Reimagining Topic Models with Feature Engineering

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This study was carried out in the framework of the BMBF-funded project *Rez@Kultur*, where the contents of online book reviews is being analyzed. We propose to apply differently trained topic models on data aggregated from the online platform Amazon (McAuley, Leskovec 2013) in order to create a more thorough description of review content that is at the same time understandable to humans.

One of the main concerns when working with topic models is the difficulty humans have in interpreting the results, especially when the topic models are applied to an inhomogenous corpus the text subject of which varies from medical articles to historical novels.

The research conducted by F. Martin and M. Johnson showed that just training a topic model on a corpus consisting only of nouns significantly improves the outcome as well as the interpretability by humans (word intrusion evaluation, introduced by J. Chang). Though A. Schofield and D. Mimno later indicated that though it is assumed that introducing stemmers to topic models would also result in better topics, the effect was negligible and the procedure was time-consuming. However both of the studies involved only English language, which is by far less morphosyntactically complex than German.

We proposed to go a step further by combining bigrams/trigrams with part of speech information. Instead of using documents comprising of a sequence of unlemmatized words as input for training the models, we represent a document as a sequence of syntactically relevant pairs: combinations of lemmatized nouns and verbs as well as combination of lemmatized adjectives and nouns. Additionally we ran experiments with applying the algorithm on sequences of bigrams and trigrams.

We trained multiple models on 27,857 German reviews, by using the Gensim implementation (see R. Rehurek, 2010) of the Latent Dirichlet Allocation algorithm.

**References:**  