Feature Encoding for Image Classification

1. Download Animals with Attributes (AwA2) dataset from https://cvml.ist.ac.at/AwA2/. This dataset consists of 37322 images of 50 animal classes. Split the images in each category into 60% for training and 40% for testing (use the same training/test split as in Project 1,2).

2. For each image, extract local descriptors. (a) The mandatory choice is SIFT descriptors of keypoints. There are many available toolboxes to extract SIFT descriptors. (b) The optional choice is deep learning features of proposals. To extract proposals from each image, you can use selective search http://disi.unitn.it/~uijlings/MyHomepage/index.php#page=projects1.

3. After obtaining local descriptors from each image, use at least three different encoding methods (e.g., bag-of-word, VLAD, Fisher Vector) to encode the local descriptors within each image into a feature vector. If the dimensionality of obtained feature vectors is too high, you can perform PCA for dimensionality reduction. Try different cluster numbers and observe the performance variance.

4. Feed encoded feature vectors into SVM for image classification. Compare the performance based on different encoding methods.

5. Summarize your experimental results and write a project report in English. The project report should contain experimental setting (i.e., dataset, training/testing split, local descriptors), the encoding methods and cluster numbers you tried, the experimental results you obtained, and the experimental observations based on your experimental results.