ground truth boxes: 47.4
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.039480452053248884
Loss RPN regression: 0.043982863798737525
Loss Detector classifier: 0.12742442339658738
Loss Detector regression: 0.08874521721154452
Elapsed time: 41.273963928222656
Epoch 962/1000
Average number of overlapping bounding boxes from RPN = 47.4 for 10 previous iterations
10/10 [==============================] - 59s - rpn_cls: 0.0397 - rpn_regr: 0.0541 - detector_cls: 0.2592 - detector_regr: 0.1174
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.3
Classifier accuracy for bounding boxes from RPN: 0.875
Loss RPN classifier: 0.039734129281714 56
Loss RPN regression: 0.05409220308065414
Loss Detector classifier: 0.25916956141591074
Loss Detector regression: 0.11740358732640743
Elapsed time: 59.19913649559021
Epoch 963/1000
Average number of overlapping bounding boxes from RPN = 55.3 for 10 previous iterations
10/10 [==============================] - 45s - rpn_cls: 0.0235 - rpn_regr: 0.0395 - detector_cls: 0.1438 - detector_regr: 0.0939
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.2
Classifier accuracy for bounding boxes from RPN: 0.94375
Loss RPN classifier: 0.02346309325657785
Loss RPN regression: 0.039461112767457965
Loss Detector classifier: 0.14379482716321945
Loss Detector regression: 0.09388560131192207
Elapsed time: 45.345008850097656
Epoch 964/1000
Average number of overlapping bounding boxes from RPN = 55.2 for 10 previous iterations
10/10 [==============================] - 60s - rpn_cls: 0.0691 - rpn_regr: 0.0502 - detector_cls: 0.2370 - detector_regr: 0.1350
Mean number of bounding boxes from RPN overlapping ground truth boxes: 55.2
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.06911303587257862
Loss RPN regression: 0.05021040886640549
Loss Detector classifier: 0.23696521520614625
Loss Detector regression: 0.13501907438039779

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Loss Detector regression: 0.13501907450059779
Elapsed time: 60.496472120285034
Epoch 965/1000
Average number of overlapping bounding boxes from RPN = 55.2 for 10 previous iterations
10/10 [==============================] - 66s - rpn_cls: 0.0416 - rpn_regr: 0.0405 - detector_cls:
0.1749 - detector_regr: 0.0862
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.2
Classifier accuracy for bounding boxes from RPN: 0.9375
Loss RPN classifier: 0.04159588175825775
Loss RPN regression: 0.04049846464768052
Loss Detector classifier: 0.17485742270946503
Loss Detector regression: 0.08624408692121506
Elapsed time: 66.22908401489258
Epoch 966/1000
Average number of overlapping bounding boxes from RPN = 44.2 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0327 - rpn_regr: 0.0537 - detector_cls:
0.1993 - detector_regr: 0.1030
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.9
Classifier accuracy for bounding boxes from RPN: 0.896875
Loss RPN classifier: 0.032738365978002545
Loss RPN regression: 0.05371503811329603
Loss Detector classifier: 0.19932858794927596
Loss Detector regression: 0.10301463678479195
Elapsed time: 54.41686391830444
Epoch 967/1000
Average number of overlapping bounding boxes from RPN = 57.9 for 10 previous iterations
10/10 [==============================] - 58s - rpn_cls: 0.0419 - rpn_regr: 0.0454 - detector_cls:
0.2458 - detector_regr: 0.0871
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.3
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.041904175910167395
Loss RPN regression: 0.04535827785730362
Loss Detector classifier: 0.24584734588861465
Loss Detector regression: 0.08706113472580909
Elapsed time: 58.5530641078949
Epoch 968/1000
Average number of overlapping bounding boxes from RPN = 57.3 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0542 - rpn_regr: 0.0544 - detector_cls:
0.2083 - detector_regr: 0.1135
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.1
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.05416292014997452
Loss RPN regression: 0.05439168009907007
Loss Detector classifier: 0.20826386660337448
Loss Detector regression: 0.11347552314400673
Elapsed time: 47.53901124000549
Epoch 969/1000
Average number of overlapping bounding boxes from RPN = 56.1 for 10 previous iterations
10/10 [==============================] - 61s - rpn_cls: 0.0644 - rpn_regr: 0.0524 - detector_cls:
0.1847 - detector_regr: 0.0973
Mean number of bounding boxes from RPN overlapping ground truth boxes: 57.0
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.06438863854855299
Loss RPN regression: 0.052393633499741556
Loss Detector classifier: 0.18471189290285112
Loss Detector regression: 0.09728851914405823
Elapsed time: 61.844327449798584
Epoch 970/1000
Average number of overlapping bounding boxes from RPN = 57.0 for 10 previous iterations
10/10 [==============================] - 56s - rpn_cls: 0.0366 - rpn_regr: 0.0511 - detector_cls:
0.2160 - detector_regr: 0.0904
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.8
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.03656275609973818
Loss RPN regression: 0.05113272648304701
Loss Detector classifier: 0.21602922156453133
Loss Detector regression: 0.09042370989918709
Elapsed time: 56.53941488265991
Epoch 971/1000
Average number of overlapping bounding boxes from RPN = 56.8 for 10 previous iterations
10/10 [==============================] - 35s - rpn_cls: 0.0660 - rpn_regr: 0.0425 - detector_cls:
0.2334 - detector_regr: 0.0937
Mean number of bounding boxes from RPN overlapping ground truth boxes: 41.7
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.06595945917069912
Loss RPN regression: 0.04253611657768488
Loss Detector classifier: 0.2334146596491337
Loss Detector regression: 0.09372868612408639
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Loss Detector regression: 0.09572866012406059
Elapsed time: 35.25314164161682
Epoch 972/1000
Average number of overlapping bounding boxes from RPN = 41.7 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0382 - rpn_regr: 0.0527 - detector_cls:
0.1755 - detector_regr: 0.0966
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.0
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.038201134721748534
Loss RPN regression: 0.05274536367505789
Loss Detector classifier: 0.17545235976576806
Loss Detector regression: 0.09656571187078952
Elapsed time: 47.73412895202637
Epoch 973/1000
Average number of overlapping bounding boxes from RPN = 52.0 for 10 previous iterations
10/10 [==============================] - 66s - rpn_cls: 0.0769 - rpn_regr: 0.0549 - detector_cls:
0.2227 - detector_regr: 0.1183
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.3
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.07693698005750775
Loss RPN regression: 0.05492878686636686
Loss Detector classifier: 0.22265117168426513
Loss Detector regression: 0.11825310289859772
Elapsed time: 66.14825463294983
Epoch 974/1000
Average number of overlapping bounding boxes from RPN = 58.3 for 10 previous iterations
10/10 [==============================] - 51s - rpn_cls: 0.0550 - rpn_regr: 0.0610 - detector_cls:
0.1734 - detector_regr: 0.0941
Mean number of bounding boxes from RPN overlapping ground truth boxes: 46.7
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.055024283658713105
Loss RPN regression: 0.06103799007833004
Loss Detector classifier: 0.17335151750594377
Loss Detector regression: 0.09407770819962025
Elapsed time: 51.66423726081848
Epoch 975/1000
Average number of overlapping bounding boxes from RPN = 46.7 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0430 - rpn_regr: 0.0533 - detector_cls:
0.2042 - detector_regr: 0.0958
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.3
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.0429719096980989
Loss RPN regression: 0.05332555510103702
Loss Detector classifier: 0.20424849838018416
Loss Detector regression: 0.09580663368105888
Elapsed time: 53.54972243309021
Epoch 976/1000
Average number of overlapping bounding boxes from RPN = 50.3 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0456 - rpn_regr: 0.0507 - detector_cls:
0.1997 - detector_regr: 0.1054
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.2
Classifier accuracy for bounding boxes from RPN: 0.934375
Loss RPN classifier: 0.04559204913675785
Loss RPN regression: 0.050695335119962694
Loss Detector classifier: 0.19967353641986846
Loss Detector regression: 0.10540583319962024
Elapsed time: 53.987348556518555
Epoch 977/1000
Average number of overlapping bounding boxes from RPN = 56.2 for 10 previous iterations
10/10 [==============================] - 65s - rpn_cls: 0.0466 - rpn_regr: 0.0555 - detector_cls:
0.1855 - detector_regr: 0.1086
Mean number of bounding boxes from RPN overlapping ground truth boxes: 48.2
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.046551628573797646
Loss RPN regression: 0.055482224375009534
Loss Detector classifier: 0.18551692068576814
Loss Detector regression: 0.10855575129389763
Elapsed time: 65.26565718650818
Epoch 978/1000
Average number of overlapping bounding boxes from RPN = 48.2 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0404 - rpn_regr: 0.0550 - detector_cls:
0.2093 - detector_regr: 0.1078
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.4
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.040388129535131156
Loss RPN regression: 0.0549761600792408
Loss Detector classifier: 0.2093358188867569
Loss Detector regression: 0.10778868719935417
```

