Weekly Work Report

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1   Research problem

During this period of week, I spend time studying deep learning courses and working about Faster R-CNN algorithm for URPC2018. Our team download match data sets and change them into ILSVRC2015 format, then we can train a contest model.

When produce match data sets, I have difficulty in organising its architecture and change text into xml document according to the requirements of the senior. Besides, I need to rectify and debug the relevant codes of algorithm until they can meet the requirement to train a contest model. At last, I should evaluate the proformance of algorithm with mAP in whatever underwater scenes.

2   Research approach

In the process of research, I use the method of documentary analysis, comparative analysis and experimental research method. I read the thesis of Fast R-CNN [1] and Faster R-CNN algorithm [2]. I try to unferstand core ideology in paper and learn about concept introduced by author.

Besides, I need to clone codes from github which shared by other researcher. Then I debug and run the demo program to learn how to realize an algorithm which can be called experimental method.

For deep learning, I watch videos and write down the issues which I think are much important for further research. And then, I not only have learned the lessons of deep learning, but also put them into code editing action.

3   Research progress

During preparation for URPC2018, I continue to learn about Faster R-CNN algorithm [2] and relevant codes. After that, our team put match data in order according to the senior. By using the remote server, I try to train a contest model with data sets and test how well model run. I will list details about weekly work in Tab. 1 below.

Table 1: Weekly work progress.

URPC2018	Finish reading Fast R-CNN paper written by Ross Girshick and learn about algorithm.
	Finish change match data set into ILSVRC2015 format.
	Finish training a contest model.
	Finish test several pictures with contest model.
Deep learning courses	Finish learning improving deep neural network course which is the second lesson and a part of the third lesson called structuring machine learning projects.

4   Progress in this week

During preparation for URPC2018, I have learned to do some relevant work in order to achieve goal of contest. Our team reorganize the data sets and train a preliminary model. The progress has been maked at the present stage as shown in table blow.

Step 1 Finish training the first VOC2007 model and getting good outcome.

Step 2 Finish changing the txt truth table into xml files which are used for training contest model.

Step 3 Finish putting confusing contest data sets in VOC2007 order.

Step 4 Finish learning improving deep neural network course which is the second lesson.
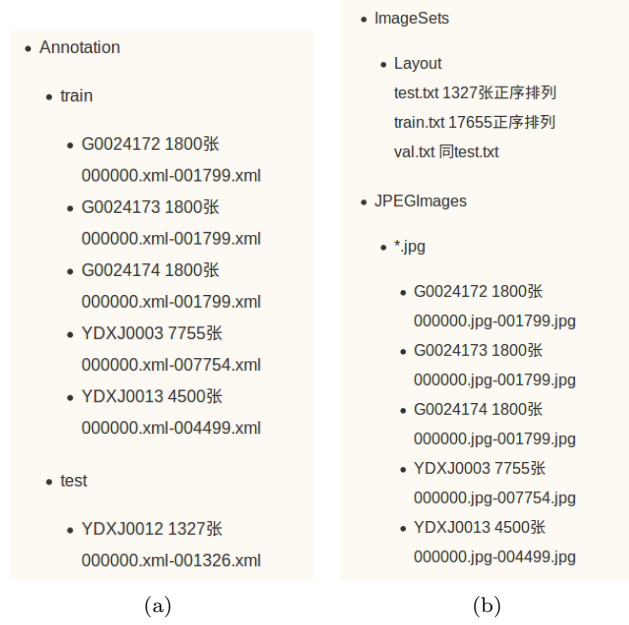
- Annotation
  - train
    - G0024172 1800张
      000000.xml-001799.xml
    - G0024173 1800张
      000000.xml-001799.xml
    - G0024174 1800张
      000000.xml-001799.xml
    - YDXJ0003 7755张
      000000.xml-007754.xml
    - YDXJ0013 4500张
      000000.xml-004499.xml
  - test
    - YDXJ0012 1327张
      000000.xml-001326.xml

- ImageSets
  - Layout
    test.txt 1327张正序排列
    train.txt 17655正序排列
    val.txt 同test.txt
- JPEGImages
  - *.jpg
    - G0024172 1800张
      000000.jpg-001799.jpg
    - G0024173 1800张
      000000.jpg-001799.jpg
    - G0024174 1800张
      000000.jpg-001799.jpg
    - YDXJ0003 7755张
      000000.jpg-007754.jpg
    - YDXJ0013 4500张
      000000.jpg-004499.jpg

