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Bachelorarbeit

Betreuer: Prof. Dr. Andreas Fahr

Optimierung von  
Meinungsführerschaft auf Twitter  
(Optimization of Opinion  
Leadership on Twitter)

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# Abstract

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Opinion leaders are experts in their field of endeavour who maintain a network of contacts and can exert great influence over others within and potentially beyond their reference group. Due to this and significantly their increasing presence in social media, opinion leaders are often sought-after partners of enterprises wishing to promote products and services to their target markets. This work provides – through empirical analysis and deep learning techniques – methods which may be potentially employed to heighten the messaging efficiency of opinion leaders using the Twitter micro blogging platform.

Semantic and topological Twitter data was collected for a particular social network archetype (the community cluster) from a period of 12 months. A network and sentiment analysis of 227'759 unique Tweet-texts provided the basis for the supervised training of several multi-layer feed-forward neural networks simulating betweenness-centrality and sentiment. To enable this training, it was first necessary – due to the somewhat specialized vocabulary employed by twitter users – to create dedicated word embeddings for all encountered tokens in the corpus. The generated word vectors produced were of dimension 300 to allow their use in combination with pre-trained word embeddings from the University of Stanford. Finally, a tool was programmed, utilizing the word embeddings and trained neural networks, to predict and visualize the degree of opinion leadership as well as positive and negative sentiment in tweets.

The results showed very strong correlations between results from the neural networks regarding positive sentiment analysis (ca. 80%) and negative sentiment analysis (ca. 90%) with less clear results for betweenness-centralities (ca. 60%).

In conclusion it appears quite possible to use deep learning for the prediction and optimization of twitter messages. In particular it is realistic to train useful neural networks where the correlation of semantic content to classification is strong (e.g. sentiment) and when more complex language such as irony or oblique humour is omitted. Opinion leadership does tend to be topical and as such requires similarly topically designed ANNs. Highly dynamic aspects of a topic (creation of new hashtags, for example) demand more frequent retraining of the ANNs. Nonetheless, it can be concluded that additionally, more complex correlations in communication science may also be effectively simulated with such a deep learning approach.