A “Wind of Change” - Shaping Public Opinion of the “Arab Spring” Using Metaphors

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Motivation

How does mass media affect the way we think about controversial topics such as the “Arab Spring”? What persuasive role do metaphors play especially in opinion pieces?

During the events of the years 2010–2011 in the Middle East & North Africa Region (MENA) a new discourse was established in the German media; immediately these events were described and assessed as a “wave” of democratization and liberation, and have been metaphorically labeled “Arab Spring”. Metaphors were frequently used to categorize and understand these events (Möller, 2014; Núñez, 2014).

Given the premise that mass media organizes (Couldry, 2010) and shapes social reality (Luhmann, 1996), we analyze how the aforementioned political events are categorized and assessed using metaphorical constructions in newspaper opinion pieces. We show ways in which particularly the use of metaphors reveals how the media tried to achieve acceptance for the events based on our cultural models (Quinn & Holland, 1987), which are grounded on our western knowledge.

According to the *Conceptual Metaphor Theory* (Lakoff & Johnson, 1980; Lakoff, 1993) metaphors are ubiquitous and exhibit a binary source-target domain structure. The knowledge that we choose to function as a source domain illustrates which conventionalized, overt or tacit knowledge we require to understand new or abstract domains (target domains) in terms of our cultural imprints. Metaphors are instantiated on the text surface and give us clues toward our knowledge basis. Thus, the required knowledge can be described in terms of ubiquitous metaphorical patterns that function as semantic “anchors” in texts, and in terms of conceptual knowledge clusters that function as an intertextual semantic knowledge structure.

As such, we constructed a pipeline that automatically detects (and filters) metaphors appearing within certain grammatical constructions, before clustering them by presumed source and target domains. The results give us insights into how the “Arab Spring” is metaphorically structured by semantic clusters in opinion pieces.

Corpus and Annotation

Our corpus consists of 300 manually collected opinion pieces (Ramge & Schuster, 2001) from five national German newspapers, *Frankfurter Rundschau, Die Zeit, Der Spiegel, taz,* and *Die Welt*, which have been written between December 2010 and November 2011 and cover the events of the Arab Spring.

In nine of these opinion pieces, two of this abstract's authors annotated following grammatical constructions: adjective-noun (AN) pairs (e.g. "Tunisian spark"), and genitive constructions (GEN) (e.g. "torch of freedom"). Due to their binary, interrelated components they provide a good insight into the structural systematicity of metaphorical mappings (source domain → target domain).
While we used three classes for annotation - novel metaphor, ubiquitous metaphor, literal - we combined both metaphor classes for annotation aggregation, leading to an inter-annotator agreement of 0.45 in terms of Krippendorff's alpha, which indicates a difficult annotation task. Common sources of annotation disagreement were, e.g., heavily conventionalized metaphors such as "social network", personifications like "self-consciousness of a generation", or metaphors that need a larger context to function. For further training and evaluation, we only use those annotations on which both annotators agree as our gold standard ("annotated", Table 1).

	Sentences	AN constructions	AN metaphors	GEN constructions	GEN metaphors
annotated	538	968	116 (12%)	102	29 (28%)
complete	11402	19573	-	2758	-

Table 1: Constructions and metaphors in the corpus.

Technical Realization

To examine our questions quantitatively, we contrast two approaches to automatically detect metaphors, namely random forests (Tsvetkov, 2014) and multilayer-perceptron (Do Dinh & Gurevych, 2016). The extracted metaphors are subsequently clustered (Figure 1). To extract AN and GEN constructions we first perform automatic preprocessing, including part-of-speech tagging and dependency parsing.

The random forests approach of Tsvetkov (2014) firmly roots in conceptual metaphor theory, mainly employing features extracted from manually crafted resources such as an abstractness wordlist and supersenses, to classify adjective-noun and subject-verb-object constructions. For use on other languages than English, a bilingual dictionary is required. We manually expand an existing dictionary[1]

1 http://ftp.tu-chemnitz.de/pub/Local/urz/ding/de-en/

to cover our corpus, and extend their system to classify GEN metaphors.

