

PyTorch Week 3

Custom dataset

Request

1. Access the custom dataset with PyTorch API.
2. Train the VGG-16 or ResNet18 with the dataset (optional).

Submit your python code before 8/22.

Template

This is the template of reading custom dataset provided by PyTorch. You can reference the template to finish the request.

```
class CustomImageDataset(Dataset):
    def __init__(self, annotations_file, img_dir, transform=None, target_transform=None):
        self.img_labels = pd.read_csv(annotations_file)
        self.img_dir = img_dir
        self.transform = transform
        self.target_transform = target_transform

    def __len__(self):
        return len(self.img_labels)

    def __getitem__(self, idx):
        img_path = os.path.join(self.img_dir, self.img_labels.iloc[idx, 0])
        image = read_image(img_path)
        label = self.img_labels.iloc[idx, 1]
        if self.transform:
            image = self.transform(image)
        if self.target_transform:
            label = self.target_transform(label)
        return image, label
```

Using to augment data or something else.

The dataloader needed !

Pandas

A powerful python package to access the data format, e.g. .csvs file.

annotation.csvs					pandas.read_csvs				
1	class index	filepaths	labels	data set					
2	0	train/ABBOTTS BABBLER/001.jpg	ABBOTTS BABBLER	train	0	0	train/ABBOTTS BABBLER/001.jpg	ABBOTTS BABBLER	train
3	0	train/ABBOTTS BABBLER/002.jpg	ABBOTTS BABBLER	train	1	0	train/ABBOTTS BABBLER/002.jpg	ABBOTTS BABBLER	train
4	0	train/ABBOTTS BABBLER/003.jpg	ABBOTTS BABBLER	train	2	0	train/ABBOTTS BABBLER/003.jpg	ABBOTTS BABBLER	train
5	0	train/ABBOTTS BABBLER/004.jpg	ABBOTTS BABBLER	train	3	0	train/ABBOTTS BABBLER/004.jpg	ABBOTTS BABBLER	train
6	0	train/ABBOTTS BABBLER/005.jpg	ABBOTTS BABBLER	train	4	0	train/ABBOTTS BABBLER/005.jpg	ABBOTTS BABBLER	train
7	0	train/ABBOTTS BABBLER/006.jpg	ABBOTTS BABBLER	train	...	...	...	...	...
8	0	train/ABBOTTS BABBLER/007.jpg	ABBOTTS BABBLER	train	62383	399	valid/YELLOW HEADED BLACKBIRD/1.jpg	YELLOW HEADED BLACKBIRD	valid
9	0	train/ABBOTTS BABBLER/008.jpg	ABBOTTS BABBLER	train	62384	399	valid/YELLOW HEADED BLACKBIRD/2.jpg	YELLOW HEADED BLACKBIRD	valid
10	0	train/ABBOTTS BABBLER/009.jpg	ABBOTTS BABBLER	train	62385	399	valid/YELLOW HEADED BLACKBIRD/3.jpg	YELLOW HEADED BLACKBIRD	valid
11	0	train/ABBOTTS BABBLER/010.jpg	ABBOTTS BABBLER	train	62386	399	valid/YELLOW HEADED BLACKBIRD/4.jpg	YELLOW HEADED BLACKBIRD	valid
12	0	train/ABBOTTS BABBLER/011.jpg	ABBOTTS BABBLER	train	...	...	valid/YELLOW HEADED BLACKBIRD/5.jpg	YELLOW HEADED BLACKBIRD	valid
13	0	train/ABBOTTS BABBLER/012.jpg	ABBOTTS BABBLER	train					
14	0	train/ABBOTTS BABBLER/013.jpg	ABBOTTS BABBLER	train					
15	0	train/ABBOTTS BABBLER/014.jpg	ABBOTTS BABBLER	train					
16	0	train/ABBOTTS BABBLER/015.jpg	ABBOTTS BABBLER	train					
17	0	train/ABBOTTS BABBLER/016.jpg	ABBOTTS BABBLER	train					
18	0	train/ABBOTTS BABBLER/017.jpg	ABBOTTS BABBLER	train					
19	0	train/ABBOTTS BABBLER/018.jpg	ABBOTTS BABBLER	train					
20	0	train/ABBOTTS BABBLER/019.jpg	ABBOTTS BABBLER	train					
21	0	train/ABBOTTS BABBLER/020.jpg	ABBOTTS BABBLER	train					
22	0	train/ABBOTTS BABBLER/021.jpg	ABBOTTS BABBLER	train					
23	0	train/ABBOTTS BABBLER/022.jpg	ABBOTTS BABBLER	train					
24	0	train/ABBOTTS BABBLER/023.jpg	ABBOTTS BABBLER	train					
25	0	train/ABBOTTS BABBLER/024.jpg	ABBOTTS BABBLER	train					
26	0	train/ABBOTTS BABBLER/025.jpg	ABBOTTS BABBLER	train					
27	0	train/ABBOTTS BABBLER/026.jpg	ABBOTTS BABBLER	train					
28	0	train/ABBOTTS BABBLER/027.jpg	ABBOTTS BABBLER	train					
29	0	train/ABBOTTS BABBLER/028.jpg	ABBOTTS BABBLER	train					
30	0	train/ABBOTTS BABBLER/029.jpg	ABBOTTS BABBLER	train					
		train/ABBOTTS BABBLER/030.jpg	ABBOTTS BABBLER	train					
		train/ABBOTTS BABBLER/031.jpg	ABBOTTS BABBLER	train					

