# IPR_PROJECT_1_DETAILS

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## 1 Implementation Details

### 1.1 Model Idea

- Two different models are implemented for crowd counting purpose. For each of the model, a standard crowd counting model is jointly trained with two different frameworks, (i) A refinement Framework (ii) A adaptive generator framework
- **CSRNet** is used for the crowd counting framework.

#### 1.1.1 Refiner Model

- The refiner network enhances the crowd density maps generated by standard methods.
- This framework is jointly trained with the counter network, via designing a **Joint Loss Function**, which captures the diffrence between the counter and the refiner network and the deviation from the ground truth density map

#### 1.1.2 Generator Model

- This adaptive density map generator networks generates denisty maps from ground truth maps, which is then used to jointly train the counter model.
- The loss function is designed to capture the diffrence between the generator output and counter output, along with the deviation from ground truth densities.

### 1.2 Implementation Ideas

- **THE MODEL IS IMPLEMENTED FROM SCRATCH, NO REFERENCE IMPLEMENTATION AVAILABLE**
- SGD optimizer is used for counter framework. Adam is used for the refiner and generator frameworks.
- Images the normalized according to ImageNet standards.

- Learning rate scheduler is used to change the rate suitably during training.
- Batch size 2 is used for training and the model is trained for 10-20 epochs (GPU availability and RAM constraints)

# 2 Dataset

- **Dataset :** ShanghaiTech With People Density Map
- It contains 2 datasets : ShanghaiTechA and ShanghaiTechB
- In each dataset , there are 3 folder:

  images: the jpg image file

  ground-truth: matlab file contain annotated head (coordinate x, y)

  ground-truth-h5: people density map
- ShanghaiTech A contains 482 crowd images with crowd numbers varying from 33 to 3139, and ShanghaiTech B contains 716 high-resolution images with crowd numbers from 9 to 578.

# 3 Results:

(These are best possible results got testing on my system on few epochs)

## 3.1 ShanghaiTechA

### 3.1.1 Refiner :

- MAE : 188.10
- RMSE : 323.36

### 3.1.2 Generator :

- MAE : 238.96
- RMSE : 397.41

## 3.2 ShanghaiTechB

### 3.2.1 Refiner :

- MAE : 61.23
- RMSE : 92.78

### 3.2.2 Generator :

- MAE : 84.78
- RMSE : 121.42