The described feature-rich approach will be compared - with regards to what (kind of) metaphors can be found - to the shallow neural network approach by Do Dinh & Gurevych (2016), which does not presuppose any specific metaphor theory. It thus does not make use of external features, but rather learns exclusively from given annotations and their context. However, preliminary experiments show that more training data is needed for this bottom-up approach.

To gain further insight into usage of metaphor in our corpus, we cluster the automatically found metaphors - resp. their components - into coarse grained semantic fields. While there are works using a theory-supported top-down approach (e.g. using source domain lists (Gordon et al., 2015)), we opt for a more unsupervised approach, without preselecting the number of clusters or manually fixing cluster centers (similar to Shutova et al. (2010), who use spectral clustering for metaphor detection). To that end, we employ Affinity Propagation (Frey & Dueck, 2007), which we supply with cosine similarities between pre-trained word embeddings[2] of the metaphor components.

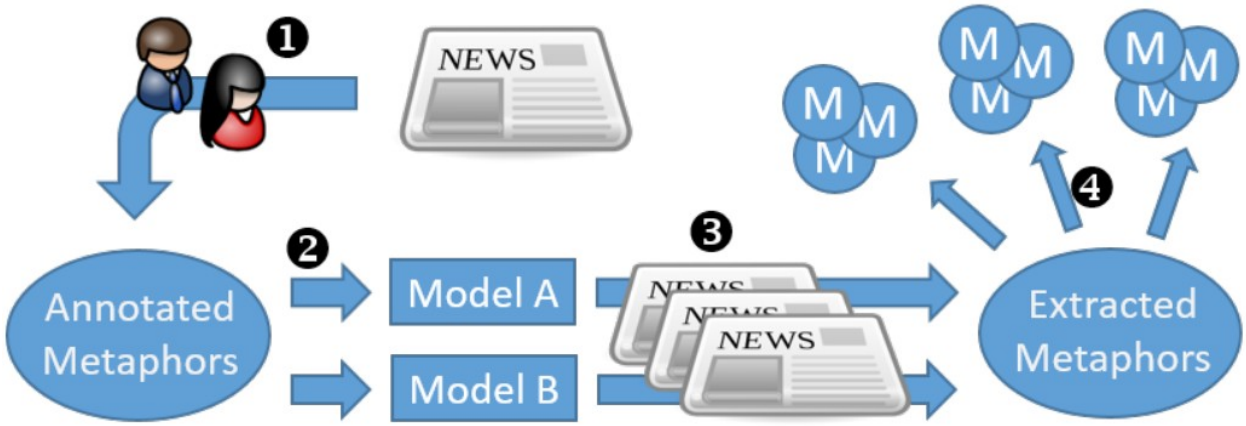

Figure 1: Few newspaper opinion pieces are annotated (1) and the obtained metaphors are used to learn different models A and B (2) (Tsvetkov, 2014; Do Dinh & Gurevych, 2016). These models are then applied to more articles to extract metaphors (3), which are subsequently clustered (4).

Experiments and Discussion

We use cross-validation for the intrinsic evaluation of the metaphor detection part. For GEN metaphors, the tested system achieves a precision of 0.63, a recall of 0.25, and an F1-measure of 0.35, showing similar performance for AN metaphors. While these results seem low, the actual output of the system when trained on all annotated instances looks promising, and the precision is improved

2 https://www.ukp.tu-darmstadt.de/research/ukp-in-challenges/germeval-2014/

by filtering out constructions which involve named entities.

The automatic clustering creates an impression of which knowledge (source domain) is required for abstract concepts (target domains), and how abstract concepts are perspectivized in the corpus, while also giving a good overview of the present intertextual metaphors. Although the cluster assignment and the metaphor detection is not flawless (e.g. Figure 2: “face of her son”), the clusters still reveal the systematicity and constraints of metaphorical mappings. Thus, they point to strategies of newspapers that come along with the choice of the (conceptual) source domain.

