

A Tutorial to Apply YOLO to Object Detection for Corn Counting in Kaggle

Zhiyi Li

2020.10.05

Jupyter Notebook in Kaggle

- Kaggle is a well-known machine learning platform for contests and sharing datasets, owned by Google.

<https://www.kaggle.com/>

- Jupyter Notebook is a standard interface to run Python code.
- We provide an example Jupyter Notebook to run corn images detection in Kaggle.

Jupyter Notebook in Kaggle

- Upload your own dataset corn image object detection.
- Generate an example Jupyter Notebook python script to train/evaluate in Kaggle.

Jupyter Notebook in Kaggle

- Kaggle is a well-known machine learning platform for contests and sharing datasets, owned by Google.

<https://www.kaggle.com/>

- Jupyter Notebook is a standard interface to run Python code.
- We provide an example Jupyter Notebook to run Corn images detection in Kaggle.

Jupyter Notebook in Kaggle

The screenshot displays the Kaggle Jupyter Notebook environment. The browser address bar shows the URL `https://www.kaggle.com/zhiyili1/tutorialforyolo/edit`. The notebook title is "TutorialForYOLO" with a "Draft saved" status. The interface includes a top menu bar (File, Edit, View, History, Bookmarks, Tools, Help) and a right sidebar with sections for Data, Settings, and Code Help.

The main notebook area shows a code cell with the following output:

```
Epoch 85/100
20/20 [=====] - 140s 7s/step - loss: 600.3028 - val_loss: 576.4202 - lr: 1.0000e-08
Epoch 86/100
20/20 [=====] - ETA: 0s - loss: 538.4250
Epoch 00086: ReduceLROnPlateau reducing learning rate to 9.999999939225292e-10.
20/20 [=====] - 139s 7s/step - loss: 538.4250 - val_loss: 525.3217 - lr: 1.0000e-08
Epoch 87/100
20/20 [=====] - 136s 7s/step - loss: 562.1774 - val_loss: 561.9818 - lr: 1.0000e-09
Epoch 88/100
20/20 [=====] - 139s 7s/step - loss: 551.9978 - val_loss: 590.5399 - lr: 1.0000e-09
Epoch 89/100
20/20 [=====] - ETA: 0s - loss: 570.5040
Epoch 00089: ReduceLROnPlateau reducing learning rate to 9.999999717180686e-11.
20/20 [=====] - 137s 7s/step - loss: 570.5040 - val_loss: 682.3727 - lr: 1.0000e-09
Epoch 90/100
20/20 [=====] - 136s 7s/step - loss: 552.6517 - val_loss: 667.9196 - lr: 1.0000e-10
Epoch 00090: early stopping
```

Below the code cell are buttons for "+ Code" and "+ Markdown". The right sidebar shows the "Data" section with "input (950.26 MB)" containing "tutorialforyolodataset" and "output" containing "/kaggle/working". The "Settings" section shows "Language" set to "Python", "Environment" set to "Preferences", "Accelerator" set to "None", and "Internet" set to "On". The "Code Help" section has a search bar labeled "Find Code Help" and the text "Search for examples of how to do things".

The bottom of the image shows a Windows taskbar with various application icons and a system clock indicating 5:03 PM on 8/31/2020.

Dataset used

- High Resolution Images taken from 10 meters ground level.
 - 68 training RGB images
 - 22 testing RGB images

Train/Evaluation processes in Kaggle

Create a Kaggle account, it is free.

- 1. Put dataset in readable/writable director in Kaggle:
todirectory = '/kaggle/working/'
copy_tree(fromdirectory, todirectory)
- 2. Prepare YOLO bounding box format annotation files
!python xml_to_yolo_for_train.py
!python xml_to_yolo_for_test.py
- 3. Clustering to get anchor boxes information by kmeans for initialization.
!python kmeans.py

Train/Evaluation processes

- 4. Train: Two stages, early-stopping, generate trained model.
!python train.py
- 5. Evaluation: Based on trained model, generate ground truth and prediction test images results.
!python yolo_evaluation.py
- 6. Calculate mAP (Mean Average Precision): Based on ground truth and prediction results
!python yolo_mAP_Calculation.py

Train/Evaluation processes

- Train/Evaluation process is done on-line in Kaggle
- Training process normally take more than 2 hours, early-stopping, change learning rates in training.
- Evaluation: mAP (mean average Precision): 0.58

Next improvements

- Code in Github and can be downloaded:

<https://github.com/zhiyilearn/A-Tutorial-for-YOLO-Object-Detection-in-Kaggle-Platform>

- Show real code(expansion) instead of running only scripts
- As a homework (extra credits) to let students accomplish.