Crowd Analysis

CVI Group - Sai Vinay, Lokesh Kumar

Centre For Innovation

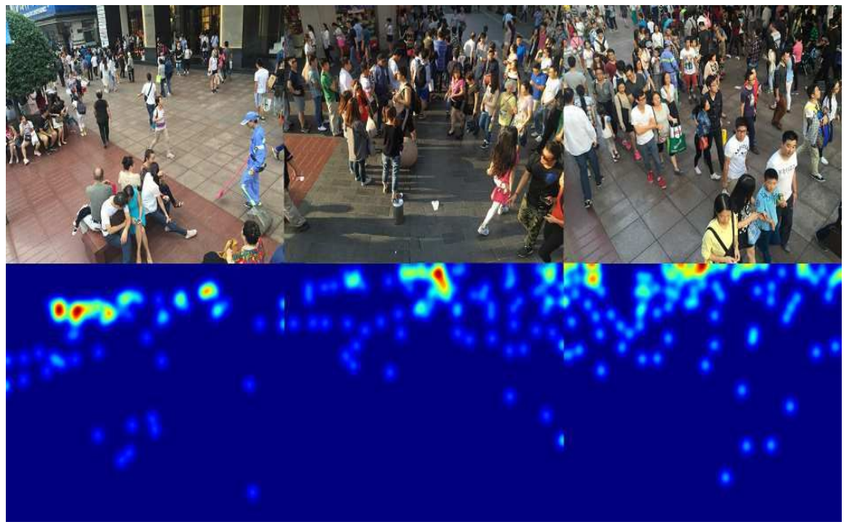
Crowd analysis is automated analysis of crowd density estimation, crowd motion detection, crowd tracking and crowd behavior understanding .The main aim of this project is to increase safety and avoid casualties in mass crowd gatherings.

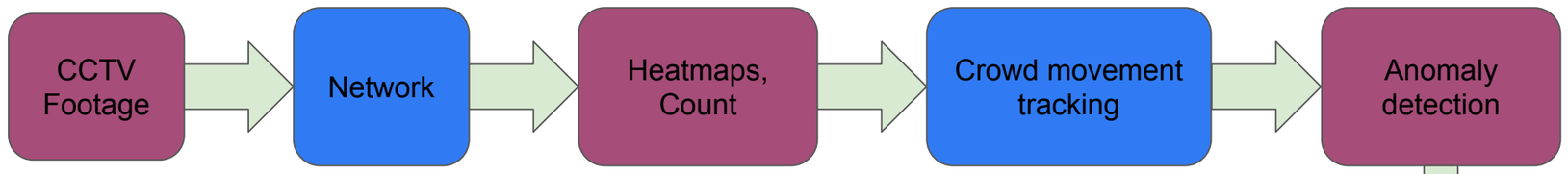
Introduction:

Increase of population and diversity of human activities, crowded scenes have been more frequent in the real world.It brings enormous challenges to public management, safety and security. Every year hundreds of people die due to stampedes and crushes.

Objectives:

- Automating monitoring densely crowded areas using deep learning.
- Early identification of abnormal behaviour in the scene.
- Tracking the pattern of crowd movement.



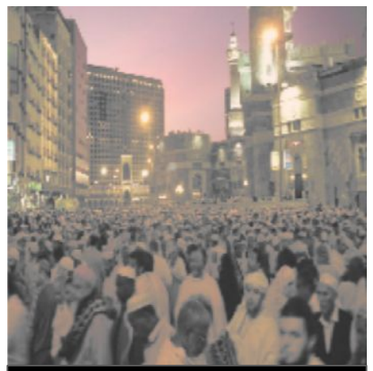


Implementation details:

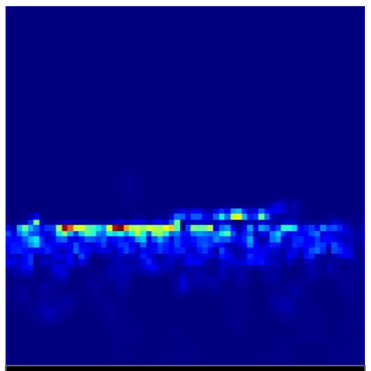
- Multi-task learning to boost individual task performance.
- Using encoder decoder architecture.
- Tensorflow,Tfrecord files to increase training efficiency and Input pipeline for data augmentation.
- Transfer learning by truncating resnet50 and added few layers on top of it.
- In csrnet we built on top of 13 layers of vgg net.
- L2 loss,AdaGrad optimizer for resnet crowd.In csrnet we used perpetual loss and Adam optimizer.

Results:

- Accuracy of ~69% on heatmaps.
- Accuracy of ~58% on count prediction.



Crowded image



Our prediction

Current work:

- Prediction of density maps.
- Prediction of number of people in scene.

Experiments:

- We implemented two architectures Resnet Crowd and Csrnet.
- Used Shanghai-tech dataset consisting of 482 images, on which we applied data augmentation.

Future Plans :

- Violent behaviour recognition.
- Crowd movement tracking (flow directions)
- Locating and tracking of Suspicious people in crowd using pose estimation
- Person Re-identification.