Classification of vehicle manufacturer

Project Summary

Overview

The task is to find suitable and accurate way to determine the truck manufacturer from given image data. Part of the solution should be a comparison of different approaches of image classification (SVM, RandomForest etc.) and evaluation of OCR tools usability for this problem. Data are collected from two camera sources from different places and the data were selected from various parts of the day to provide picture variability.

Data

Given image data of trucks displays front part of the vehicle (the image has been already preprocessed, including equalization of histogram). Given data sets have three main classes - DAF, MAN and Mercedes. The numbers of collected samples are shown in following table.

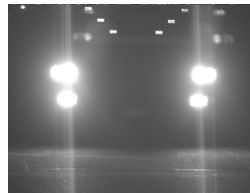| -	Number of samples
DAF	202
MAN	267
Mercedes	242

According to the fact that data are collected from real devices, there are many difficulties with processing this type of data. The data sets contain various weather conditions, vehicle damages and of course some outliers samples as you can see on following images.

(a) Outlier

(b) Vehicle damages (e.g. missing letters)

(c) Bad weather conditions

Figure 1: Difficulties with processing data

Goal

The goal of the project is to compare various methods of machine learning for vehicle manufacturer recognition. For feature extraction, you can use given application for histogram of oriented gradient extraction [1,2]. Application is able to generate ARFF file with extracted features which were selected by parameters or you can choose other feature extraction of your choice. Part of solution is to compare usability of OCR tools like Tesseract.

Literature

[1] Dalal, Navneet and Triggs, Bill, "Histograms of oriented gradients for human detection," 2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05), San Diego, CA, USA, 2005, pp. 886-893 vol. 1. doi: 10.1109/CVPR.2005.177

[2] Shah, Mubarak. Histograms of Oriented Gradients. [online]. UCF Computer Vision Video Lectures 2012 [cit. 14.11.2016]. Available from https://www.youtube.com/watch?v=0Zib1YEE4LU