```
Loss Detector regression: 0.10778668719935417
Elapsed time: 44.3707971572876
Epoch 979/1000
Average number of overlapping bounding boxes from RPN = 52.4 for 10 previous iterations
10/10 [==============================] - 67s - rpn_cls: 0.0515 - rpn_regr: 0.0567 - detector_cls:
0.2312 - detector_regr: 0.1061
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.2
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.051509909448213875
Loss RPN regression: 0.056657735258340836
Loss Detector classifier: 0.23124585598707198
Loss Detector regression: 0.10608509108424187
Elapsed time: 67.30225372314453
Epoch 980/1000
Average number of overlapping bounding boxes from RPN = 54.2 for 10 previous iterations
10/10 [==============================] - 35s - rpn_cls: 0.0217 - rpn_regr: 0.0485 - detector_cls:
0.2071 - detector_regr: 0.0951
Mean number of bounding boxes from RPN overlapping ground truth boxes: 41.3
Classifier accuracy for bounding boxes from RPN: 0.915625
Loss RPN classifier: 0.021728880377486347
Loss RPN regression: 0.048506920039653775
Loss Detector classifier: 0.20709459856152534
Loss Detector regression: 0.09514230452477931
Elapsed time: 36.00099039077759
Epoch 981/1000
Average number of overlapping bounding boxes from RPN = 41.3 for 10 previous iterations
10/10 [==============================] - 44s - rpn_cls: 0.0338 - rpn_regr: 0.0460 - detector_cls:
0.2036 - detector_regr: 0.0910
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.5
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.033848296757787465
Loss RPN regression: 0.04598817601799965
Loss Detector classifier: 0.2035665163770318
Loss Detector regression: 0.09096242487430573
Elapsed time: 44.07872200012207
Epoch 982/1000
Average number of overlapping bounding boxes from RPN = 44.5 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0345 - rpn_regr: 0.0494 - detector_cls:
0.1804 - detector_regr: 0.1081
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.0
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.03452204465866089
Loss RPN regression: 0.04936263095587492
Loss Detector classifier: 0.1804039768874645
Loss Detector regression: 0.10813012644648552
Elapsed time: 54.745914459228516
Epoch 983/1000
Average number of overlapping bounding boxes from RPN = 52.0 for 10 previous iterations
10/10 [==============================] - 54s - rpn_cls: 0.0436 - rpn_regr: 0.0370 - detector_cls:
0.1628 - detector_regr: 0.1086
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.9
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.043564140400849286
Loss RPN regression: 0.037019874714314935
Loss Detector classifier: 0.16282969564199448
Loss Detector regression: 0.10855792500078679
Elapsed time: 54.700061082839966
Epoch 984/1000
Average number of overlapping bounding boxes from RPN = 50.9 for 10 previous iterations
10/10 [==============================] - 53s - rpn_cls: 0.0469 - rpn_regr: 0.0478 - detector_cls:
0.1777 - detector_regr: 0.0921
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.9
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.04686749000102282
Loss RPN regression: 0.04783417209982872
Loss Detector classifier: 0.17773275896906854
Loss Detector regression: 0.09214231017977
Elapsed time: 53.14701557159424
Epoch 985/1000
Average number of overlapping bounding boxes from RPN = 56.9 for 10 previous iterations
10/10 [==============================] - 52s - rpn_cls: 0.0418 - rpn_regr: 0.0485 - detector_cls:
0.1756 - detector_regr: 0.1121
Mean number of bounding boxes from RPN overlapping ground truth boxes: 63.2
Classifier accuracy for bounding boxes from RPN: 0.91875
Loss RPN classifier: 0.041788256447762254
Loss RPN regression: 0.048464000783860685
Loss Detector classifier: 0.1756324551999569
Loss Detector regression: 0.11214192674994706
```

```
Loss Detector regression: 0.11214182674884796
Elapsed time: 52.51393246650696
Epoch 986/1000
Average number of overlapping bounding boxes from RPN = 63.2 for 10 previous iterations
10/10 [==============================] - 46s - rpn_cls: 0.0437 - rpn_regr: 0.0491 - detector_cls:
0.2488 - detector_regr: 0.1121
Mean number of bounding boxes from RPN overlapping ground truth boxes: 49.8
Classifier accuracy for bounding boxes from RPN: 0.9
Loss RPN classifier: 0.04368202536134049
Loss RPN regression: 0.049067741446197036
Loss Detector classifier: 0.24880463033914565
Loss Detector regression: 0.11214249767363071
Elapsed time: 46.43088674545288
Epoch 987/1000
Average number of overlapping bounding boxes from RPN = 49.8 for 10 previous iterations
10/10 [==============================] - 47s - rpn_cls: 0.0467 - rpn_regr: 0.0445 - detector_cls:
0.2161 - detector_regr: 0.1196
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.1
Classifier accuracy for bounding boxes from RPN: 0.890625
Loss RPN classifier: 0.046674983901903035
Loss RPN regression: 0.044549408741295336
Loss Detector classifier: 0.21610925905406475
Loss Detector regression: 0.11960041597485542
Elapsed time: 47.60991168022156
Epoch 988/1000
Average number of overlapping bounding boxes from RPN = 54.1 for 10 previous iterations
10/10 [==============================] - 39s - rpn_cls: 0.0470 - rpn_regr: 0.0439 - detector_cls:
0.2323 - detector_regr: 0.1210
Mean number of bounding boxes from RPN overlapping ground truth boxes: 44.0
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.0470165983075276
Loss RPN regression: 0.04393783323466778
Loss Detector classifier: 0.23230544179677964
Loss Detector regression: 0.12101002112030983
Elapsed time: 39.771645307540894
Epoch 989/1000
Average number of overlapping bounding boxes from RPN = 44.0 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0487 - rpn_regr: 0.0430 - detector_cls:
0.1956 - detector_regr: 0.1169
Mean number of bounding boxes from RPN overlapping ground truth boxes: 42.8
Classifier accuracy for bounding boxes from RPN: 0.925
Loss RPN classifier: 0.048665457288734615
Loss RPN regression: 0.04296261351555586
Loss Detector classifier: 0.19561925195157528
Loss Detector regression: 0.11692717224359513
Elapsed time: 41.40014982223511
Epoch 990/1000
Average number of overlapping bounding boxes from RPN = 42.8 for 10 previous iterations
10/10 [==============================] - 62s - rpn_cls: 0.0350 - rpn_regr: 0.0453 - detector_cls:
0.2126 - detector_regr: 0.1107
Mean number of bounding boxes from RPN overlapping ground truth boxes: 63.7
Classifier accuracy for bounding boxes from RPN: 0.90625
Loss RPN classifier: 0.03497157561359927
Loss RPN regression: 0.04529017247259617
Loss Detector classifier: 0.21259222626686097
Loss Detector regression: 0.11065382659435272
Elapsed time: 62.38906168937683
Epoch 991/1000
Average number of overlapping bounding boxes from RPN = 63.7 for 10 previous iterations
10/10 [==============================] - 50s - rpn_cls: 0.0650 - rpn_regr: 0.0557 - detector_cls:
0.2356 - detector_regr: 0.1148
Mean number of bounding boxes from RPN overlapping ground truth boxes: 56.4
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.06500213220715523
Loss RPN regression: 0.05566327907145023
Loss Detector classifier: 0.2356478214263916
Loss Detector regression: 0.1148453775793314
Elapsed time: 50.50853967666626
Epoch 992/1000
Average number of overlapping bounding boxes from RPN = 56.4 for 10 previous iterations
10/10 [==============================] - 66s - rpn_cls: 0.0427 - rpn_regr: 0.0579 - detector_cls:
0.2317 - detector_regr: 0.0976
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.8
Classifier accuracy for bounding boxes from RPN: 0.921875
Loss RPN classifier: 0.042746824631467464
Loss RPN regression: 0.05794479437172413
Loss Detector classifier: 0.23167319260537625
```

```
Loss Detector regression: 0.09761548116803169
Elapsed time: 66.25400447845459
Epoch 993/1000
Average number of overlapping bounding boxes from RPN = 54.8 for 10 previous iterations
10/10 [==============================] - 41s - rpn_cls: 0.0561 - rpn_regr: 0.0453 - detector_cls:
0.1883 - detector_regr: 0.1436
Mean number of bounding boxes from RPN overlapping ground truth boxes: 45.5
Classifier accuracy for bounding boxes from RPN: 0.93125
Loss RPN classifier: 0.05611265618354082
Loss RPN regression: 0.045288090221583845
Loss Detector classifier: 0.18832313343882562
Loss Detector regression: 0.14360512532293795
Elapsed time: 41.87990355491638
Epoch 994/1000
Average number of overlapping bounding boxes from RPN = 45.5 for 10 previous iterations
10/10 [==============================] - 49s - rpn_cls: 0.0469 - rpn_regr: 0.0550 - detector_cls:
0.1430 - detector_regr: 0.1201
Mean number of bounding boxes from RPN overlapping ground truth boxes: 50.3
Classifier accuracy for bounding boxes from RPN: 0.946875
Loss RPN classifier: 0.04692221935838461
Loss RPN regression: 0.05497282948344946
Loss Detector classifier: 0.142950402200222
Loss Detector regression: 0.12010392248630523
Elapsed time: 49.50592660903931
Epoch 995/1000
Average number of overlapping bounding boxes from RPN = 50.3 for 10 previous iterations
10/10 [==============================] - 55s - rpn_cls: 0.0694 - rpn_regr: 0.0457 - detector_cls:
0.2215 - detector_regr: 0.1211
Mean number of bounding boxes from RPN overlapping ground truth boxes: 58.4
Classifier accuracy for bounding boxes from RPN: 0.903125
Loss RPN classifier: 0.06942664887756109
Loss RPN regression: 0.04569203406572342
Loss Detector classifier: 0.22153238393366337
Loss Detector regression: 0.12108215615153313
Elapsed time: 55.9059898853302
Epoch 996/1000
Average number of overlapping bounding boxes from RPN = 58.4 for 10 previous iterations
10/10 [==============================] - 57s - rpn_cls: 0.0414 - rpn_regr: 0.0500 - detector_cls:
0.1913 - detector_regr: 0.0952
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.3
Classifier accuracy for bounding boxes from RPN: 0.9125
Loss RPN classifier: 0.04136336343362927
Loss RPN regression: 0.05000711102038622
Loss Detector classifier: 0.19134059213101864
Loss Detector regression: 0.09518673121929169
Elapsed time: 57.03368043899536
Epoch 997/1000
Average number of overlapping bounding boxes from RPN = 59.3 for 10 previous iterations
10/10 [==============================] - 57s - rpn_cls: 0.0301 - rpn_regr: 0.0438 - detector_cls:
0.1667 - detector_regr: 0.0997
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.2
Classifier accuracy for bounding boxes from RPN: 0.940625
Loss RPN classifier: 0.030141263408586 38
Loss RPN regression: 0.04376998152583837
Loss Detector classifier: 0.16666697412729264
Loss Detector regression: 0.09971616007387638
Elapsed time: 57.49515199661255
Epoch 998/1000
Average number of overlapping bounding boxes from RPN = 54.2 for 10 previous iterations
10/10 [==============================] - 48s - rpn_cls: 0.0456 - rpn_regr: 0.0457 - detector_cls:
0.1549 - detector_regr: 0.1187
Mean number of bounding boxes from RPN overlapping ground truth boxes: 52.9
Classifier accuracy for bounding boxes from RPN: 0.95
Loss RPN classifier: 0.045587119460105 89
Loss RPN regression: 0.045733909122645855
Loss Detector classifier: 0.15492367818951608
Loss Detector regression: 0.11873894557356834
Elapsed time: 48.968019008636475
Epoch 999/1000
Average number of overlapping bounding boxes from RPN = 52.9 for 10 previous iterations
10/10 [==============================] - 75s - rpn_cls: 0.0618 - rpn_regr: 0.0499 - detector_cls:
0.2303 - detector_regr: 0.1143
Mean number of bounding boxes from RPN overlapping ground truth boxes: 59.5
Classifier accuracy for bounding boxes from RPN: 0.909375
Loss RPN classifier: 0.061797683499753474
Loss RPN regression: 0.04988872967660427
Loss Detector classifier: 0.2302665412425995
```

