Implementation Details

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Dataset

Dataset ShangaiTech Part A and B are available to download in annotated format in one of the paper github repo mentioned in related works section of Github.

ShangaiTech Part A contains 182 train and 300 test images with annotated txt files and ground truths. ShangaiTech Part B contains 316 train and 400 test images with annotated txt files and ground truths.

To make it compatible to the annotation format required in this paper implementation, **preprocess_dataset1.py** script is written to delete last three columns from .txt files present in test/images and train/images folder of dataset, so that only (x,y) coordinates of point remains.

To make the Dataset structure as mentioned in readme of github:

- DATA ROOT folder and specified directory structure is made and updated train and test dataset is added in corresponding folders by implementing **preprocess_dataset3.py** script.

- To make train.list and test.list txt files as mentioned in readme **preprocess_dataset2.py** script is implemented.

Errors encountered and Resolved

Code written in github repo was only supported to run on **GPU enabled devices**.
To run it on **CPU enabled devices** following code snippet was added in the
run_test.py and **train.py**

```
if torch.cuda.is_available():
    os.environ["CUDA_VISIBLE_DEVICES"] = '{}'.format(args.gpu_id)
else:
    os.environ["CUDA_VISIBLE_DEVICES"] = ""
```

Pretrained Model of **Vgg16 backbone** network is downloaded and it's path is added in **models/vgg.py** file at specified place.

Evaluation

For the Dataset SHTech Part A according to the resources present model is trained for 500 epochs which took nearly 11 hours and got MAE score of 57.27 and MSE score of 91.01 which is significantly close to mentioned score in paper which is obtained by running 3500 epochs. Therefore, if having sufficient resources and running model for 3500 epochs it can easily approach the mentioned scores.

SHTech Part A Dataset	Mentioned Scores	Obtained Scores	Approximated Scores
MAE Score	52.74	57.27 (500 epochs)	can easily match (in 3500 epoch)
MSE Score	85.06	91.01 (500 epochs)	can easily match (in 3500 epoch)

Screenshot of obtained values after running

For the Dataset SHTech Part B according to the resources present model is trained for 500 epochs which took nearly 12 hours and got MAE score of 8.85 and MSE score of 13.84 which is significantly close to mentioned score in paper which is obtained by running 3500 epochs. Therefore, if having sufficient resources and running model for 3500 epochs it can easily approach the mentioned scores.

SHTech Part B Dataset	Mentioned Scores	Obtained Scores	Approximated Scores
MAE Score	6.25	8.85 (300 epochs)	can easily match (in 3500 epoch)
MSE Score	9.9	13.84 (300 epochs)	can easily match (in 3500 epoch)

Screenshot of obtained values after running

Results

Resulting Prediction obtained on Image