OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

FACULTY OF COMPUTER SCIENCE

Advanced Topics in Machine Learning - Project Proposal "Object detection using Semi-Supervised Classification"

Group - T02

May 09th, 2020

TEAM MEMBERS

- Shubham Kumar Agrawal
- Syed Muhammad Laique Abbas
- Usama Ashfaq
- Ranjiraj Rajendran Nair
- Pavan Tummala

Object detection using Semi-Supervised Classification

DATA LOADING

We propose to implement a `DataLoader` where we feed the images in an array along with their labels which further goes to the partition for train-test-validate.

FEATURE EXTRACTION

We target to extract the three key features `MPEG-7 Color Layout Descriptor`, `Visual BoW`, `SURF`. For the `Color Layout Descriptor`, the extraction process comprises 4 phases namely: `Image partitioning`, `Representative color selection`, `DCT transformation`, `Zigzag scanning`. For `Visual BoW` and `SURF` combined we extract the features for each of the image using the functionality provided by `OpenCV`. We then intend to construct a codebook vector using the k-means clustering algorithm of a certain vocabulary size using the extracted features from the first step. Thereafter, for each image feature we assign a code from the above-created codebook, and then produce a histogram for the codes, which we use as a feature to the model. We intend to follow and apply the above outline for the `SIFT` feature as well. Additionally, for the extra fourth feature, we plan to go for the `Frequency Density Histogram`.

FEATURE SELECTION

Once we successfully perform the feature extraction on all train-test-validate set separately, we aim to conduct feature selection (using PCA, Stepwise selection) and normalization and in the further development stages, we plan on using the SSL techniques with a focus on multi-class classification followed by model evaluation (using statistical methods) and re-iterate the steps for best results.