

# Assignment 3 Introduction

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CSIT 5410 Recognition Systems

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# Assignment 3

- This assignment consists of two sections: programming section and written section.
- You should submit a compressed file containing:
  - all M-files, mat-file, and test images related to the programming section.
  - a PDF file for the report of programming section and your answer for written section.
  - a README.txt file indicating the programming software (Octave/MATLAB) that you are using for this assignment.
- The skeleton code is prepared in MATLAB and can be obtained from CANVAS.

# Programming section

Programming section (Object recognition system):

- Task 1: Feature extraction
- Task 2: Weak classifiers
- Task 3: Adaboost algorithm and sliding window
- Task 4: Report



# Prerequisite

- Download the PASCAL VOC 2007 dataset. (approx. 5000 images, 500 MB)
- Follow our instructions to unzip the dataset and set-up the MATLAB workspace.



## The PASCAL Visual Object Classes Challenge 2007



# Task 1: Feature extraction

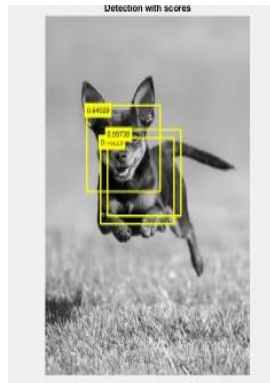
- Complete a feature extraction function, which compute the feature vector from the input image.
- The feature type must be either Harr-like feature (rectangle features) or Local Binary Patterns (LBP) that you have learnt in the lecture.
- Built-in functions related to feature extraction are NOT ALLOWED in this task.
- If you are not able to finish this task, you can use the built-in function directly. In this case, no marks will be given.

## Task 2: Weak Classifiers

- Complete the weak classifiers function, which compute a trained weak classifier with specified feature type.
- You must create at least five unique weak classifiers.
- For example, Harr-like features computed on different set of spatial positions can be regarded as different features.
- Train your weak classifiers by the VOC 2007 dataset.
- Pre-processing (optional). For example, histogram equalization.
- Built-in functions are ALLOWED in this task.

## Task 3: Adaboost algorithm and sliding window

- load the trained weak classifiers from Task 2 and classifies the unseen validation data from the dataset.
- Apply adaboost algorithm to compute a strong classifier.
- Apply the strong classifier on sliding windows to find out 3 image patches with highest scores.



## Task 4: Report

You should submit a report.pdf containing:

- An explanation of your weak classifiers
- An explanation of your preprocessing method (if any)
- Your selected weak classifiers and its weight after the Adaboost algorithm
- Classification accuracy of each weak classifiers and the strong classifier on images specified in csit5410\_test.txt
- Detect results of the given test images. (3 bounding boxes per image)
- Your answers for the written section.



Thank you!