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Shopee Competition #2

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Submitted by Cocoa a month ago

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0.84339	0.84085

Version 4 of

Notebook

- This Notebook in Nutshell
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- Train Model
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We will share our pipeline and it's source code on https://github.com/ilos-vigil/scl-2020-product-detection

For current best submission (0.85325 on public leaderboard), see https://www.kaggle.com/ilosvigil/scl2020-2-5-model?scriptVersionId=37953296

This notebook in nutshell

> This notebook source code based on Ensemble, LAMB & GridMask on TPU version 37 and 43

- Multimodal Deep Learning
  - Image
    - GridMask (https://arxiv.org/abs/2001.04086) from GridMask data augmentation with tensorflow
    - Rotate, shear, zoom, shift from Rotation Augmentation GPU/TPU - [0.96+]
    - tf.image functions
- TF-IDF word representation
  - L2 normalization
  - Sublinear Term Frequency
- EfficientNet B7 (https://arxiv.org/abs/1905.11946)
- Global Average Pooling (https://arxiv.org/abs/1312.4400)
- LAMB optimizer (https://arxiv.org/abs/1904.00962)
- MLP / Multi Layer Perceptron
- TTA / Test Time Augmentation
- TPU v3-8

Library

In [1]:

```
!pip install --upgrade efficientnet tensorflow_addons tensorflow
```

```
Collecting efficientnet
  Downloading efficientnet-1.1.0-py3-none-any.whl (18 kB)
Requirement already up-to-date: tensorflow_addons in /opt/conda/lib/python3.7/site-packages
(0.10.0)
Requirement already up-to-date: tensorflow in /opt/conda/lib/python3.7/site-packages (2.2.0)
Requirement already satisfied, skipping upgrade: scikit-image in /opt/conda/lib/python3.7/si
te-packages (from efficientnet) (0.16.2)
```

```
site-packages (from tensorflow_addons) (2.9.1)
Requirement already satisfied, skipping upgrade: tensorflow-estimator<2.3.0,>=2.2.0 in /opt/
conda/lib/python3.7/site-packages (from tensorflow) (2.2.0)
Requirement already satisfied, skipping upgrade: scipy==1.4.1; python_version >= "3" in /op
t/conda/lib/python3.7/site-packages (from tensorflow) (1.4.1)
Requirement already satisfied, skipping upgrade: wheel>=0.26; python_version >= "3" in /opt/
conda/lib/python3.7/site-packages (from tensorflow) (0.34.2)
Requirement already satisfied, skipping upgrade: six>=1.12.0 in /opt/conda/lib/python3.7/sit
e-packages (from tensorflow) (1.14.0)
Requirement already satisfied, skipping upgrade: termcolor>=1.1.0 in /opt/conda/lib/python3.
7/site-packages (from tensorflow) (1.1.0)
Requirement already satisfied, skipping upgrade: tensorboard<2.3.0,>=2.2.0 in /opt/conda/li
b/python3.7/site-packages (from tensorflow) (2.2.2)
Requirement already satisfied, skipping upgrade: h5py<2.11.0,>=2.10.0 in /opt/conda/lib/pyth
on3.7/site-packages (from tensorflow) (2.10.0)
Requirement already satisfied, skipping upgrade: wrapt>=1.11.1 in /opt/conda/lib/python3.7/s
ite-packages (from tensorflow) (1.11.2)
Requirement already satisfied, skipping upgrade: gast==0.3.3 in /opt/conda/lib/python3.7/sit
e-packages (from tensorflow) (0.3.3)
Requirement already satisfied, skipping upgrade: grpcio>=1.8.6 in /opt/conda/lib/python3.7/s
ite-packages (from tensorflow) (1.29.0)
Requirement already satisfied, skipping upgrade: opt-einsum>=2.3.2 in /opt/conda/lib/python
3.7/site-packages (from tensorflow) (3.2.1)
Requirement already satisfied, skipping upgrade: protobuf>=3.8.0 in /opt/conda/lib/python3.
7/site-packages (from tensorflow) (3.12.2)
Requirement already satisfied, skipping upgrade: numpy<2.0,>=1.16.0 in /opt/conda/lib/python
3.7/site-packages (from tensorflow) (1.18.1)
Requirement already satisfied, skipping upgrade: keras-preprocessing>=1.1.0 in /opt/conda/li
b/python3.7/site-packages (from tensorflow) (1.1.2)
```

```
3.7/site-packages (from tensorflow) (1.6.3)
Requirement already satisfied, skipping upgrade: absl-py>=0.7.0 in /opt/conda/lib/python3.7/
site-packages (from tensorflow) (0.9.0)
Requirement already satisfied, skipping upgrade: matplotlib!=3.0.0,>=2.0.0 in /opt/conda/li
b/python3.7/site-packages (from scikit-image->efficientnet) (3.2.1)
Requirement already satisfied, skipping upgrade: networkx>=2.0 in /opt/conda/lib/python3.7/s
