Dimensionality Reduction

1. Download Animals with Attributes (AwA2) dataset from https://cvml.ist.ac.at/AwA2/. This dataset consists of 37322 images of 50 animal classes with pre-extracted deep learning features for each image. You can also download the dataset from Baidu Cloud: https://pan.baidu.com/s/1HMn2hVcdlQlus7nq5Y_8ow?pwd=3tnq (code: 3tnq). Split the images in each category into 60% for training and 40% for testing. You can use K-fold cross-validation within the training set to determine hyperparameters, such as C in SVM.

2. Use linear SVM for image classification based on the deep learning features.

3. Reduce the dimensionality of deep learning features using three methods (one feature selection method, one feature projection method, one feature learning method) and perform image classification again based on the obtained low-dimensional features. Record the performance variance with respect to different feature dimensionalities.

4. Explore the optimal dimensionality reduction method and the optimal dimensionality.

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