

Categorical Classification of image

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Overview

We are trying to differentiate the images depending on the objects that are present in the image.

100 categories are present in the dataset



Data Source

We used data sets from Caltech 101, collected by Fei-Fei Li, Marco Andreetto, and Marc 'Aurelio Ranzato.

It is a collection of 100 different categories of images grouped in different folders named after each categories.

Key Concepts and algorithm used

- Bag-of-Words
- K-mean Clustering
- Multiclass SVM linear Classifier

Bag-of-Words

bag-Of-features(inbuilt matlab function):

We directly used this function to create a bag of words.

It does the following:

1. Extracts SURF features from all images belonging to different image Sets
2. Reduces the number of features through quantization of feature space using K-mean clustering



K-means clustering

1. Chooses k initial cluster centers
2. Computes point-to-cluster-centroid distances of all observations to each centroid.
3. Assigns a cluster to each feature

SVM

We have used this function to categorize the images using their histograms

Results

Input : test image

Output : the type of the object in the image

Bag-of-words

bag-of-feature(our implementation):

Steps involved:

1. Selecting an image from the different image sets
2. Processing that image by taking out its features
3. Loading all these image datasets into a single matrix and also storing the information of the image (description,number of features)
4. Feature reduction using k-means
5. Creating histograms based on extracted clusters

Histograms from our implementation of bag of features