ite-packages (from scikit-image->efficientnet) (2.4)
Requirement already satisfied, skipping upgrade: pillow>=4.3.0 in /opt/conda/lib/python3.7/s
ite-packages (from scikit-image->efficientnet) (5.4.1)
Requirement already satisfied, skipping upgrade: imageio>=2.3.0 in /opt/conda/lib/python3.7/
site-packages (from scikit-image->efficientnet) (2.8.0)
Requirement already satisfied, skipping upgrade: PyWavelets>=0.4.0 in /opt/conda/lib/python
3.7/site-packages (from scikit-image->efficientnet) (1.1.1)
Requirement already satisfied, skipping upgrade: tensorboard-plugin-wit>=1.6.0 in /opt/cond
a/lib/python3.7/site-packages (from tensorboard<2.3.0,>=2.2.0->tensorflow) (1.6.0.post3)
Requirement already satisfied, skipping upgrade: google-auth-oauthlib<0.5,>=0.4.1 in /opt/co
nda/lib/python3.7/site-packages (from tensorboard<2.3.0,>=2.2.0->tensorflow) (0.4.1)
Requirement already satisfied, skipping upgrade: google-auth<2,>=1.6.3 in /opt/conda/lib/pyt
hon3.7/site-packages (from tensorboard<2.3.0,>=2.2.0->tensorflow) (1.14.0)
Requirement already satisfied, skipping upgrade: requests<3,>=2.21.0 in /opt/conda/lib/pytho
n3.7/site-packages (from tensorboard<2.3.0,>=2.2.0->tensorflow) (2.23.0)
Requirement already satisfied, skipping upgrade: markdown>=2.6.8 in /opt/conda/lib/python3.
7/site-packages (from tensorboard<2.3.0,>=2.2.0->tensorflow) (3.2.1)
Requirement already satisfied, skipping upgrade: setuptools>=41.0.0 in /opt/conda/lib/python
3.7/site-packages (from tensorboard<2.3.0,>=2.2.0->tensorflow) (46.1.3.post20200325)
Requirement already satisfied, skipping upgrade: werkzeug>=0.11.15 in /opt/conda/lib/python
3.7/site-packages (from tensorboard<2.3.0,>=2.2.0->tensorflow) (1.0.1)
Requirement already satisfied, skipping upgrade: cycler>=0.10 in /opt/conda/lib/python3.7/si
te-packages (from matplotlib!=3.0.0,>=2.0.0->scikit-image->efficientnet) (0.10.0)
Requirement already satisfied, skipping upgrade: kiwisolver>=1.0.1 in /opt/conda/lib/python
```

```
entnet) (2.4.7)
Requirement already satisfied, skipping upgrade: python-dateutil>=2.1 in /opt/conda/lib/pyth
on3.7/site-packages (from matplotlib!=3.0.0,>=2.0.0->scikit-image->efficientnet) (2.8.1)
Requirement already satisfied, skipping upgrade: decorator>=4.3.0 in /opt/conda/lib/python3.
7/site-packages (from networkx>=2.0->scikit-image->efficientnet) (4.4.2)
Requirement already satisfied, skipping upgrade: requests-oauthlib>=0.7.0 in /opt/conda/lib/
python3.7/site-packages (from google-auth-oauthlib<0.5,>=0.4.1->tensorboard<2.3.0,>=2.2.0->t
ensorflow) (1.2.0)
Requirement already satisfied, skipping upgrade: cachetools<5.0,>=2.0.0 in /opt/conda/lib/py
thon3.7/site-packages (from google-auth<2,>=1.6.3->tensorboard<2.3.0,>=2.2.0->tensorflow)
(3.1.1)
Requirement already satisfied, skipping upgrade: pyasn1-modules>=0.2.1 in /opt/conda/lib/pyt
hon3.7/site-packages (from google-auth<2,>=1.6.3->tensorboard<2.3.0,>=2.2.0->tensorflow) (0.
2.7)
Requirement already satisfied, skipping upgrade: rsa<4.1,>=3.1.4 in /opt/conda/lib/python3.
7/site-packages (from google-auth<2,>=1.6.3->tensorboard<2.3.0,>=2.2.0->tensorflow) (4.0)
Requirement already satisfied, skipping upgrade: chardet<4,>=3.0.2 in /opt/conda/lib/python
3.7/site-packages (from requests<3,>=2.21.0->tensorboard<2.3.0,>=2.2.0->tensorflow) (3.0.4)
Requirement already satisfied, skipping upgrade: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in
/opt/conda/lib/python3.7/site-packages (from requests<3,>=2.21.0->tensorboard<2.3.0,>=2.2.0-
>tensorflow) (1.24.3)
Requirement already satisfied, skipping upgrade: idna<3,>=2.5 in /opt/conda/lib/python3.7/si
te-packages (from requests<3,>=2.21.0->tensorboard<2.3.0,>=2.2.0->tensorflow) (2.9)
Requirement already satisfied, skipping upgrade: certifi>=2017.4.17 in /opt/conda/lib/python
3.7/site-packages (from requests<3,>=2.21.0->tensorboard<2.3.0,>=2.2.0->tensorflow) (2020.4.
5.2)
Requirement already satisfied, skipping upgrade: oauthlib>=3.0.0 in /opt/conda/lib/python3.
7/site-packages (from requests-oauthlib>=0.7.0->google-auth-oauthlib<0.5,>=0.4.1->tensorboar
d<2.3.0,>=2.2.0->tensorflow) (3.0.1)
Requirement already satisfied, skipping upgrade: pyasn1<0.5.0,>=0.4.6 in /opt/conda/lib/pyth
```

```
Successfully installed efficientnet-1.1.0 keras-applications-1.0.8
```

