Traffic Sign Classification

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Downloading the German Traffic Sign Recognition Benchmark, GTSRB

The following downloads the dataset, unzips it, and moves the internal directories around (and changes their name) to match my prefered directory convention.

```bash
dataset=GTSRB_Final_Training_Images.zip

if [[ ! -d "data" ]]; then
    wget https://sid.erda.dk/public/archives/daaeac0d7ce1152aea9b61d9f1e19370/$dataset
    unzip $dataset -d "data"
    rm -f $dataset
fi;

mv "data/GTSRB/Final_Training/Images" "data/train"
mv "data/GTSRB/Readme-Images.txt" "data/README_GTSRB"
rm -rf "data/GTSRB"

echo "DONE!"
```

Common Variables

`common.py`

```python
import pandas

signNames = pandas.read_csv("../data/signnames.csv")['SignName'].values

trainPath = "../data/train"
modelPath = "./model"
imageSize = 30
```

Class Names

```python
import common
for i, name in enumerate(common.signNames):
    print(i, name)
```

```
 0 Speed limit (20km/h)
 1 Speed limit (30km/h)
 2 Speed limit (50km/h)
 3 Speed limit (60km/h)
 4 Speed limit (70km/h)
 5 Speed limit (80km/h)
 6 End of speed limit (80km/h)
 7 Speed limit (100km/h)
 8 Speed limit (120km/h)
 9 No passing
10 No passing for vehicles over 3.5 metric tons
11 Right-of-way at the next intersection
12 Priority road
13 Yield
14 Stop
15 No vehicles
16 Vehicles over 3.5 metric tons prohibited
17 No entry
18 General caution
19 Dangerous curve to the left
20 Dangerous curve to the right
21 Double curve
22 Bumpy road
23 Slippery road
24 Road narrows on the right
25 Road work
26 Traffic signals
27 Pedestrians
28 Children crossing
29 Bicycles crossing
30 Beware of ice/snow
31 Wild animals crossing
32 End of all speed and passing limits
33 Turn right ahead
34 Turn left ahead
35 Ahead only
36 Go straight or right
37 Go straight or left
38 Keep right
39 Keep left
40 Roundabout mandatory
41 End of no passing
42 End of no passing by vehicles over 3.5 metric tons
```

Load Images using keras.preprocessing

```python
from keras.preprocessing.image import ImageDataGenerator

import common

size = 32
```

```
batchGenerator = ImageDataGenerator(rescale=1./255)
batch = batchGenerator.flow_from_directory(
    directory = common.trainPath,
    batch_size = size,
    shuffle = True,
    target_size = (common.imageSize, common.imageSize))
```

