Crowd analysis from drone footages using Image processing and Machine learning
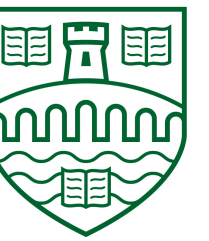
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Background

Due to the rapid expansion of human population along with the urbanization, the crowd occurrence is more frequent. Crowd management and public safety is one of the major issue in the areas such as sports event, crowded public places, religious events or any public mass gathering. Most of the disasters occurs when there are conflicting motion patterns among the crowd.

- Crowd analysis can be used for designing the schema for the crowd management..

- It can be applicable in design and development of public spaces such as Stadiums, Concert halls, Shopping malls etc which further can help to improve the evacuation strategies in emergency situations.

- It can also be useful for visual surveillance i.e. for noticing any peculiarity which can be helpful in a situation such as identifying and tracking the suspect in a crowd.
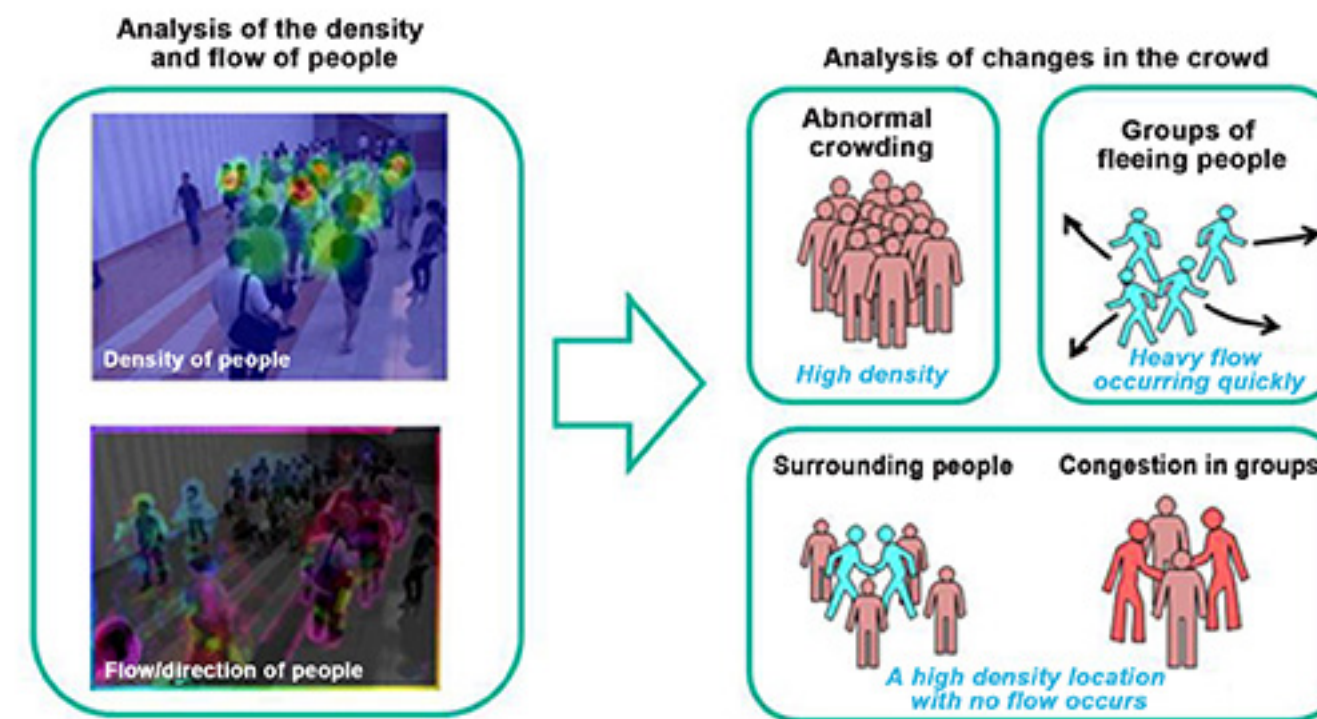
Objectives

From the outlook of computer vision the two main components of crowd analysis are, Crowd information gain and modelling of the crowd event to draw the inferences. To overcome the problem of crowd analysis, we develop an algorithm that uses OpenCV library which is a python library of programming functions mainly aimed at real-time computer vision.