(a)   (b)

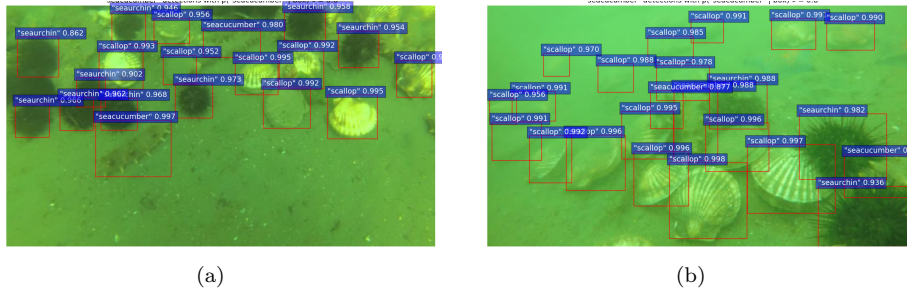Figure 1: URPC2018 data sets architecture

(a)   (b)

Figure 2: Experimental results of the first contest model.

4.1 Data Sets

On last week, I have trained a model with VOC2007 data sets and learn about standard architecture. Then my colleague and I try to change thousands of pictures into ILSVRC2015 format, which are from six videos got from organizing committee. As shown in Fig. 1, we reorder the picture number from zero to a 6 digit number with a python file that can do batch processing work to deal with nonstandard format.

4.2 Train a Contest Model

We put organised data sets to the remote server and try to train a model that can meet requirement of contest. Before doing like this, appropriate code modification is necessary because self.classes and label is not as same as VOC. In the project of Faster R-CNN files, relevant codes in pascal_voc.py need to revise, for example contents in self._classes variable has become what we want that are seaurchin, scallop and seacucumber.

I get the first contest trained model on Wednesday after two days running code on the server. Then I run demo.py to test the performance of model by two randomly selected pictures as shown in Fig. 2.

Furthermore, I should check total loss of my model in Fig. 3 to learn more about my model. Simulation results prove that this improved algorithm achieves an effect in accelerating the converging rate.
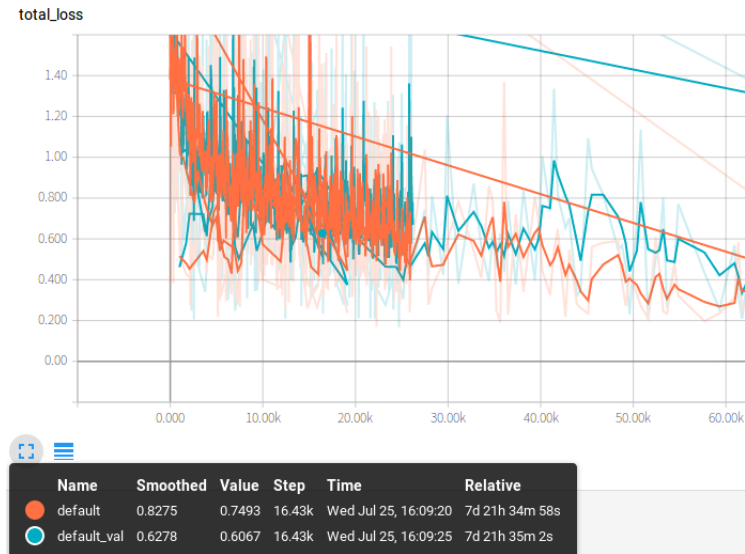
2

Figure 3: Scalars in tensorboead.

5   Plan

Objective: Finish training a model with contest data sets for URPC2018
Deadline: 2018.07.24

2018.07.16—2018.07.22 Finish neural networks and Deep Learning.

2018.07.23—2018.07.29 Finish improving deep neural networks courses.

2018.07.30—2018.08.05 Finish structuring machine learning projects courses.

2018.08.06—2018.08.12 Finish convolutional neural networks courses.

2018.08.13—2018.08.19 Finish sequence models courses.

References

[1] R. Girshick. Fast R-CNN. In *ICCV*, 2015. 1

[2] S. Ren, K. He, R. Girshick, and J. Sun. Faster R-CNN: Towards real-time object detection with region proposal networks. In *NIPS*, 2015. 1