```
Loss Detector regression: 0.11425206065177917
Elapsed time: 75.80846977233887
Epoch 1000/1000
Average number of overlapping bounding boxes from RPN = 59.5 for 10 previous iterations
10/10 [==============================] - 43s - rpn_cls: 0.0248 - rpn_regr: 0.0377 - detector_cls:
0.2007 - detector_regr: 0.0916
Mean number of bounding boxes from RPN overlapping ground truth boxes: 54.2
Classifier accuracy for bounding boxes from RPN: 0.928125
Loss RPN classifier: 0.024761165771633387
Loss RPN regression: 0.03770830575376749
Loss Detector classifier: 0.20074789077043534
Loss Detector regression: 0.09157584868371486
Elapsed time: 43.701765060424805
Training complete, exiting.
```

In [0]:

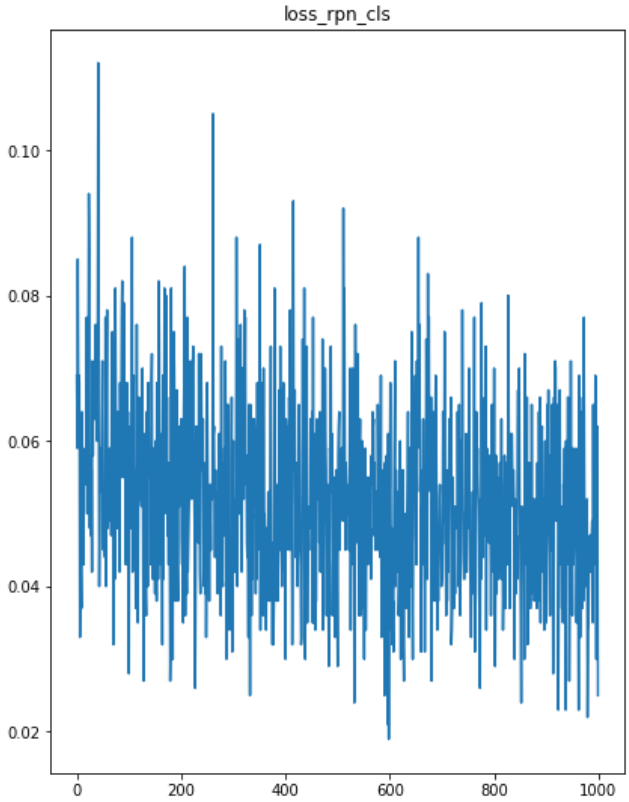
```
result = pd.read_csv("/content/drive/My Drive/rcnn/Data_model/result_df.csv")
```

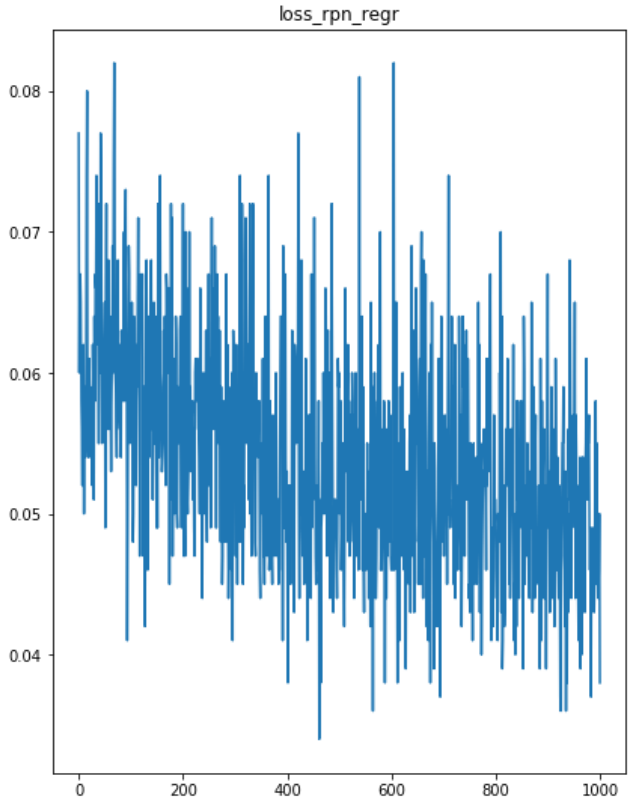
In [0]:

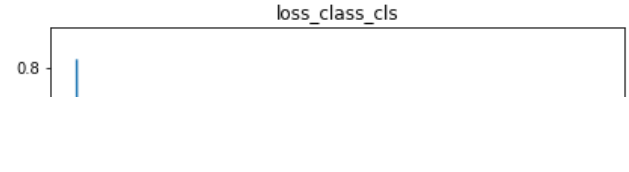
```
plt.figure(figsize=(15,20))
plt.subplot(2,2,1)
plt.plot(range(0, 1000), result['loss_rpn_cls'])
plt.title('loss_rpn_cls')
plt.subplot(2,2,2)
plt.plot(range(0, 1000), result['loss_rpn_regr'])
plt.title('loss_rpn_regr')

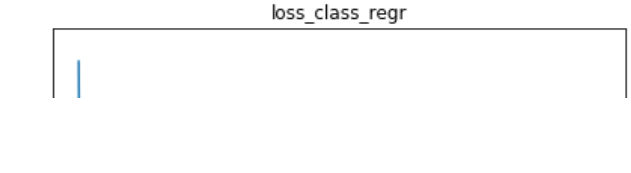
plt.subplot(2,2,3)
plt.plot(range(0, 1000), result['loss_class_cls'])
plt.title('loss_class_cls')
plt.subplot(2,2,4)
plt.plot(range(0, 1000), result['loss_class_regr'])
plt.title('loss_class_regr')

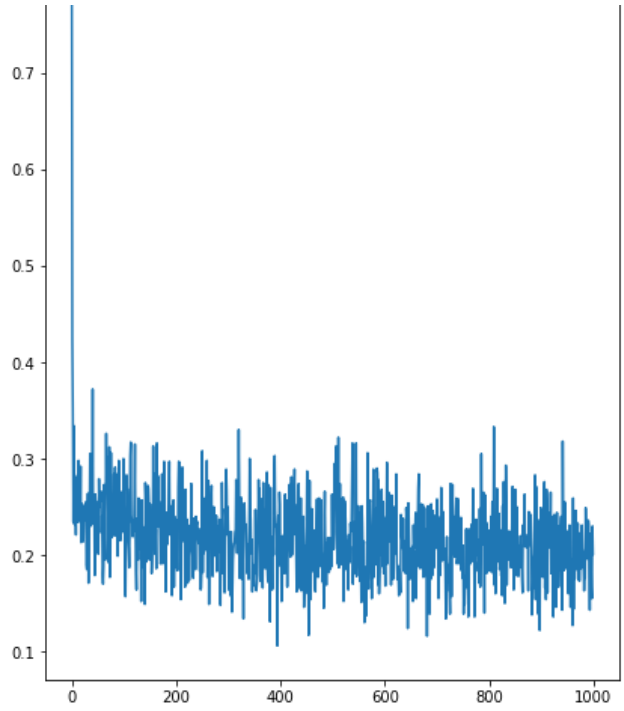
plt.show()
```

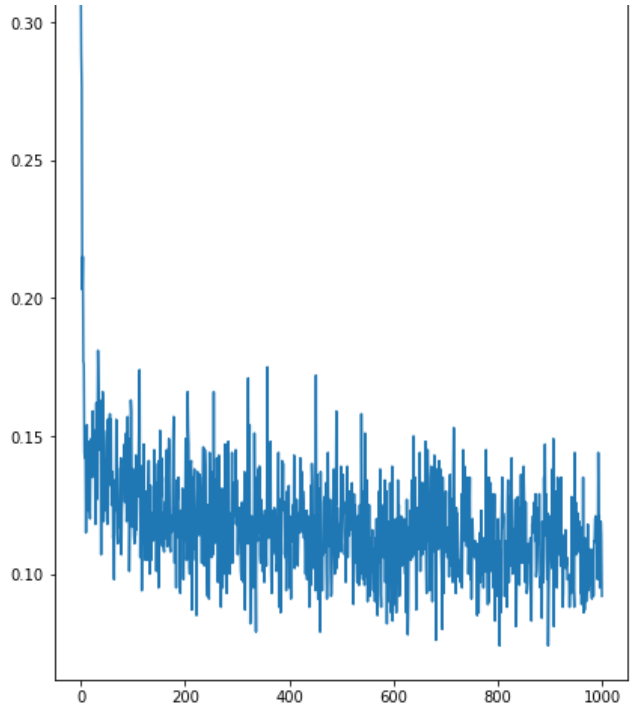












2nd level classifier training

In [0]:

