



different closely-related concepts. Datasets using different popularity methods are compared to baseline corpora to evaluate the performance of the proposed method.

The second research topic presented in this thesis estimates the absolute visual variety by comparing the variety of visual characteristics across imagesets using an algorithm-driven approach. Using this information, imageability scores for arbitrary words on a dictionary-level are estimated by means of a machine learning model. Thus, in this research, the core assumption of using visual image data for human mental image prediction is applied for the concept of imageability. Imageability is a concept originating from Psycholinguistics which aims to provide word ratings on a Lickert scale from unimageable to imageable. A large image corpora crawled from Social Media services is analyzed using a mixture of six low- and high-level visual characteristics. Using the cross-similarity across all visual features, a model is trained to regress an imageability score from an input imageset. The corpora is evaluated using imageability dictionaries from Psycholinguistics as a ground-truth. The evaluations compare the proposed method to existing methods using textual analysis instead of image analysis.

As part of the appendix, two dataset visualization projects are outlined, each loosely connected to one of the two research topics introduced above. In these projects, visual datasets originating from either research topic are compared and analyzed regarding their visual characteristics. These projects complement the ideas from the research topics, looking into future directions and applications of the proposed ideas.

In summary, this thesis presents methods to analyze the mental image of words, targeting a way to quantify the semantic gap between vision and language. Chapter 1 gives an overview on the background of this research from various angles. Chapter 2 reviews existing work in the discussed fields thoroughly, giving a comprehensive analysis of the state-of-the-art in this field. The proposed methods for Research Topics 1 and 2 are discussed in Chapter 3 and Chapter 4, respectively. Chapter 5 compares the results of both approaches, outlining the upsides and downsides of each method for different applications. Lastly, Chapter 6 concludes this thesis by summarizing the research contributions and results found through my doctoral studies.