Week 8
HoG Features

Content descriptors or Features

How do you match content of one image with the content of another image?

Two questions

1. Is similar content present?

2. Where is the similar content present?

Pixel Values as Features

- Vulnerable to illumination change
- Vulnerable to scale change
- Vulnerable to orientation change
- Poor efficiency and accuracy

Observations

- Gradient is basic characteristic of local shape.
- Binning allows variations in scaling and translations to some extent.

Histogram of Oriented Gradients (HOG)

Steps

- Divide Image Into overlapping (50%) blocks of 16*16

- Each block consists of 2*2 cells of 8*8 pixels

- Calculate 9 bin histogram of each cell and concatenate

- Normalize the histogram at block level

Cells and Blocks
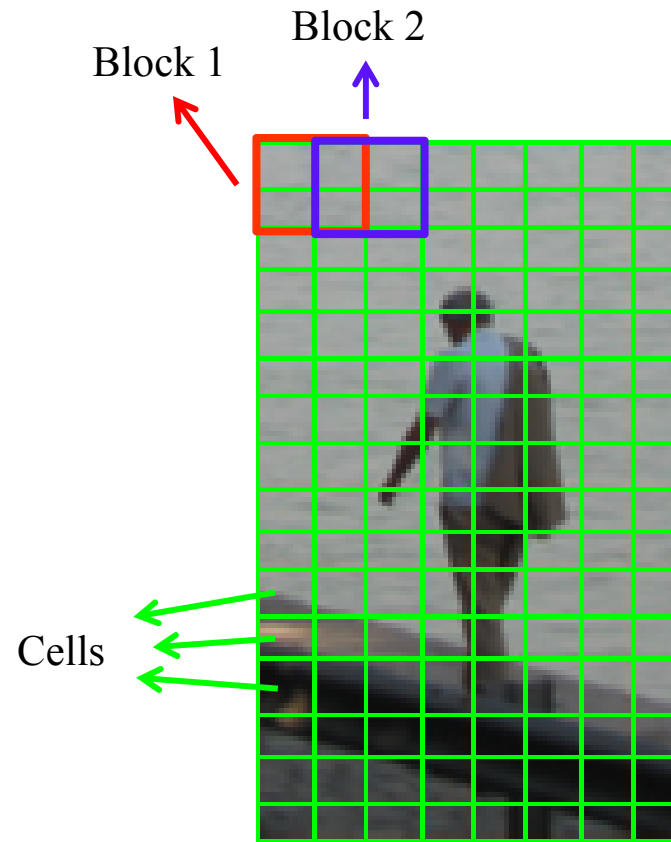
Histograms

- Divide orientation into 9 bins
- The vote is gradient magnitude
- Normalization is done at feature level

Final feature vector is concatenation of histograms of all cells!

Classification

- Calculate HoG features of training images
  - Negative and positive
- Train machine learning model
- Test image: Use a moving window over all possible scales to detect object

HoG + SVM have produced good detection results!