**Title of Topic**

Crowd density classification using deep learning and computer vision.

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**Description**:

Automatic Crowd analysis becomes one of the most trending research topics in the area of computer vision due to the increased safety needs of the world. Crowd density is one of the critical surveillance parameters which represents the space occupied by the crowd in a scene. I propose to solve this problem by using Computer Vision and Machine Learning tied to an Android Platform to analyze user’s scanned scenes and estimate current crowd conditions. In this project our crowd density estimation method using two kinds of methods. One is the classification of any images in three classes and another is person counting using an object detection model. This system can be improved to get the accurate number of people in the crowd and density level.

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Introduction to Problem statement

Crowd Classification Using TensorFlow classification model.

Crowd counting via person detection Models.

Transfer learning techniques for retraining.

What methods mentioned in research paper.

Convolution Neural Network (CNN)

              Recurrent Neural Network (RNN)

Recurrent Neural Network(LSTM)

What we can Do?

Creating a dataset for three classes(High, Low, Mid) for classification from scratch.

Retrain pre-existing classification model(s) with our own dataset of crowd images.

Successes

Able to find images for every class.

Failures

Trouble counting people in large crowds due to more occlusion and overlapping people

Challenges:

Not able to decide the range of each class like How many people could be a low-density crowd? Medium-density? High density?

Detecting and classifying large crowds can be difficult.

**Sources:**

[Deep Learning Framework for Density Estimation of Crowd Video](https://ieeexplore-ieee-org.proxylib.csueastbay.edu/document/8704051/)

Authors: [Muhammed V Anees](https://ieeexplore-ieee-org.proxylib.csueastbay.edu/author/37086825978); [Santhosh G Kumar](https://ieeexplore-ieee-org.proxylib.csueastbay.edu/author/37086825863)

Publication:[2018 8th International Symposium on Embedded Computing and System Design (ISED)](https://ieeexplore-ieee-org.proxylib.csueastbay.edu/xpl/conhome/8698774/proceeding)

Year: 2018 | Conference Paper | Publisher: IEEE

Multiple features fusion for crowd density estimation

Authors: Zi Ye, Jinqiao Wang, Zhenchong Wang, Hanqing Lu

Publication: [ICIMCS '12: Proceedings of the 4th International Conference on Internet Multimedia Computing and Service](https://dl-acm-org.proxylib.csueastbay.edu/doi/proceedings/10.1145/2382336)

Year: September 2012