

Assignment #2: Recognizing Human Actions in Still Images using Support Vector Machine

Description: Human action recognition is a standard Computer Vision problem and has been well studied. The fundamental goal is to analyze a video to identify the actions taking place in the video. Recognition of human actions is usually addressed in the scope of video interpretation. Meanwhile, common human actions such as “reading a book”, “playing a guitar” or “writing notes” also provide a natural description for still images. In addition, some actions in video such as “taking a photograph” are static by their nature and may require recognition methods based on static cues only. Motivated by the potential impact of recognizing actions in still images and the little attention this problem has received in computer vision so far, in this assignment, we try to address recognition of human actions using a single photograph.

In this assignment, the proposed system to predict actions from still images contains four stages.

- The first stage of this system is the pre-processing stage which is applied by smoothing, then resizing the images, and then Histogram Equalization (HE) technique is applied to normalize the effects of illumination.
- The second stage is extracting features from action images using Histogram of Oriented Gradient (HOG), and Local Binary Pattern (LBP) feature extraction algorithms, which generates the training dataset and the testing dataset that contains actions of seven classes: *Interacting with computer, Photographing, Playing Instrument, Riding Bike, Riding Horse, Running, Walking*
- The third stage is to train SVM of seven classes with the features extracted from the aforementioned step.
- The fourth stage is to test the trained model with the test set for validating the proposed algorithm.

Requirements:

- Implement the action recognition algorithm in MATLAB.
- Train the KNN/SVM with the train set of the dataset.
- Validate the implemented algorithm with the test set of the dataset.
- Write a report in which you describe and discuss the results of the proposed algorithm.

Deliverables [Due 29/10/2020]:

- A MATLAB function (Action_Recognition.m) that includes the training and validation steps.
- Report in a PDF format.