# MRSD Project

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Team G / Robographer

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ILR #2

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**Individual progress**

(a.)The algorithm

We've read several papers of human detection, including one detecting human with the shape and another one using Haar wavelet to describe the characteristic of pedestrian. Eventually we picked up the most distinctive and accurate one to distill the formulas for human detection. It could be concluded into the following steps:

1. Normalize the image by changing it from RGB to Grayscale
2. Use Gaussian Pyramid to smooth the image
3. Compute the gradient of each 8 pixel
4. Weight vote by histogram
5. Linear SVM training with MIT database

The first and second and step aim to smooth the image and remove the noises. Because the edge in the image could cause the noises and infect the accuracy of detection, we need to transfer it to from RGB to Grayscale and apply Gaussian filter before handling the image. Then we can compute the gradient of the image after we combine each 8 pixel into a cell. 9(3*3) cell would make a block, combining all descriptor of a block we can get the HOG descriptor of this block. The HOG descriptor could be put into SVM for training.

(b.) The implementation

We tested the code on Matlab to see the performance.

Outcome:

Miss rate of all the people = 6 / 12 = 50%

Miss rate of standing people = 6 / 8 = 75%

Result: 0.33 seconds

The miss rate of all of the people is 50%. Given the account that the training data are all people standing upright, we also calculate the miss rate of standing people, which is 75%.

**Challenges**

The result is about 0.33 second per image, which could be a problem because we will processing video of moving human in the future. To solve the accumulated delay time issues, we may rewrite the code into C++ and see how it goes.

**Teamwork**

I was working with Sida on implement human detection with HOG. On the other hand, Rohit worked on pan-tilt unit part. Gauri and Jimit will do research on planning and navigation parts.

**Figures**



**Original image**



Processed image

**Future Plan**

We are planning to make intraface working properly on ROS before 11/5.

**References**

N. Dalal and B. Triggs, "Histograms of Oriented Gradients for Human Detection," Proc. IEEE International Conference on Computer Vision and pattern Recognition, 2005