Label

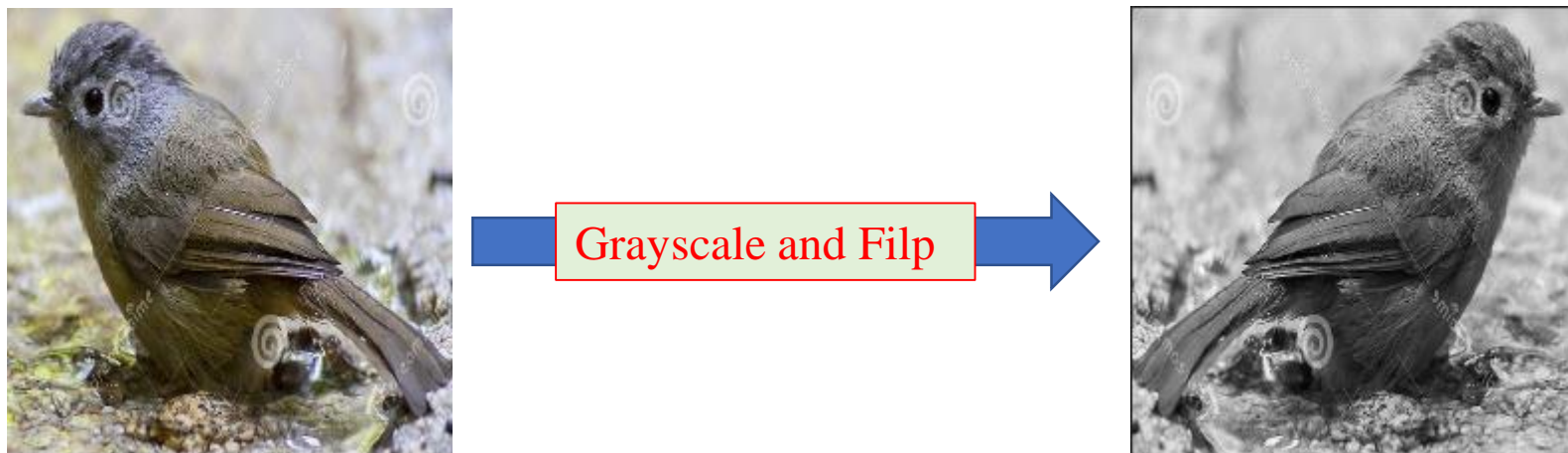
column data

pandas.read_csvs

The Getting started is helpful for handling the DataFrame (data structure of pandas) in the pandas website.

Explore torchvision

The transformation of data can be augmented the dataset for training the neural network. Exploring the torchvision API for more information (CenterCrop, Pad or Grayscale...).



Try another transformation by yourself !

Reference

- https://pytorch.org/tutorials/beginner/basics/data_tutorial.html
- <https://pandas.pydata.org/docs/index.html>
- <https://pytorch.org/vision/stable/transforms.html>

Dataset : <https://www.kaggle.com/datasets/gpiosenska/100-bird-species?resource=download>