```
##### for training I am using densenet structure
```

In [0]:

```
X_train = np.load("/content/drive/My Drive/rcnn/train_image_array/x_train_images_arrays.npz", allo
w_pickle = True)
X_test = np.load("/content/drive/My Drive/rcnn/test_image_array/x_images_arrays_test.npz",
allow_pickle = True)
```

In [0]:

```
y_train = np.load("y_target.npz", allow_pickle = True)
y_test = np.load("y_target_test.npz", allow_pickle = True)
```

In [0]:

```
print("Train dataset shape",X_train["arr_0"].shape)
print("Test dataset shape",X_test["arr_0"].shape)
```

```
Train dataset shape (2163, 32, 32, 3)
Test dataset shape (527, 32, 32, 3)
```

In [0]:

```
# this part will prevent tensorflow to allocate all the avaliable GPU Memory
# backend
import tensorflow as tf
# from tensorflow import keras

# from keras import backend as k

# Don't pre-allocate memory; allocate as-needed
# import tensorflow as tf
config = tf.ConfigProto()
config.gpu_options.per_process_gpu_memory_fraction = 0.75
config.gpu_options.allow_growth= True
# config = tf.ConfigProto()
# config.gpu_options.allow_growth = True
```

```
# Create a session with the above options specified.
# k.tensorflow_backend.set_session(tf.Session(config=config))
```

In [0]:

```
type(y_train["arr_0"])
```

Out[0]:

```
numpy.ndarray
```

In [0]:

```
unique, counts = np.unique(y_train["arr_0"], return_counts=True)
```

In [0]:

```
dict(zip(unique, counts))
```

Out[0]:

```
{'difficult': 335,
 'gametocyte': 113,
 'leukocyte': 85,
 'ring': 281,
 'schizont': 142,
 'trophozoite': 1207}
```

In [0]:

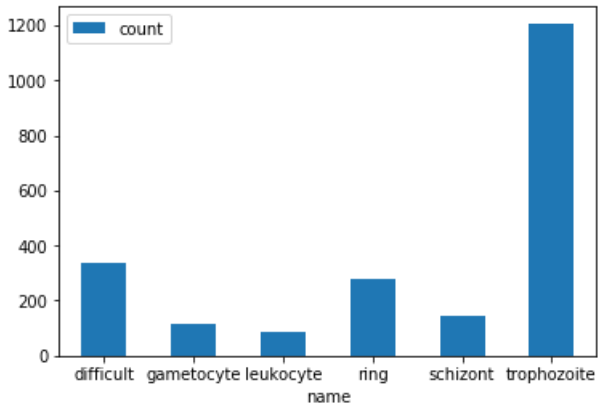
```
unique
```

Out[0]:

```
array(['difficult', 'gametocyte', 'leukocyte', 'ring', 'schizont',
       'trophozoite'], dtype=object)
```

In [0]:

```
df = pd.DataFrame({"name":unique,"count" :counts})
ax = df.plot.bar(x='name', y='count', rot=0)
```



In [0]:

```
unique, counts = np.unique(y_test["arr_0"], return_counts=True)
```

In [0]:

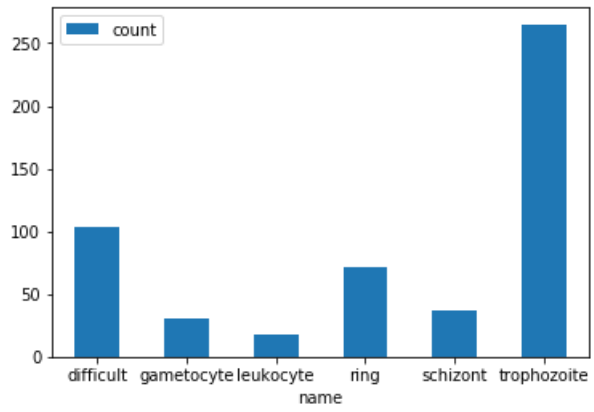
```
dict(zip(unique, counts))
```

Out[0]:

```
{'difficult': 104,
 'gametocyte': 31,
 'leukocyte': 18,
 'ring': 72,
 'schizont': 37,
 'trophozoite': 265}
```

In [0]:

```
df = pd.DataFrame({"name":unique,"count" :counts})
ax = df.plot.bar(x='name', y='count', rot=0)
```



In [0]:

```
from sklearn.feature_extraction.text import CountVectorizer
```

In [0]:

```
vect = CountVectorizer()
y_train_vect = vect.fit_transform(y_train["arr_0"])
```

In [0]:

```
y_test_vect = vect.transform(y_test["arr_0"])
```

In [0]:

```
vect.get_feature_names()
```

Out[0]:

```
['difficult', 'gametocyte', 'leukocyte', 'ring', 'schizont', 'trophozoite']
```

In [0]:

```
y_test_vect.toarray()
```

Out[0]:

```
array([[0, 0, 0, 0, 0, 1],
       [0, 0, 0, 0, 0, 1],
       [0, 0, 0, 0, 0, 1],
       ...,
       [0, 0, 0, 0, 0, 1],
       [0, 0, 0, 0, 0, 1],
       [0, 0, 0, 0, 0, 1]])
```

In [0]:

```
print("Train dataset shape:",X_train["arr_0"].shape,y_train_vect.shape)
print("Test dataset shape",X_test["arr_0"].shape,y_test_vect.shape)
```

```
Train dataset shape: (2163, 32, 32, 3) (2163, 6)
Test dataset shape (527, 32, 32, 3) (527, 6)
```

In [0]:

```
img_height, img_width, channel = X_train["arr_0"].shape[1],X_train["arr_0"].shape[2],X_train["arr_0
"].shape[3]
```

In [0]:

```
X_train_mean = np.mean(X_train["arr_0"], axis=(0,1,2))
X_train_std = np.std(X_train["arr_0"], axis=(0,1,2))
X_train = (X_train["arr_0"] - X_train_mean) / X_train_std
X_test = (X_test["arr_0"] - X_train_mean) / X_train_std
```

In [0]:

```
X_test.shape
```

Out[0]:

```
(527, 32, 32, 3)
```

In [0]:

```
batch_size = 32
num_classes = 6
epochs = 100
l = 50
compression = 0.45
dropout_rate = 0.2
```

In [0]:

```
# Dense Block
def denseblock(input, num_filter = 12, dropout_rate = 0.5):
    global compression
    temp = input
    for _ in range(l):
        BatchNorm = layers.BatchNormalization()(temp)
        relu = layers.Activation('relu')(BatchNorm)
        Conv2D_3_3 = layers.SeparableConv2D(int(num_filter*compression), (5,5), use_bias=False ,pad
ding='same')(relu)
        if dropout_rate>0:
            Conv2D_3_3 = layers.Dropout(dropout_rate)(Conv2D_3_3)
        concat = layers.Concatenate(axis=-1)([temp,Conv2D_3_3])

        temp = concat

    return temp

## transition Blosck
def transition(input, num_filter = 12, dropout_rate = 0.5):
    global compression
    BatchNorm = layers.BatchNormalization()(input)
    relu = layers.Activation('relu')(BatchNorm)
    Conv2D_BottleNeck = layers.SeparableConv2D(int(num_filter*compression), (7,7), use_bias=False,p
adding='same')(relu)
    if dropout_rate>0:
         Conv2D_BottleNeck = layers.Dropout(dropout_rate)(Conv2D_BottleNeck)
    avg = layers.AveragePooling2D(pool_size=(2,2))(Conv2D_BottleNeck)
    return avg

#output layer
def output_layer(input):
    global compression
    BatchNorm = layers.BatchNormalization()(input)
    relu = layers.Activation('relu')(BatchNorm)
    AvgPooling = layers.AveragePooling2D(pool_size=(2,2))(relu)
    flat = layers.Flatten()(AvgPooling)
    output = layers.Dense(num_classes, activation='softmax')(flat)
```

```
    return output
```

In [0]:

```
import keras.backend as K
K.clear_session()
```

```
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:107: The name tf.reset_default_graph is deprecated. P
lease use tf.compat.v1.reset_default_graph instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:111: The name tf.placeholder_with_default is
deprecated. Please use tf.compat.v1.placeholder_with_default instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/keras/backend/tensorflow_backend.py:66: The name tf.get_default_graph is deprecated. Plea
se use tf.compat.v1.get_default_graph instead.
```

In [0]:

```
num_filter = 64

dropout_rate = 0
l = 10

input = layers.Input(shape=(img_height, img_width, channel,))
First_Conv2D = layers.SeparableConv2D(num_filter, (5,5), use_bias=False, padding='same')(input)