We are using OpenCV for crowd detection or multiple object tracking. Apart form this we are using OpenCV for crowd counting & density estimation using methods such as CNN based like CSRNet. We used the drone footage archives for training our model which can further be used for real time application.
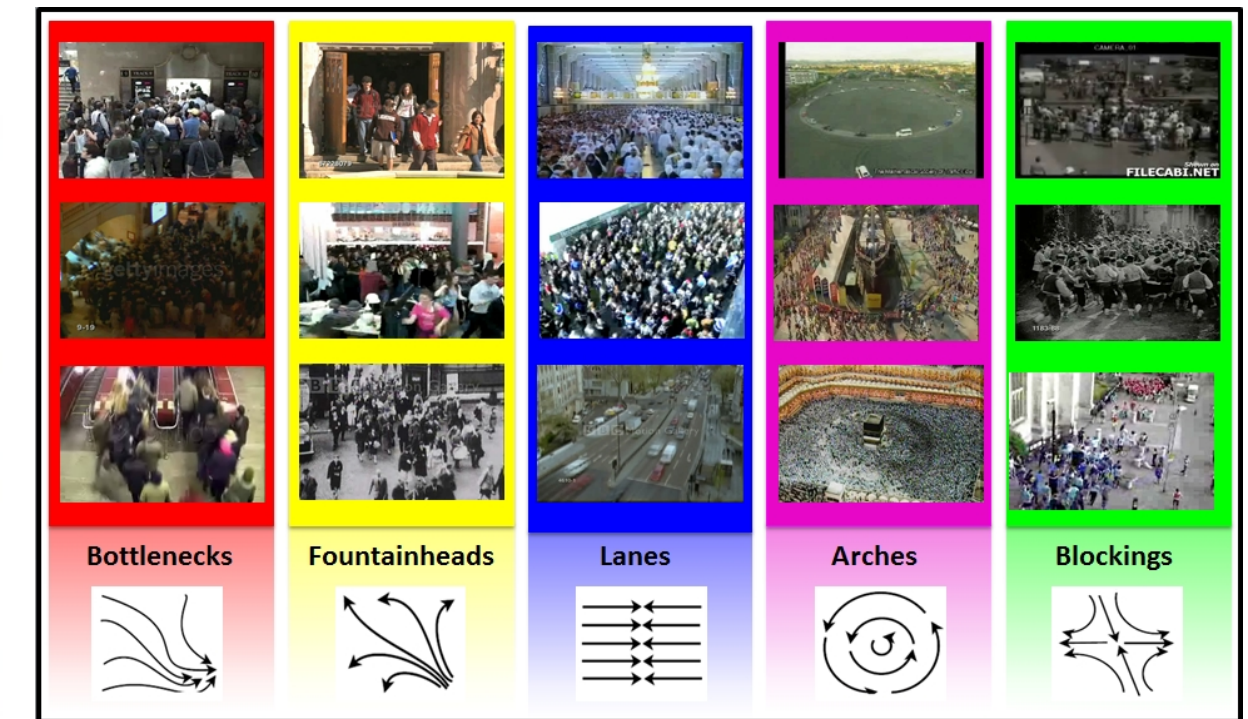
Achievements

Since the goal of our system is to detect multiple crowd, count and estimate density, and their or flow using drone footages, we are expecting system to be able to detect crowd at various angle and of different shapes and motion with good accuracy. The main contribution of the work is:

1) Expansion of the idea of using knowledge for crowd analysis to understand the unstructured crowd behaviour;

2) Using Computer vision library OpenCV to solve an existing problem in crowd analysis framework.

OpenCV