CIS519 Final Project: Objects Recognization Based on HOG with SVM

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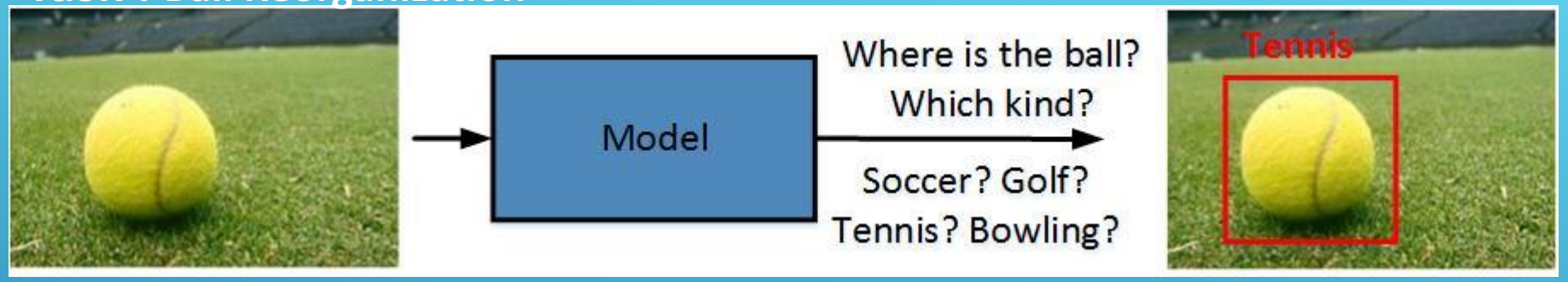
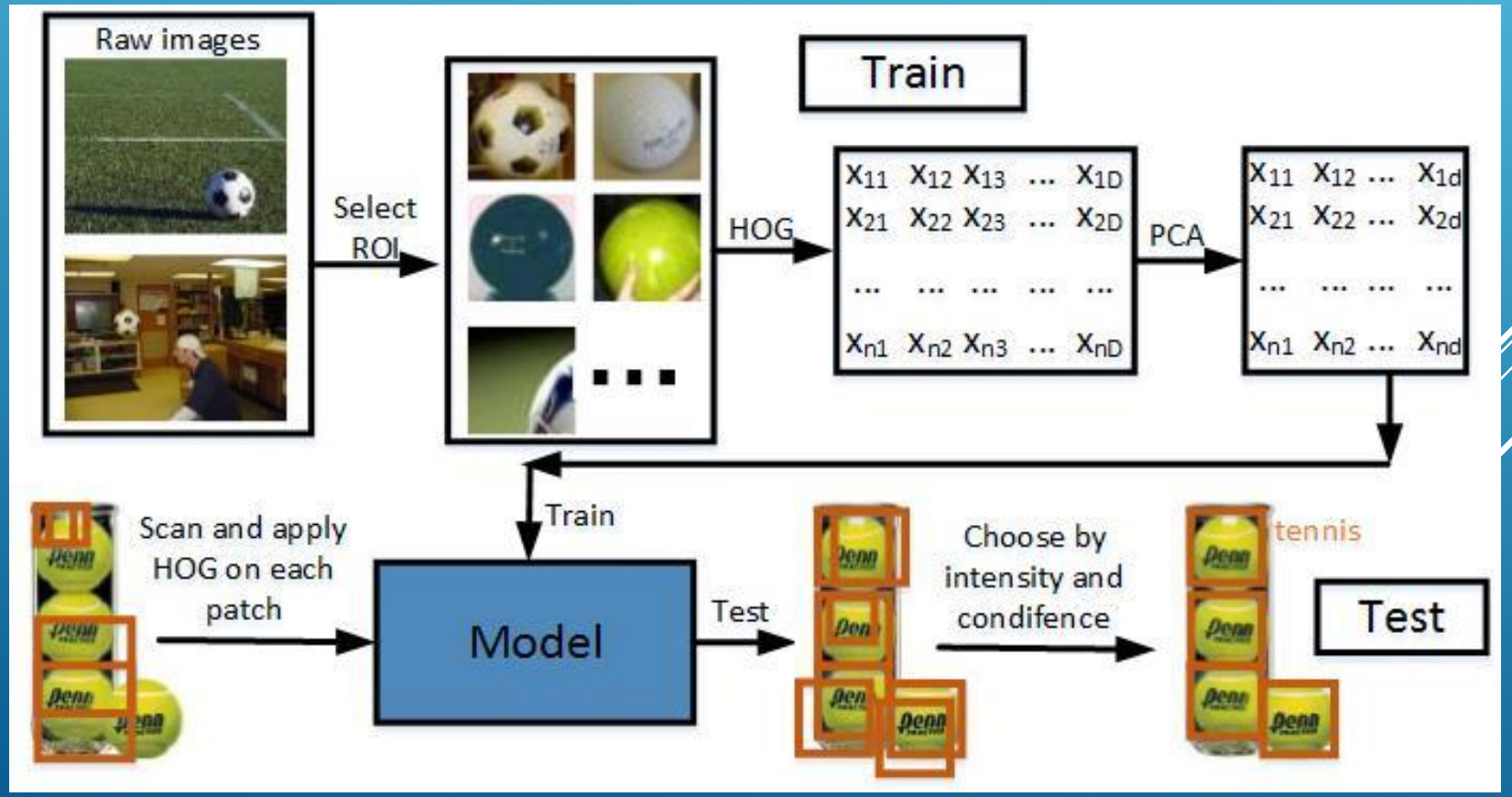
Task : Ball Reorganization