First_Block = denseblock(First_Conv2D, num_filter, dropout_rate)
First_Transition = transition(First_Block, num_filter, dropout_rate)

Second_Block = denseblock(First_Transition, num_filter, dropout_rate)
Second_Transition = transition(Second_Block, num_filter, dropout_rate)

Third_Block = denseblock(Second_Transition, num_filter, dropout_rate)
Third_Transition = transition(Third_Block, num_filter, dropout_rate)

Last_Block = denseblock(Third_Transition,  num_filter, dropout_rate)
output = output_layer(Last_Block)
```

```
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-
packages/tensorflow_core/python/ops/resource_variable_ops.py:1630: calling
BaseResourceVariable.__init__ (from tensorflow.python.ops.resource_variable_ops) with constraint i
s deprecated and will be removed in a future version.
Instructions for updating:
If using Keras pass *_constraint arguments to layers.
```

In [0]:

```
model = Model(inputs=[input], outputs=[output])
model.summary()
```

```
Model: "model"
__________________________________________________________________________________________________
Layer (type)                    Output Shape         Param #     Connected to
==================================================================================================
input_1 (InputLayer)            [(None, 32, 32, 3)]  0
__________________________________________________________________________________________________
separable_conv2d (SeparableConv (None, 32, 32, 64)   267         input_1[0][0]
__________________________________________________________________________________________________
batch_normalization (BatchNorma (None, 32, 32, 64)   256         separable_conv2d[0][0]
__________________________________________________________________________________________________
activation (Activation)         (None, 32, 32, 64)   0           batch_normalization[0][0]
__________________________________________________________________________________________________
separable_conv2d_1 (SeparableCo (None, 32, 32, 28)   3392        activation[0][0]
__________________________________________________________________________________________________
concatenate (Concatenate)       (None, 32, 32, 92)   0           separable_conv2d[0][0]
                                                                 separable_conv2d_1[0][0]
__________________________________________________________________________________________________
batch_normalization_1 (BatchNor (None, 32, 32, 92)   368         concatenate[0][0]
```

activation_1 (Activation)	(None, 32, 32, 92)	0	batch_normalization_1[0][0]
separable_conv2d_2 (SeparableCo	(None, 32, 32, 28)	4876	activation_1[0][0]
concatenate_1 (Concatenate)	(None, 32, 32, 120)	0	concatenate[0][0] separable_conv2d_2[0][0]
batch_normalization_2 (BatchNor	(None, 32, 32, 120)	480	concatenate_1[0][0]
activation_2 (Activation)	(None, 32, 32, 120)	0	batch_normalization_2[0][0]
separable_conv2d_3 (SeparableCo	(None, 32, 32, 28)	6360	activation_2[0][0]
concatenate_2 (Concatenate)	(None, 32, 32, 148)	0	concatenate_1[0][0] separable_conv2d_3[0][0]
batch_normalization_3 (BatchNor	(None, 32, 32, 148)	592	concatenate_2[0][0]
activation_3 (Activation)	(None, 32, 32, 148)	0	batch_normalization_3[0][0]
separable_conv2d_4 (SeparableCo	(None, 32, 32, 28)	7844	activation_3[0][0]
concatenate_3 (Concatenate)	(None, 32, 32, 176)	0	concatenate_2[0][0] separable_conv2d_4[0][0]
batch_normalization_4 (BatchNor	(None, 32, 32, 176)	704	concatenate_3[0][0]
activation_4 (Activation)	(None, 32, 32, 176)	0	batch_normalization_4[0][0]
separable_conv2d_5 (SeparableCo	(None, 32, 32, 28)	9328	activation_4[0][0]
concatenate_4 (Concatenate)	(None, 32, 32, 204)	0	concatenate_3[0][0] separable_conv2d_5[0][0]
batch_normalization_5 (BatchNor	(None, 32, 32, 204)	816	concatenate_4[0][0]
activation_5 (Activation)	(None, 32, 32, 204)	0	batch_normalization_5[0][0]
separable_conv2d_6 (SeparableCo	(None, 32, 32, 28)	10812	activation_5[0][0]
concatenate_5 (Concatenate)	(None, 32, 32, 232)	0	concatenate_4[0][0] separable_conv2d_6[0][0]
batch_normalization_6 (BatchNor	(None, 32, 32, 232)	928	concatenate_5[0][0]
activation_6 (Activation)	(None, 32, 32, 232)	0	batch_normalization_6[0][0]
separable_conv2d_7 (SeparableCo	(None, 32, 32, 28)	12296	activation_6[0][0]
concatenate_6 (Concatenate)	(None, 32, 32, 260)	0	concatenate_5[0][0] separable_conv2d_7[0][0]
batch_normalization_7 (BatchNor	(None, 32, 32, 260)	1040	concatenate_6[0][0]
activation_7 (Activation)	(None, 32, 32, 260)	0	batch_normalization_7[0][0]
separable_conv2d_8 (SeparableCo	(None, 32, 32, 28)	13780	activation_7[0][0]
concatenate_7 (Concatenate)	(None, 32, 32, 288)	0	concatenate_6[0][0] separable_conv2d_8[0][0]
batch_normalization_8 (BatchNor	(None, 32, 32, 288)	1152	concatenate_7[0][0]
activation_8 (Activation)	(None, 32, 32, 288)	0	batch_normalization_8[0][0]
separable_conv2d_9 (SeparableCo	(None, 32, 32, 28)	15264	activation_8[0][0]
concatenate_8 (Concatenate)	(None, 32, 32, 316)	0	concatenate_7[0][0] separable_conv2d_9[0][0]
batch_normalization_9 (BatchNor	(None, 32, 32, 316)	1264	concatenate_8[0][0]
activation_9 (Activation)	(None, 32, 32, 316)	0	batch_normalization_9[0][0]
separable_conv2d_10 (SeparableC	(None, 32, 32, 28)	16748	activation_9[0][0]

concatenate_9 (Concatenate)	(None, 32, 32, 344)	0	concatenate_8[0][0] separable_conv2d_10[0][0]
batch_normalization_10 (BatchNo	(None, 32, 32, 344)	1376	concatenate_9[0][0]
activation_10 (Activation)	(None, 32, 32, 344)	0	batch_normalization_10[0][0]
separable_conv2d_11 (SeparableC	(None, 32, 32, 28)	26488	activation_10[0][0]
average_pooling2d (AveragePooli	(None, 16, 16, 28)	0	separable_conv2d_11[0][0]
batch_normalization_11 (BatchNo	(None, 16, 16, 28)	112	average_pooling2d[0][0]
activation_11 (Activation)	(None, 16, 16, 28)	0	batch_normalization_11[0][0]
separable_conv2d_12 (SeparableC	(None, 16, 16, 28)	1484	activation_11[0][0]
concatenate_10 (Concatenate)	(None, 16, 16, 56)	0	average_pooling2d[0][0] separable_conv2d_12[0][0]
batch_normalization_12 (BatchNo	(None, 16, 16, 56)	224	concatenate_10[0][0]
activation_12 (Activation)	(None, 16, 16, 56)	0	batch_normalization_12[0][0]
separable_conv2d_13 (SeparableC	(None, 16, 16, 28)	2968	activation_12[0][0]
concatenate_11 (Concatenate)	(None, 16, 16, 84)	0	concatenate_10[0][0] separable_conv2d_13[0][0]
batch_normalization_13 (BatchNo	(None, 16, 16, 84)	336	concatenate_11[0][0]
activation_13 (Activation)	(None, 16, 16, 84)	0	batch_normalization_13[0][0]
separable_conv2d_14 (SeparableC	(None, 16, 16, 28)	4452	activation_13[0][0]
concatenate_12 (Concatenate)	(None, 16, 16, 112)	0	concatenate_11[0][0] separable_conv2d_14[0][0]
batch_normalization_14 (BatchNo	(None, 16, 16, 112)	448	concatenate_12[0][0]
activation_14 (Activation)	(None, 16, 16, 112)	0	batch_normalization_14[0][0]
separable_conv2d_15 (SeparableC	(None, 16, 16, 28)	5936	activation_14[0][0]
concatenate_13 (Concatenate)	(None, 16, 16, 140)	0	concatenate_12[0][0] separable_conv2d_15[0][0]
batch_normalization_15 (BatchNo	(None, 16, 16, 140)	560	concatenate_13[0][0]
activation_15 (Activation)	(None, 16, 16, 140)	0	batch_normalization_15[0][0]
separable_conv2d_16 (SeparableC	(None, 16, 16, 28)	7420	activation_15[0][0]
concatenate_14 (Concatenate)	(None, 16, 16, 168)	0	concatenate_13[0][0] separable_conv2d_16[0][0]
batch_normalization_16 (BatchNo	(None, 16, 16, 168)	672	concatenate_14[0][0]
activation_16 (Activation)	(None, 16, 16, 168)	0	batch_normalization_16[0][0]
separable_conv2d_17 (SeparableC	(None, 16, 16, 28)	8904	activation_16[0][0]
concatenate_15 (Concatenate)	(None, 16, 16, 196)	0	concatenate_14[0][0] separable_conv2d_17[0][0]
batch_normalization_17 (BatchNo	(None, 16, 16, 196)	784	concatenate_15[0][0]
activation_17 (Activation)	(None, 16, 16, 196)	0	batch_normalization_17[0][0]
separable_conv2d_18 (SeparableC	(None, 16, 16, 28)	10388	activation_17[0][0]
concatenate_16 (Concatenate)	(None, 16, 16, 224)	0	concatenate_15[0][0] separable_conv2d_18[0][0]
batch_normalization_18 (BatchNo	(None, 16, 16, 224)	896	concatenate_16[0][0]
activation_18 (Activation)	(None, 16, 16, 224)	0	batch_normalization_18[0][0]

separable_conv2d_19 (SeparableC	(None, 16, 16, 28)	11872	activation_18[0][0]
