Filter and Annotate: Towards Automatic Identification of Genuine Metaphoricity

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Abstract—Natural Language Processing has largely addressed automatic metaphor detection on grounds of (cognitive) linguistic frameworks, especially the Conceptual Metaphor Theory of Lakoff and Johnson [1], which sees metaphor as ubiquitous. In contrast, in this work we view metaphor as an exceptional phenomenon [2]. This change in perspective affects applicability of machine learning approaches for metaphor detection, usage of corresponding features, as well as availability of datasets. We propose a combination of manual annotation and automatic filtering as an approach to conduct first steps into the direction of genuine metaphor detection.

Index Terms—conceptual metaphor theory, genuine metaphors, automatic metaphor detection

I. MOTIVATION

Metaphors have been a long standing subject in Natural Language Processing (NLP). More than just mere literary devices, phrases like green energy or collapsing economy permeate our everyday language. Accordingly, NLP researchers often base their models for detecting such metaphorical phrases in text corpora on the Conceptual Metaphor Theory (CMT) [1]. In short, it states that a metaphor is constructed using a source and a target domain, and constitutes a mapping between these domains. For example, the metaphor the economy collapsed maps the concrete domain of BUILDING to the more abstract domain of SYSTEM, facilitating understanding of the latter. Further, such a metaphor may entail many more metaphorical linguistic expressions, e.g., an economy can be rebuilt, be supported by pillars, or even be found in ruins.

Due to the dominance of the CMT in NLP, other definitions of metaphor are usually not examined. While one of the prominent features of metaphors in the CMT is their ubiquity, Gehring stresses that rarity and interaction between an expression and its larger context, or frame, are instead defining attributes of metaphors [2], [3]. In difference to the CMT, this interaction does not need to be binary in its nature. For example, in the “genuine” metaphor

“we have to] possess ourselves and not let our machine possess us, we have to get the technological gallop under non-technological control” [4, p. 91]

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sense information. For supervised approaches to detection of metaphors under the CMT, many, small annotated datasets exist, however often using a slightly different concrete realization of the definition. In contrast, there is no such dataset for genuine metaphoricity at all. Closest to our use case are the English datasets annotated for novel metaphor relations [10] and novel metaphor tokens [11].

Thus, our approach consists of two phases:

- First, using unsupervised methods (e.g., derived from [9]), we mark likely non-metaphoric sentences in given documents. The user can adjust thresholds and parameters to influence this pre-selection.
- Second, we use an interactive annotation approach to further narrow down metaphoric sentences. This phase alternates user annotation and supervised learning to further filter out non-metaphoric sentences.

For the first phase, we combine relatedness measures from three levels: global (external background corpus / document collection), regional (inner-document), and local (inner-sentence). For the second phase, we approach the problem of data sparseness using existing annotation tools. Further, while the actual metaphor can span arbitrarily many tokens, for easier modeling purposes we constrain ourselves to sentence-based classification and annotation, i.e., we annotate and classify sentences that contain genuine metaphoricity. After automatically filtering out non-metaphorical sentences with unsupervised approaches in the first phase, we present the remaining sentences in the annotation tool. Here, the user can label sentences as non-metaphoric and thus further refine the filter. While this initially presents the user with a large annotation task, our interactive learning approach aims to quickly reduce the amount of data a user has to review to find genuine metaphors. This process is inherently subjective; because metaphor is a highly nuanced phenomenon and can thus be subject to high judgment variability, our first goal is to guide the user in an exploratory search. As such, inter-annotator agreement between multiple users is not of primary concern. However, annotations of other users can be incorporated into the filtering and the supervised learning step.

At a later stage, our approach may be applied to a possibly more appropriate phrase instead of the sentence level. However, for such a refinement we would first need reliable dependency parsing to delineate the phrases. To the best of our knowledge, we are the first to attempt to exclusively identify genuine metaphoricity in document context, in contrast to ubiquitous conceptual metaphors.

**REFERENCES**