Methodology:

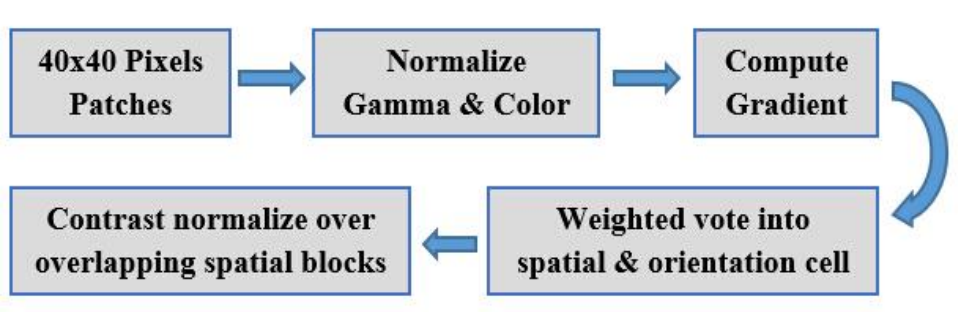
Train:

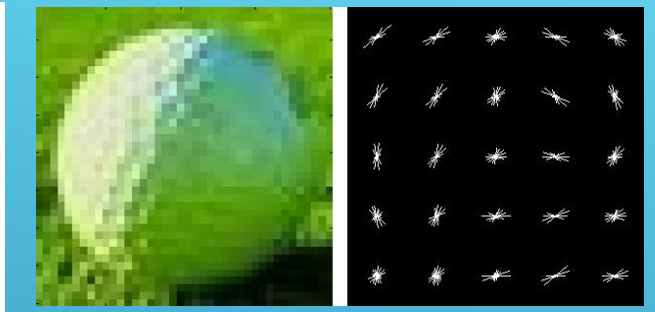
- 1. Select ROI manually
- 2. Resize and apply HOG to get features
- 3. Use PCA to decrease dimension
- 4. Train a SVM (Gaussian kernel)

Test:

