

## 381V Visual Recognition: Outline of lecture for Sept 7, 2016

- I. Finish instance recognition
  - a. Spatial verification
    - i. RANSCAC
      1. Lines
      2. Translations
      3. Affine transformations
    - ii. Generalized Hough Transform
      1. Lines
      2. Hough for SIFT matches, Lowe's method
  - b. Application examples
- II. Introduction to categorization
  - a. Defining the basic-level recognition task
  - b. Challenges
- III. Discriminative models: Landmark case studies
  - a. Boosting and Viola-Jones face detection
    - i. Rectangular filters, integral images
    - ii. Boosting algorithm
    - iii. Classifier cascade
  - b. Nearest neighbors for scene recognition
    - i. K-NN
    - ii. GIST descriptor
  - c. SVM for person detection
    - i. SVM classifier
    - ii. HOG descriptor
    - iii. Kernels
      1. Pyramid match kernel
      2. Spatial pyramid match for scenes
    - iv. Multi-class from binary classifiers
  - d. Convolutional neural networks for image classification
    - i. Linear perceptrons
    - ii. Multi-layer neural networks
    - iii. Convolutional neural networks
    - iv. Connections to SIFT, spatial pyramids
    - v. ImageNet challenge
    - vi. Tasks beyond image labeling (teaser)