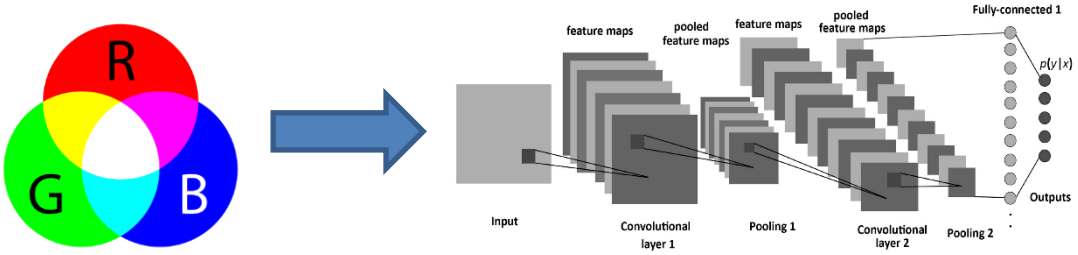
Lehrstuhl für Multimediakommunikation und Signalverarbeitung
Universität Erlangen-Nürnberg

Proposal for a Master Thesis

Topic: **Influence of Different Color Spaces on the Classification Performance of Convolutional Neural Networks**

Description: Convolutional Neural Networks (CNNs) represent the best tool for classification of image content. Over the past few years, this area of research brought great progress to image classification. One of the most significant breakthroughs in the beginning is the reliant classification of handwritten postal zip numbers and later the recognition of faces or license plates. Current state of the art applications use powerful real-time-capable networks that are able to detect multiple classes in images for detecting pedestrians, vehicles, obstacles and traffic signs in real-time. A CNN is rated by its overall ability to classify its input. Common CNNs use JPEG-compressed images with RGB-values as an input, but PNG and BMP are also widely spread.



The thesis shall consider the acquisition and arrangement of a dataset that is represented in different color spaces, such as RGB, YUV, YCbCr and HSV. The dataset should also comprise training and test images, where illumination of similarly-colored objects are different. This dataset should then be used to train a state of the art CNN and compare its classification results. Depending on the results, several preprocessing methods such as histogram equalization should then be applied and tested. The results should then give a good understanding, which color space representation and preprocessing methods can help increasing the performance of convolutional neural networks.

The current state of the art shall be determined by conducting a literature research.

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Prerequisites: Intermediate skills in Python, especially with Tensorflow, advanced knowledge in image processing and familiar with Machine Learning

Available from: June 1st