

K-Nearest Neighbors (KNN) Classification with Different Distance Metrics

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. Split the images in each category into 60% for training and 40% for testing (use the same training/test split as in Project 1). You can use K-fold cross-validation within the training set to determine hyper-parameters, such as K in KNN.
2. Use KNN for image classification based on the deep learning features.
3. When measuring the distance between two samples, try different simple distance metrics (e.g., Chebyshev distance, Euclidean distance, Manhattan distance, Cosine distance) and explore which metric can achieve the optimal performance.
4. Use at least one metric learning method to learn a good metric, which can help improve the performance of KNN.
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 distance metrics you tried, the experimental results you obtained, and the experimental observations based on your experimental results.