View a Batch

```
import matplotlib.pyplot as pyplot

import common
import batch
from textwrap import wrap

columns = 5
rows = 5

imageBatch, labelBatch = next(batch.batch)

pyplot.figure(figsize=(2*columns,2*rows))
pyplot.subplots_adjust(hspace = .6)

for n in range(min(columns*rows, batch.size)):
    ax = pyplot.subplot(rows, columns, n+1)
    pyplot.imshow(imageBatch[n])
    title = common.signNames[labelBatch[n] == 1][0].title()
    wrappedTitle = "\n".join(wrap(title, 18))
    pyplot.title(wrappedTitle, fontsize=10)
    pyplot.axis('off')

pyplot.tight_layout()
pyplot.savefig('../figure/batchView.png')
```
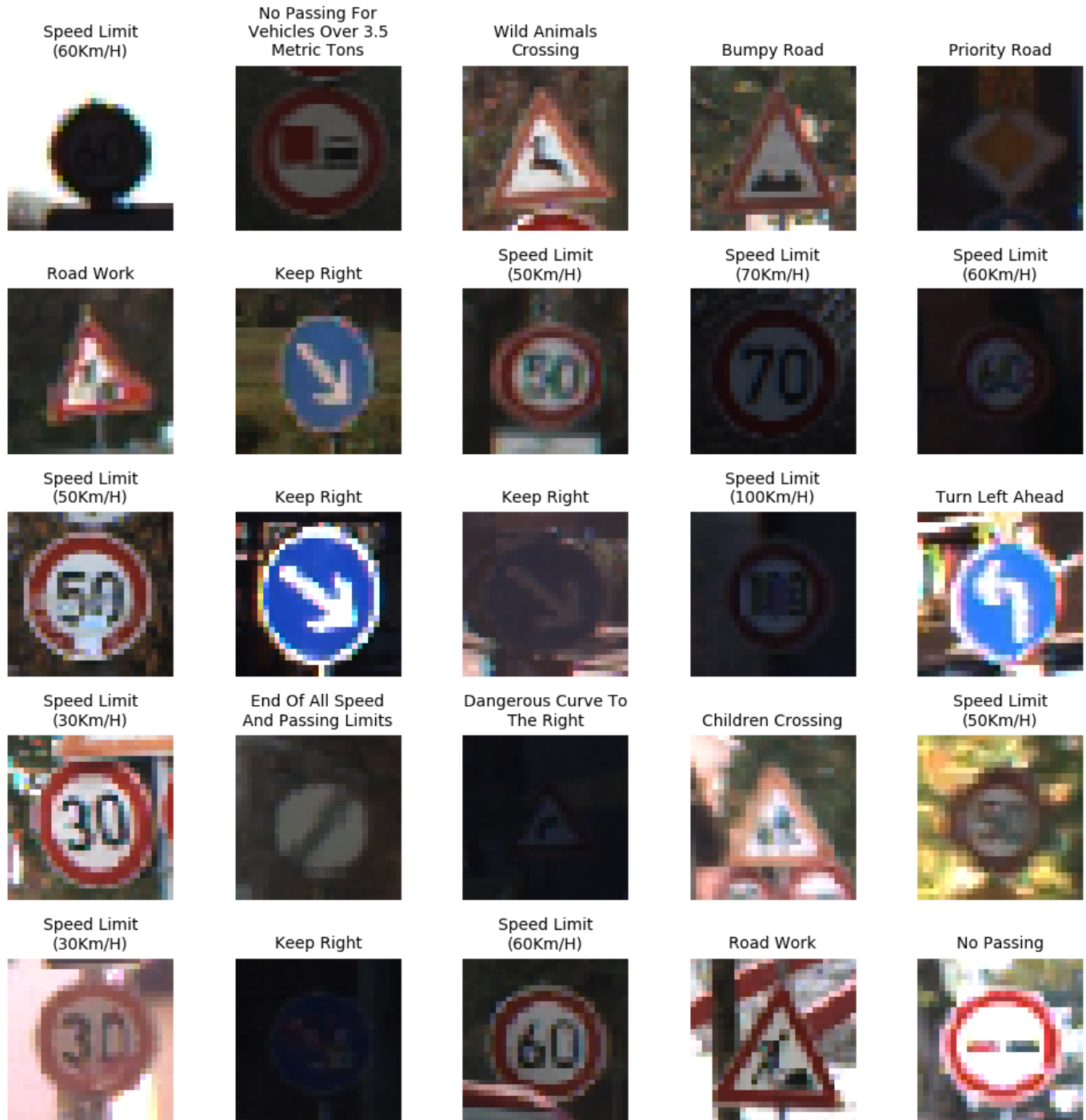
Speed Limit (60Km/H)	No Passing For Vehicles Over 3.5 Metric Tons	Wild Animals Crossing	Bumpy Road	Priority Road
Road Work	Keep Right	Speed Limit (50Km/H)	Speed Limit (70Km/H)	Speed Limit (60Km/H)
Speed Limit (50Km/H)	Keep Right	Keep Right	Speed Limit (100Km/H)	Turn Left Ahead
Speed Limit (30Km/H)	End Of All Speed And Passing Limits	Dangerous Curve To The Right	Children Crossing	Speed Limit (50Km/H)
Speed Limit (30Km/H)	Keep Right	Speed Limit (60Km/H)	Road Work	No Passing

Resources

Tutorial

- https://towardsdatascience.com/recognizing-traffic-signs-with-over-98-accuracy-using-deep-learning-86737aedc2ab
- https://github.com/kenshiro-o/CarND-Traffic-Sign-Classifier-Project
- https://github.com/kenshiro-o/CarND-Traffic-Sign-Classifier-Project/blob/master/Traffic_Sign_Classifier.ipynb

Dataset

- https://sid.erda.dk/public/archives/daaeac0d7ce1152aea9b61d9f1e19370/published-archive.html
- http://benchmark.ini.rub.de/?section=gtsrb&subsection=dataset

Loading Images

- `https://www.tensorflow.org/tutorials/load_data/images`