Title:	From Crowd Dynamics to Crowd Saftey
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Keyword(s):	Object Detection Local Min/Max point Crowd Modelling
Subject(s):	Image Processing Control System
Abstract:	At present there are large number of Crowd gatherings all over the world but also there are numerous crowd disasters occurring every year. Unfortunately, the information about the (spatio-temporal) development of these events tend to be qualitative rather than a systematic quantitative analysis, and there are not many preventive measures to manage the crowd and control the huge crowd during the critical crowd conditions in order to avoid Crowd Disaster.During Crowd gathering we can collect ``live video recordings''. With this video material, it is possible to analyse the behaviour of the crowd. Further more, we may use this analysis to manage the crowd movement as well as to avoid the crowd Disaster.This thesis aims at analyzing the crowd by using live video recording and use the crowd analysis to manage the crowd and prevent the disaster. First, a novel mathematical crowd model is proposed where we have re-defined the crowd parameters such as Local Density, Local Velocity, Variation in Velocity, Pressure which play a crucial role in analyzing the crowd as well as managing the crowd to avoid the crowd disasters. Further, in order to implement the crowd model we proposed a novel method to detect the head in the given location which is an important step in crowd modeling. In this method we have cascaded the HOG with the local minimum and maximum which has increased our speed of detection without reducing the detection rate. Finally, we have implemented the crowd model incorporating head detection information by which we are able to analyze the density, velocity, critical regions all of whom can be used for studying the behavior of crowd, manage the flow of the crowd to avoid the Crowd Disasters.

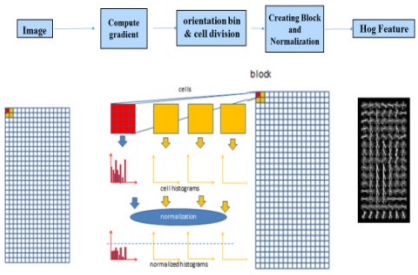

Figure 2.1: Histogram of Orientation (HOG) Feature

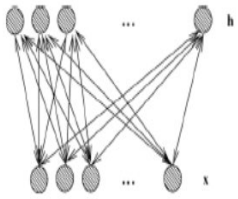

Figure 3.1: Restricted Boltzmann machine

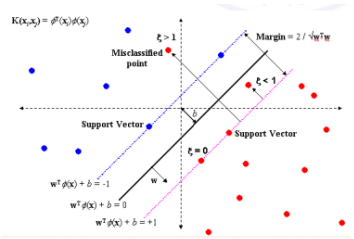

Figure 2.3: Support Vector Machine