Pedestrian Detection and Advanced Driver Assistance Systems

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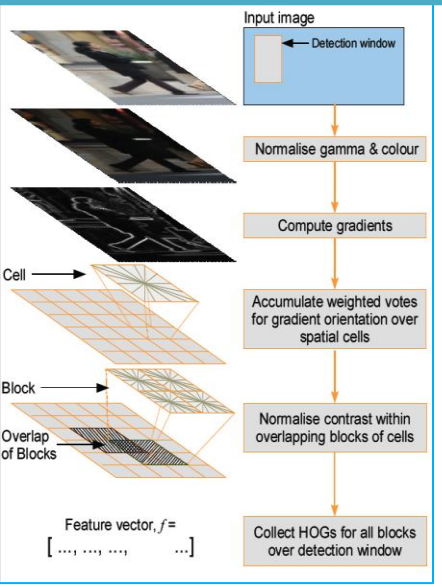
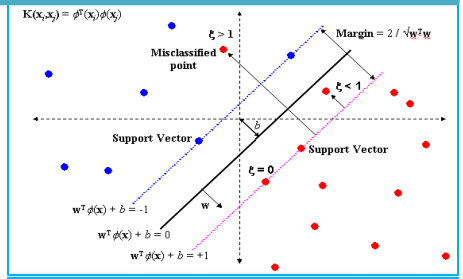
Abstract : Pedestrian detection is an ADAS system with established datasets and robust algorithms helping in preventing automobile accidents using Stereo Vision. HoG*+SVM is an established algorithm which provides better results in trainable systems. Benchmarks and types of detection are discussed. Hough transform is used to identify the different lanes in lane detection, and spline fitting is used for extrapolation. Speed braker detection uses auto-thresholding and color mapping for detection. Deep learning and Hough Forest extensions are discussed. (HoG – Histogram of Oriented Gradients .)

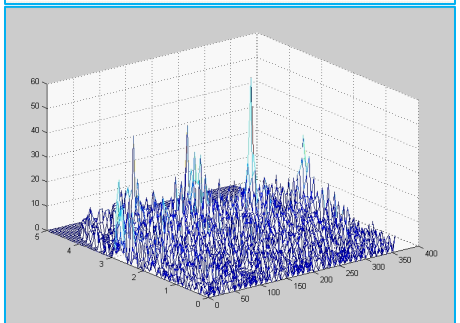
Objectives :

- Study and analyse the paradigms in Advanced Driver Assistance Systems and in particular Pedestrian Detection systems in real time environments for pedestrian safety especially in non-ideal, Indian road conditions.
- Implement Pedestrian Detection , lane detection and speed-braker detection.

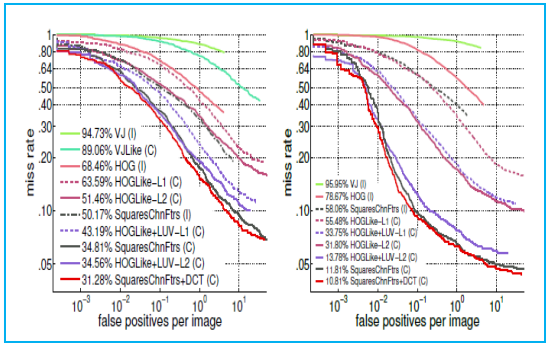
HoG flowchart + SVM and Hough Lines

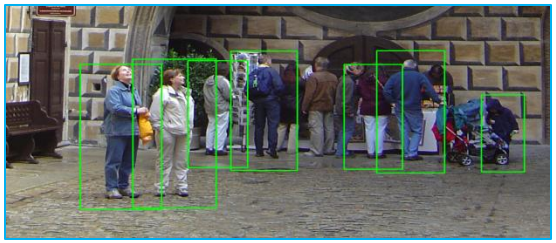


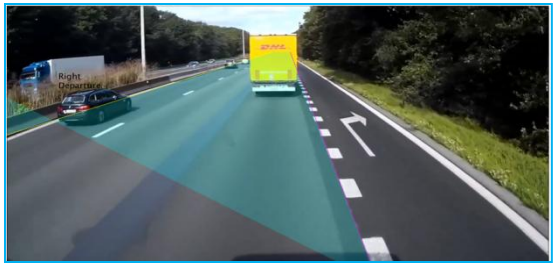




Result graph and Outputs.







Conclusions:

- HoG,SVM gives a detection rate of 14%, with a false +ve of 84%.
- Lane detection, speed braker detection are achieved using Hough transform and triangular thresholding.

References :
1.Dalal, N., Triggs, HoG, CVPR.
2. Video Lane estimation, McCall, 2005