VIC Assignement 2

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Background subtraction

First we removed background by using **createBackgroundSubtractorMOG** from opencv which is a Gaussian Mixture-based Background/Foreground Segmentation Algorithm.

Foreground cleaning

Then we used morphology transformations (opening, closing and dilatation) to make our image more consistent because the foreground detector only outputs a mask of pixels.

Bounding boxes extraction

Given a foreground we extracted bounding boxes around object in the foreground. We extended them by 10 pixels and merged overlapping bounding boxes because often background subtractor was not able to detect that the whole body was moving and was only extracting some part of the body so by doing this we were able to detect the whole body.

Human bounding boxes extraction

We could not just output bounding boxes detected by background subtractor because it detects everything that is moving. So we built a function that can detect whether a bounding box contains pedestrians or not.

Training pedestrians detector

We trained a SVM model that given an image resizes it to (128x64), extracts hog features and returns whether the image represents pedestrians or not (based on Navneet Dalal paper).

Detect pedestrians in an image

Given this pedestrian detector we use a sliding window that is scanning images at different scales to detect pedestrians by using trained SVM on each extracted window.

Results

This approach take some times to return outputs when there are a lot of moving objects because of the pedestrian detection that requires a lot of SVM evaluation per bounding box. Intersection of the union for the given dataset was about 0.37.