concatenate_17 (Concatenate)	(None, 16, 16, 252)	0	concatenate_16[0][0] separable_conv2d_19[0][0]
batch_normalization_19 (BatchNo	(None, 16, 16, 252)	1008	concatenate_17[0][0]
activation_19 (Activation)	(None, 16, 16, 252)	0	batch_normalization_19[0][0]
separable_conv2d_20 (SeparableC	(None, 16, 16, 28)	13356	activation_19[0][0]
concatenate_18 (Concatenate)	(None, 16, 16, 280)	0	concatenate_17[0][0] separable_conv2d_20[0][0]
batch_normalization_20 (BatchNo	(None, 16, 16, 280)	1120	concatenate_18[0][0]
activation_20 (Activation)	(None, 16, 16, 280)	0	batch_normalization_20[0][0]
separable_conv2d_21 (SeparableC	(None, 16, 16, 28)	14840	activation_20[0][0]
concatenate_19 (Concatenate)	(None, 16, 16, 308)	0	concatenate_18[0][0] separable_conv2d_21[0][0]
batch_normalization_21 (BatchNo	(None, 16, 16, 308)	1232	concatenate_19[0][0]
activation_21 (Activation)	(None, 16, 16, 308)	0	batch_normalization_21[0][0]
separable_conv2d_22 (SeparableC	(None, 16, 16, 28)	23716	activation_21[0][0]
average_pooling2d_1 (AveragePoo	(None, 8, 8, 28)	0	separable_conv2d_22[0][0]
batch_normalization_22 (BatchNo	(None, 8, 8, 28)	112	average_pooling2d_1[0][0]
activation_22 (Activation)	(None, 8, 8, 28)	0	batch_normalization_22[0][0]
separable_conv2d_23 (SeparableC	(None, 8, 8, 28)	1484	activation_22[0][0]
concatenate_20 (Concatenate)	(None, 8, 8, 56)	0	average_pooling2d_1[0][0] separable_conv2d_23[0][0]
batch_normalization_23 (BatchNo	(None, 8, 8, 56)	224	concatenate_20[0][0]
activation_23 (Activation)	(None, 8, 8, 56)	0	batch_normalization_23[0][0]
separable_conv2d_24 (SeparableC	(None, 8, 8, 28)	2968	activation_23[0][0]
concatenate_21 (Concatenate)	(None, 8, 8, 84)	0	concatenate_20[0][0] separable_conv2d_24[0][0]
batch_normalization_24 (BatchNo	(None, 8, 8, 84)	336	concatenate_21[0][0]
activation_24 (Activation)	(None, 8, 8, 84)	0	batch_normalization_24[0][0]
separable_conv2d_25 (SeparableC	(None, 8, 8, 28)	4452	activation_24[0][0]
concatenate_22 (Concatenate)	(None, 8, 8, 112)	0	concatenate_21[0][0] separable_conv2d_25[0][0]
batch_normalization_25 (BatchNo	(None, 8, 8, 112)	448	concatenate_22[0][0]
activation_25 (Activation)	(None, 8, 8, 112)	0	batch_normalization_25[0][0]
separable_conv2d_26 (SeparableC	(None, 8, 8, 28)	5936	activation_25[0][0]
concatenate_23 (Concatenate)	(None, 8, 8, 140)	0	concatenate_22[0][0] separable_conv2d_26[0][0]
batch_normalization_26 (BatchNo	(None, 8, 8, 140)	560	concatenate_23[0][0]
activation_26 (Activation)	(None, 8, 8, 140)	0	batch_normalization_26[0][0]
separable_conv2d_27 (SeparableC	(None, 8, 8, 28)	7420	activation_26[0][0]
concatenate_24 (Concatenate)	(None, 8, 8, 168)	0	concatenate_23[0][0] separable_conv2d_27[0][0]

batch_normalization_27 (BatchNo	(None, 8, 8, 168)	672	concatenate_24[0][0]
activation_27 (Activation)	(None, 8, 8, 168)	0	batch_normalization_27[0][0]
separable_conv2d_28 (SeparableC	(None, 8, 8, 28)	8904	activation_27[0][0]
concatenate_25 (Concatenate)	(None, 8, 8, 196)	0	concatenate_24[0][0] separable_conv2d_28[0][0]
batch_normalization_28 (BatchNo	(None, 8, 8, 196)	784	concatenate_25[0][0]
activation_28 (Activation)	(None, 8, 8, 196)	0	batch_normalization_28[0][0]
separable_conv2d_29 (SeparableC	(None, 8, 8, 28)	10388	activation_28[0][0]
concatenate_26 (Concatenate)	(None, 8, 8, 224)	0	concatenate_25[0][0] separable_conv2d_29[0][0]
batch_normalization_29 (BatchNo	(None, 8, 8, 224)	896	concatenate_26[0][0]
activation_29 (Activation)	(None, 8, 8, 224)	0	batch_normalization_29[0][0]
separable_conv2d_30 (SeparableC	(None, 8, 8, 28)	11872	activation_29[0][0]
concatenate_27 (Concatenate)	(None, 8, 8, 252)	0	concatenate_26[0][0] separable_conv2d_30[0][0]
batch_normalization_30 (BatchNo	(None, 8, 8, 252)	1008	concatenate_27[0][0]
activation_30 (Activation)	(None, 8, 8, 252)	0	batch_normalization_30[0][0]
separable_conv2d_31 (SeparableC	(None, 8, 8, 28)	13356	activation_30[0][0]
concatenate_28 (Concatenate)	(None, 8, 8, 280)	0	concatenate_27[0][0] separable_conv2d_31[0][0]
batch_normalization_31 (BatchNo	(None, 8, 8, 280)	1120	concatenate_28[0][0]
activation_31 (Activation)	(None, 8, 8, 280)	0	batch_normalization_31[0][0]
separable_conv2d_32 (SeparableC	(None, 8, 8, 28)	14840	activation_31[0][0]
concatenate_29 (Concatenate)	(None, 8, 8, 308)	0	concatenate_28[0][0] separable_conv2d_32[0][0]
batch_normalization_32 (BatchNo	(None, 8, 8, 308)	1232	concatenate_29[0][0]
activation_32 (Activation)	(None, 8, 8, 308)	0	batch_normalization_32[0][0]
separable_conv2d_33 (SeparableC	(None, 8, 8, 28)	23716	activation_32[0][0]
average_pooling2d_2 (AveragePoo	(None, 4, 4, 28)	0	separable_conv2d_33[0][0]
batch_normalization_33 (BatchNo	(None, 4, 4, 28)	112	average_pooling2d_2[0][0]
activation_33 (Activation)	(None, 4, 4, 28)	0	batch_normalization_33[0][0]
separable_conv2d_34 (SeparableC	(None, 4, 4, 28)	1484	activation_33[0][0]
concatenate_30 (Concatenate)	(None, 4, 4, 56)	0	average_pooling2d_2[0][0] separable_conv2d_34[0][0]
batch_normalization_34 (BatchNo	(None, 4, 4, 56)	224	concatenate_30[0][0]
activation_34 (Activation)	(None, 4, 4, 56)	0	batch_normalization_34[0][0]
separable_conv2d_35 (SeparableC	(None, 4, 4, 28)	2968	activation_34[0][0]
concatenate_31 (Concatenate)	(None, 4, 4, 84)	0	concatenate_30[0][0] separable_conv2d_35[0][0]
batch_normalization_35 (BatchNo	(None, 4, 4, 84)	336	concatenate_31[0][0]
activation_35 (Activation)	(None, 4, 4, 84)	0	batch_normalization_35[0][0]
separable_conv2d_36 (SeparableC	(None, 4, 4, 28)	4452	activation_35[0][0]

concatenate_32 (Concatenate)	(None, 4, 4, 112)	0	concatenate_31[0][0] separable_conv2d_36[0][0]
batch_normalization_36 (BatchNo	(None, 4, 4, 112)	448	concatenate_32[0][0]
activation_36 (Activation)	(None, 4, 4, 112)	0	batch_normalization_36[0][0]
separable_conv2d_37 (SeparableC	(None, 4, 4, 28)	5936	activation_36[0][0]
concatenate_33 (Concatenate)	(None, 4, 4, 140)	0	concatenate_32[0][0] separable_conv2d_37[0][0]
batch_normalization_37 (BatchNo	(None, 4, 4, 140)	560	concatenate_33[0][0]
activation_37 (Activation)	(None, 4, 4, 140)	0	batch_normalization_37[0][0]
separable_conv2d_38 (SeparableC	(None, 4, 4, 28)	7420	activation_37[0][0]
concatenate_34 (Concatenate)	(None, 4, 4, 168)	0	concatenate_33[0][0] separable_conv2d_38[0][0]
batch_normalization_38 (BatchNo	(None, 4, 4, 168)	672	concatenate_34[0][0]
activation_38 (Activation)	(None, 4, 4, 168)	0	batch_normalization_38[0][0]
separable_conv2d_39 (SeparableC	(None, 4, 4, 28)	8904	activation_38[0][0]
concatenate_35 (Concatenate)	(None, 4, 4, 196)	0	concatenate_34[0][0] separable_conv2d_39[0][0]
batch_normalization_39 (BatchNo	(None, 4, 4, 196)	784	concatenate_35[0][0]
activation_39 (Activation)	(None, 4, 4, 196)	0	batch_normalization_39[0][0]
separable_conv2d_40 (SeparableC	(None, 4, 4, 28)	10388	activation_39[0][0]
concatenate_36 (Concatenate)	(None, 4, 4, 224)	0	concatenate_35[0][0] separable_conv2d_40[0][0]
batch_normalization_40 (BatchNo	(None, 4, 4, 224)	896	concatenate_36[0][0]
activation_40 (Activation)	(None, 4, 4, 224)	0	batch_normalization_40[0][0]
separable_conv2d_41 (SeparableC	(None, 4, 4, 28)	11872	activation_40[0][0]
concatenate_37 (Concatenate)	(None, 4, 4, 252)	0	concatenate_36[0][0] separable_conv2d_41[0][0]
batch_normalization_41 (BatchNo	(None, 4, 4, 252)	1008	concatenate_37[0][0]
activation_41 (Activation)	(None, 4, 4, 252)	0	batch_normalization_41[0][0]
separable_conv2d_42 (SeparableC	(None, 4, 4, 28)	13356	activation_41[0][0]
concatenate_38 (Concatenate)	(None, 4, 4, 280)	0	concatenate_37[0][0] separable_conv2d_42[0][0]
batch_normalization_42 (BatchNo	(None, 4, 4, 280)	1120	concatenate_38[0][0]
activation_42 (Activation)	(None, 4, 4, 280)	0	batch_normalization_42[0][0]
separable_conv2d_43 (SeparableC	(None, 4, 4, 28)	14840	activation_42[0][0]
concatenate_39 (Concatenate)	(None, 4, 4, 308)	0	concatenate_38[0][0] separable_conv2d_43[0][0]
batch_normalization_43 (BatchNo	(None, 4, 4, 308)	1232	concatenate_39[0][0]
activation_43 (Activation)	(None, 4, 4, 308)	0	batch_normalization_43[0][0]
average_pooling2d_3 (AveragePoo	(None, 2, 2, 308)	0	activation_43[0][0]
flatten (Flatten)	(None, 1232)	0	average_pooling2d_3[0][0]
dense (Dense)	(None, 6)	7398	flatten[0][0]

Total params: 458,297