In [2]:

```
import math
import re
import random
import os
import tensorflow as tf
import tensorflow_addons as tfa
import numpy as np
import tensorflow.keras.backend as K
import efficientnet.tfkeras as efn
import efficientnet
import itertools
import matplotlib
import scipy
import pandas as pd
import sklearn
from matplotlib import pyplot as plt
from datetime import datetime
```

In [3]:

```
print(f'Numpy version : {np.__version__}')
print(f'Tensorflow version : {tf.__version__}')
print(f'Tensorflow Addons version : {tfa.__version__}')
print(f'EfficientNet (library) version : {efficientnet.__version__}')
print(f'Matplotlib version : {matplotlib.__version__}')
print(f'Scipy version : {scipy.__version__}')
print(f'Pandas version : {pd.__version__}')
```

```
Numpy version : 1.18.1
Tensorflow version : 2.2.0
Tensorflow Addons version : 0.10.0
EfficientNet (library) version : 1.1.0
Matplotlib version : 3.2.1
Scipy version : 1.4.1
Pandas version : 1.0.3
Scikit-Learn version : 0.23.1
```

In [4]:

```
!pip freeze > requirements.txt
```

In [5]:

```
PRE_TRAINING_TIME_START = datetime.now()
AUTO = tf.data.experimental.AUTOTUNE
```

Set seed

In [6]:

```
SEED = 42

os.environ['PYTHONHASHSEED']=str(SEED)
random.seed(SEED)
np.random.seed(SEED)

os.environ['TF_DETERMINISTIC_OPS']=str(SEED)
tf.random.set_seed(SEED)
```

TPU or GPU detection

```
Running on TPU  grpc://10.0.0.2:8470
REPLICAS:  8
```

Configuration

TFRecord function

Image augmentation functions

Rotate, shear, zoom, shift

Gridmask

Augmentation function & tf.image function

Show augmented image

Model function

Create model

Train model

Submit Result

No TTA

No TTA + type 0

No TTA + TTA type 0 + TTA type 1

Save model