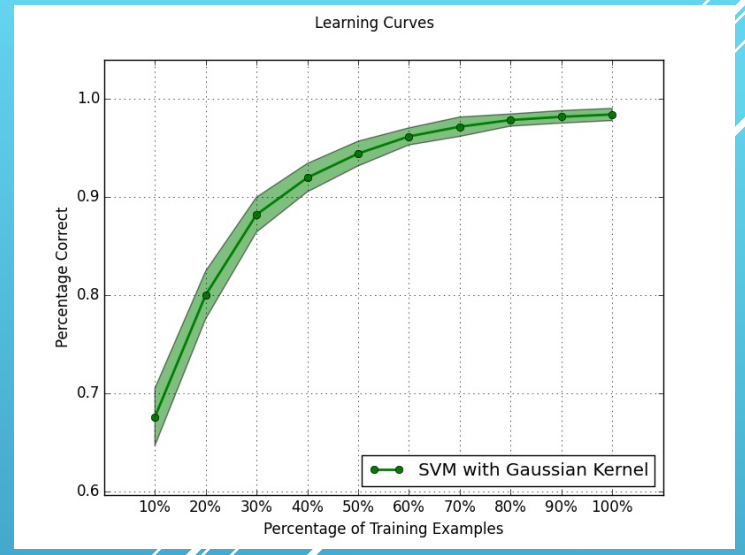
- 1. Scan the image using different masks
- 2. Repeat Step 2-3 in Train on the test image and make a prediction
- 3. Choose those with high confidence and intensity

HOG Feature Visualization

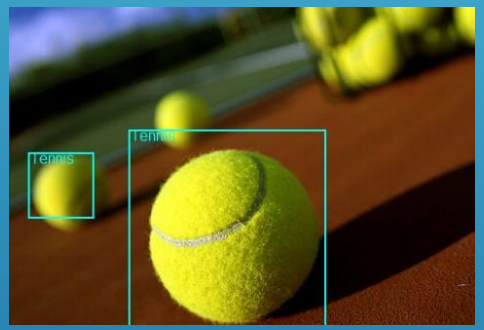




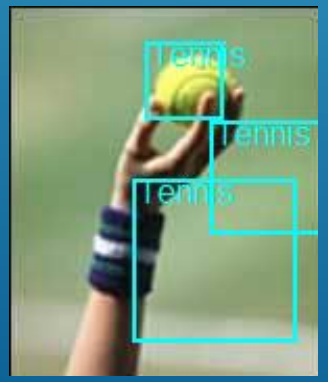
Learning Curve



Ball Recognization

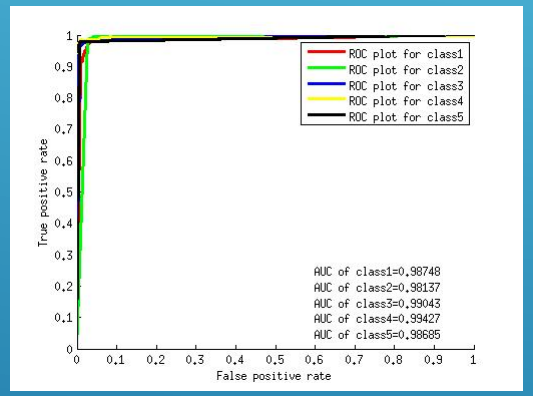


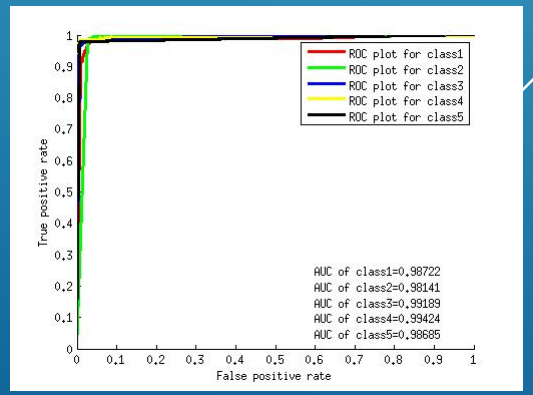
Successful Reorganization



False Positive and True Negative Results

ROC Plots





Confusion Matrix

True Label	Bowling	Golf	Soccer	Tennis	Precision
Bowling	234	3	4	2	0.96
Golf	21	357	10	7	0.88
Soccer	12	1	393	0	0.97
Tennis	6	3	4	285	0.96
Recall	0.86	0.98	0.96	0.97	

Further Work

- Larger Datasets
- Cascade Training