```
Trainable params: 442,721
Non-trainable params: 15,576
_________________________________________________________________
```

In [0]:

```
datagen = ImageDataGenerator(
    rotation_range=20,
    width_shift_range=0.15,
    height_shift_range=0.15,
    horizontal_flip=True,
    zoom_range = 0.1
    )
datagen.fit(X_train)
```

In [0]:

```
from tensorflow.python.keras.callbacks import ModelCheckpoint, EarlyStopping,ReduceLROnPlateau, Le
arningRateScheduler
```

In [0]:

```
import math
```

In [0]:

```
#https://machinelearningmastery.com/check-point-deep-learning-models-keras/
filepath="epochs:{epoch:03d}-val_acc:{val_acc:.3f}.hdf5"
checkpoint_1 = ModelCheckpoint(filepath, monitor='val_acc', verbose=1, mode='max')
```

In [0]:

```
reduce_lr_1 = ReduceLROnPlateau(monitor='val_loss', factor=0.1,
                                patience=4,verbose = 1)
```

In [0]:

```
earlystopping_1 = EarlyStopping(monitor='val_loss', patience=10, verbose=1)
```

In [0]:

```
callbacks_list = [earlystopping_1,reduce_lr_1,checkpoint_1]
```

In [0]:

```
# determine Loss function and Optimizer
model.compile(loss='categorical_crossentropy',
              optimizer="adam",
              metrics=['accuracy'])
```

In [0]:

```
y_train = y_train_vect.toarray()
y_test = y_test_vect.toarray()
```

In [0]:

```
y_test.shape
```

Out[0]:

```
(527, 6)
```

In [0]:

```
result = model.fit_generator(datagen.flow(X_train, y_train, batch_size=batch_size)
```

```
result = model.fit_generator(datagen.flow(X_train, y_train, batch_size=batch_size),
                    steps_per_epoch=X_train.shape[0] // 16,
                    epochs=100,
                    verbose=1,
                    validation_data=(X_test, y_test),callbacks=callbacks_list)
```

```
Epoch 1/100
134/135 [============================>.] - ETA: 0s - loss: 1.0972 - acc: 0.6049
Epoch 00001: saving model to epochs:001-val_acc:0.503.hdf5
135/135 [==============================] - 38s 281ms/step - loss: 1.0953 - acc: 0.6050 - val_loss:
1.5779 - val_acc: 0.5028
Epoch 2/100
134/135 [============================>.] - ETA: 0s - loss: 0.9198 - acc: 0.6464
Epoch 00002: saving model to epochs:002-val_acc:0.503.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.9193 - acc: 0.6463 - val_loss:
1.3714 - val_acc: 0.5028
Epoch 3/100
134/135 [============================>.] - ETA: 0s - loss: 0.8712 - acc: 0.6618
Epoch 00003: saving model to epochs:003-val_acc:0.548.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.8685 - acc: 0.6631 - val_loss:
1.1550 - val_acc: 0.5484
Epoch 4/100
134/135 [============================>.] - ETA: 0s - loss: 0.8249 - acc: 0.6818
Epoch 00004: saving model to epochs:004-val_acc:0.605.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.8238 - acc: 0.6821 - val_loss:
1.0831 - val_acc: 0.6053
Epoch 5/100
134/135 [============================>.] - ETA: 0s - loss: 0.8108 - acc: 0.6786
Epoch 00005: saving model to epochs:005-val_acc:0.416.hdf5
135/135 [==============================] - 12s 93ms/step - loss: 0.8104 - acc: 0.6782 - val_loss:
2.5003 - val_acc: 0.4156
Epoch 6/100
134/135 [============================>.] - ETA: 0s - loss: 0.7735 - acc: 0.6926
Epoch 00006: saving model to epochs:006-val_acc:0.562.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.7730 - acc: 0.6928 - val_loss:
1.3009 - val_acc: 0.5617
Epoch 7/100
134/135 [============================>.] - ETA: 0s - loss: 0.7365 - acc: 0.7032
Epoch 00007: saving model to epochs:007-val_acc:0.645.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.7376 - acc: 0.7035 - val_loss:
0.8486 - val_acc: 0.6452
Epoch 8/100
134/135 [============================>.] - ETA: 0s - loss: 0.7424 - acc: 0.7058
Epoch 00008: saving model to epochs:008-val_acc:0.454.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.7409 - acc: 0.7068 - val_loss:
2.4321 - val_acc: 0.4535
Epoch 9/100
134/135 [============================>.] - ETA: 0s - loss: 0.7353 - acc: 0.7114
Epoch 00009: saving model to epochs:009-val_acc:0.636.hdf5
135/135 [==============================] - 13s 93ms/step - loss: 0.7328 - acc: 0.7122 - val_loss:
1.0098 - val_acc: 0.6357
Epoch 10/100
134/135 [============================>.] - ETA: 0s - loss: 0.6908 - acc: 0.7231
Epoch 00010: saving model to epochs:010-val_acc:0.691.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.6898 - acc: 0.7233 - val_loss:
0.8323 - val_acc: 0.6907
Epoch 11/100
134/135 [============================>.] - ETA: 0s - loss: 0.6698 - acc: 0.7318
Epoch 00011: saving model to epochs:011-val_acc:0.645.hdf5
135/135 [==============================] - 13s 93ms/step - loss: 0.6701 - acc: 0.7313 - val_loss:
1.0330 - val_acc: 0.6452
Epoch 12/100
134/135 [============================>.] - ETA: 0s - loss: 0.6487 - acc: 0.7417
Epoch 00012: saving model to epochs:012-val_acc:0.668.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.6519 - acc: 0.7410 - val_loss:
0.8860 - val_acc: 0.6679
Epoch 13/100
134/135 [============================>.] - ETA: 0s - loss: 0.6270 - acc: 0.7417
Epoch 00013: saving model to epochs:013-val_acc:0.615.hdf5
135/135 [==============================] - 13s 93ms/step - loss: 0.6276 - acc: 0.7417 - val_loss:
1.1006 - val_acc: 0.6148
Epoch 14/100
134/135 [============================>.] - ETA: 0s - loss: 0.6230 - acc: 0.7410
Epoch 00014: ReduceLROnPlateau reducing learning rate to 0.00010000000474974513.

Epoch 00014: saving model to epochs:014-val_acc:0.537.hdf5
135/135 [==============================] - 13s 97ms/step - loss: 0.6229 - acc: 0.7403 - val loss:
```

```
1.4882 - val_acc: 0.5370
Epoch 15/100
134/135 [============================>.] - ETA: 0s - loss: 0.5387 - acc: 0.7778
Epoch 00015: saving model to epochs:015-val_acc:0.719.hdf5
135/135 [==============================] - 13s 93ms/step - loss: 0.5380 - acc: 0.7785 - val_loss:
0.6694 - val_acc: 0.7192
Epoch 16/100
134/135 [============================>.] - ETA: 0s - loss: 0.4975 - acc: 0.7963
Epoch 00016: saving model to epochs:016-val_acc:0.729.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4982 - acc: 0.7960 - val_loss:
0.6649 - val_acc: 0.7287
Epoch 17/100
134/135 [============================>.] - ETA: 0s - loss: 0.4899 - acc: 0.7992
Epoch 00017: saving model to epochs:017-val_acc:0.731.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4881 - acc: 0.8002 - val_loss:
0.6703 - val_acc: 0.7306
Epoch 18/100
134/135 [============================>.] - ETA: 0s - loss: 0.4771 - acc: 0.8089
Epoch 00018: saving model to epochs:018-val_acc:0.727.hdf5
135/135 [==============================] - 13s 93ms/step - loss: 0.4774 - acc: 0.8089 - val_loss:
0.7371 - val_acc: 0.7268
Epoch 19/100
134/135 [============================>.] - ETA: 0s - loss: 0.4570 - acc: 0.8082
Epoch 00019: saving model to epochs:019-val_acc:0.734.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4581 - acc: 0.8078 - val_loss:
0.6862 - val_acc: 0.7343
Epoch 20/100
134/135 [============================>.] - ETA: 0s - loss: 0.4366 - acc: 0.8189
Epoch 00020: ReduceLROnPlateau reducing learning rate to 1.0000000474974514e-05.

Epoch 00020: saving model to epochs:020-val_acc:0.725.hdf5
135/135 [==============================] - 13s 93ms/step - loss: 0.4370 - acc: 0.8190 - val_loss:
0.7601 - val_acc: 0.7249
Epoch 21/100
134/135 [============================>.] - ETA: 0s - loss: 0.4318 - acc: 0.8282
Epoch 00021: saving model to epochs:021-val_acc:0.727.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4319 - acc: 0.8281 - val_loss:
0.7041 - val_acc: 0.7268
Epoch 22/100
134/135 [============================>.] - ETA: 0s - loss: 0.4164 - acc: 0.8257
Epoch 00022: saving model to epochs:022-val_acc:0.742.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4158 - acc: 0.8259 - val_loss:
0.7020 - val_acc: 0.7419
Epoch 23/100
134/135 [============================>.] - ETA: 0s - loss: 0.4275 - acc: 0.8240
Epoch 00023: saving model to epochs:023-val_acc:0.740.hdf5
135/135 [==============================] - 12s 93ms/step - loss: 0.4290 - acc: 0.8232 - val_loss:
0.7024 - val_acc: 0.7400
Epoch 24/100
134/135 [============================>.] - ETA: 0s - loss: 0.4161 - acc: 0.8390
Epoch 00024: ReduceLROnPlateau reducing learning rate to 1.0000000656873453e-06.

Epoch 00024: saving model to epochs:024-val_acc:0.744.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4151 - acc: 0.8391 - val_loss:
0.7085 - val_acc: 0.7438
Epoch 25/100
134/135 [============================>.] - ETA: 0s - loss: 0.4189 - acc: 0.8247
Epoch 00025: saving model to epochs:025-val_acc:0.746.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4203 - acc: 0.8242 - val_loss:
0.7089 - val_acc: 0.7457
Epoch 26/100
134/135 [============================>.] - ETA: 0s - loss: 0.4171 - acc: 0.8275
Epoch 00026: saving model to epochs:026-val_acc:0.744.hdf5
135/135 [==============================] - 12s 92ms/step - loss: 0.4180 - acc: 0.8270 - val_loss:
0.7078 - val_acc: 0.7438
Epoch 00026: early stopping
```

In [0]:

```
def plt_dynamic_auc(x, vy, ty, ax, colors=['b']):
    ax.plot(x, vy, 'b', label="Validation auc")
    ax.plot(x, ty, 'r', label="Train auc")
    plt.legend()
    plt.grid()
    fig.canvas.draw()
```

In [0]:

```
fig,ax = plt.subplots(1,1)
ax.set_xlabel('epoch') ; ax.set_ylabel('loss')

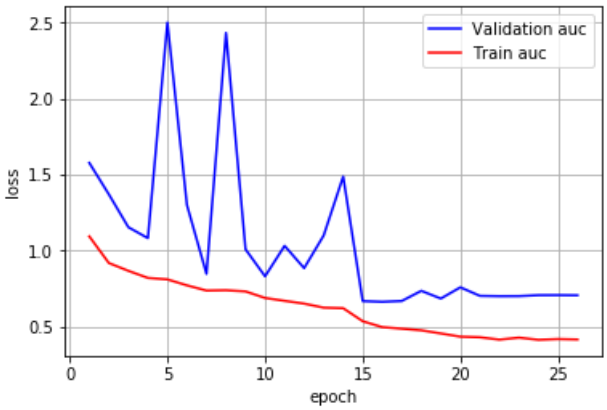
# list of epoch numbers
x = list(range(1,26+1))

# print(history.history.keys())
# dict_keys(['val_loss', 'val_acc', 'loss', 'acc'])
# history = model_drop.fit(X_train, Y_train, batch_size=batch_size, epochs=nb_epoch, verbose=1, va
lidation_data=(X_test, Y_test))

# we will get val_loss and val_acc only when you pass the paramter validation_data
# val_loss : validation loss
# val_acc : validation accuracy

# loss : training loss
# acc : train accuracy
# for each key in histrory.histrory we will have a list of length equal to number of epochs


vy = result.history['val_loss']
ty = result.history['loss']
plt_dynamic_auc(x, vy, ty, ax)
```



Testing

In [ ]:

```
!python test_frcnn.py \
-p /content/drive/My\ Drive/rcnn/train_images \
--result_path_2class /content/drive/My\ Drive/rcnn/Data_model_2/result_df_2class_train.csv \
--config_filename /content/drive/My\ Drive/rcnn/Data_model_2/config.pickle
```

In [ ]:

```
!python test_frcnn.py \
-p /content/drive/My\ Drive/rcnn/test_images \
--result_path_2class /content/drive/My\ Drive/rcnn/Data_model_2/result_df_2class.csv \
--config_filename /content/drive/My\ Drive/rcnn/Data_model_2/config.pickle
```

In [0]:

```
def get_map(annotate_path, result_df_path):

 def get_data(input_path):

  img_data = []

  with open(input_path,'r') as f:
   for line in f:
    line_split = line.strip().split(',')
    (filename,x1,y1,x2,y2,class_name) = line_split
```

```
    img_data.append({'class': class_name, 'x1': int(x1), 'x2': int(x2), 'y1': int(y1), 'y2': int(y2
)})

  return img_data
 def union(au, bu, area_intersection):
  area_a = (au[2] - au[0]) * (au[3] - au[1])
  area_b = (bu[2] - bu[0]) * (bu[3] - bu[1])
  area_union = area_a + area_b - area_intersection
  return area_union


 def intersection(ai, bi):
  x = max(ai[0], bi[0])
  y = max(ai[1], bi[1])
  w = min(ai[2], bi[2]) - x
  h = min(ai[3], bi[3]) - y
  if w < 0 or h < 0:
   return 0
  return w*h

 def iou(a, b):
  # a and b should be (x1,y1,x2,y2)

  if a[0] >= a[2] or a[1] >= a[3] or b[0] >= b[2] or b[1] >= b[3]:
   return 0.0

  area_i = intersection(a, b)
  area_u = union(a, b, area_i)

  return float(area_i) / float(area_u + 1e-6)
 gt = get_data(annotate_path)
 pred = pd.read_csv(result_df_path)
 pred.columns = ["name", "class", "x1","y1","x2","y2", "prob"]
 Truth = {}
 Predicted = {}


 for bbox in gt:
  bbox['bbox_matched'] = False

 pred_probs = np.array(pred["prob"])
 box_idx_sorted_by_prob = np.argsort(pred_probs)[::-1]

 for box_idx in tqdm(box_idx_sorted_by_prob):
  pred_box = pred.loc[box_idx]
  pred_class = pred_box['class']
  pred_x1 = pred_box['x1']
  pred_x2 = pred_box['x2']
  pred_y1 = pred_box['y1']
  pred_y2 = pred_box['y2']
  pred_prob = pred_box['prob']
  if pred_class not in Predicted:
   Predicted[pred_class] = []
   Truth[pred_class] = []
  Predicted[pred_class].append(pred_prob)
  found_match = False
  for gt_box in gt:
   gt_class = gt_box['class']
   gt_x1 = gt_box['x1']
   gt_x2 = gt_box['x2']
   gt_y1 = gt_box['y1']
   gt_y2 = gt_box['y2']
   gt_seen = gt_box['bbox_matched']
   if gt_class != pred_class:
    continue
   if gt_seen:
    continue
   iou1 = iou((pred_x1, pred_y1, pred_x2, pred_y2), (gt_x1, gt_y1, gt_x2, gt_y2))
   if iou1 >= 0.5:
    found_match = True
    gt_box['bbox_matched'] = True
    break
   else:
    continue
```

```
  Truth[pred_class].append(int(found_match))

 for gt_box in gt:
  if not gt_box['bbox_matched']:
   if gt_box['class'] not in Predicted:
    Predicted[gt_box['class']] = []
    Truth[gt_box['class']] = []

   Truth[gt_box['class']].append(1)
   Predicted[gt_box['class']].append(0)
t = {}
p = {}
for key in Truth.keys():
  if key not in t:
   t[key] = []
   p[key] = []
  t[key].extend(Truth[key])
  p[key].extend(Predicted[key])
all_aps = []
for key in t.keys():
 ap = average_precision_score(t[key], p[key])
 print('{} AP: {}'.format(key, ap))
 all_aps.append(ap)
print('mAP = {}'.format(np.mean(np.array(all_aps))))
```

In [0]:

```
print("train map:")
get_map("/content/drive/My Drive/rcnn/annotate_train_2class.txt","/content/drive/My
Drive/rcnn/Data_model_2/result_df_2class_train.csv" )
```

```
train map:

100%|██████████| 40765/40765 [12:16<00:00, 33.65it/s]

RBC AP: 0.999631335703299
other AP: 0.9872680356204361
mAP = 0.9934496856618675
```