Kopf: *Schwertern* des Islams, *Köpfen* des verhassten Regimes, *Handlanger* des Regimes, *Schlägern* des Regimes, *Arm* des alten Regimes, *Zähne* eines Kamms, *Kugeln* des Regimes, *Brust* des Leblosen, *Gesicht* des Exzesses, *Gesicht* der EZB, *Gesicht* des Arabischen Frühlings, *Gesicht* arabischer Demokratien, *Gesichter* der Demonstranten, *Gesichter* der Jasmin-Revolution, *Gesicht* der Revolution, *Gesicht* der Muslimbruderschaft, *Gesicht* der ägyptischen Revolution, *Gesicht* des Landes, *Gesicht* der tunesischen Revolution, *Gesicht* der USA, *Gesicht* ihres Sohnes, *Gesichter* der Vermissten, *Fortsatz* des alten Regimes, *Wand* der Angst, *Loch* der Diktatur, *Schweine* des Regimes, *Augen* vieler Araber, *Hände* des israelfeindlichen Regimes, *Hand* der Sozialisten, *Hände* des Obersten Kommandorates, *Händen* der Börse

Figure 2: GEN metaphors clustered by first noun, with center “Kopf”, hinting at conceptual metaphor POLITICAL SYSTEMS ARE BODIES

In Figure 2, bodily parts such as *face*, *head*, *hand*, *appendix* are used as source domains and mapped to political systems/processes (e.g. *regime, democracy, revolution*). This mapping draws on a long tradition in political and philosophical history (Musolff, 2004): *head* and *face* play a central role in our culture - comparing political processes with *faces* or *heads* conceptualize them as human beings. In this cluster the construction *face of* indicates that the events are important, thus construed as worthy to support.

Furthermore, here we see prototypical examples for ontological metaphors, which also support the premise of embodied cognition (Johnson, 1987; Rohrer, 2010).

Sturm: *Schlussphase* des alten Regimes, *Sturm* des arabischen Umbruchs, *Sturm* der Moleküle, *Sturm* der Entrüstung, *Inseln* der Diktatur, *Insel* der Stabilität, *Wind* der Freiheit, *Wind* der Demokratie, *Wind* der Revolution, *Wind* des Wandels

Figure 3: GEN metaphors clustered by first noun, with center “Sturm”, hinting at conceptual metaphor POLITICAL SYSTEMS/PROCESSES/VALUES ARE NATURAL ELEMENTS

The positive properties and the movement character of natural elements such as *wind* and *storm* are mapped to the abstract (political) nouns *freedom*, *revolution,* or *political change* and they receive a

deontic (Hermanns, 1994) character, whereas *dictatorship* is conceptualized in terms of *island* which stands for inertia and stability (Figure 3). These examples already show how the chosen metaphors shape dualistic tendencies by categorizing the events on the one hand as a dynamic movement (*wind, storm*), that has to be supported by western democracies or on the other hand pleading for stability (*island*) in the MENA Region, thus implicitly supporting dictatorship.

The analyzed clusters and metaphorical conceptualizations indicate a network of source domains that function as key concepts which structure the discourse of the Arab Spring, an assumption we will focus on in future work.

Conclusion and Future Work

Our study indicates that metaphorical constructions are important in media because of their ubiquitous use in opinion pieces. Thus media tends to use these constructions to categorize the events with regard to presupposed (western) knowledge: The generic extracted source domains already suggest that a specific network of knowledge is used in media to highlight certain political aspects of the Arab Spring. Furthermore, they illustrate how contents are emotionalized during the beginning of the Arab Spring 2010–2011 by metaphors. Combining our cognitive and discourse analytical questions we can summarize that the used “bottom-up” clustering is very helpful to get a first explorative impression of the “intertextual consistencies” (Verschuren, 2012: 179) of chosen metaphors. They are good textual “anchors” and starting points to investigate the widespread metaphorical use, and thus knowledge domains, in corpora.

We also will compare the conceptualization strategies of the “Arab Spring” and “Refugee Crisis” in German media. We assume that the same metaphors and the same (metaphorical) interpretation patterns occur in both discourses.

Further, we plan to investigate another theory of metaphor which is based on the ideas of Black (1954, 1977) and Gehring (2010). The latter model is strongly interweaved with current discussions about “Begriff” (Müller-Meiningen & Schmieder, 2016; Gehring, 2005, 2010) and discusses its ideological implication(s). Furthermore, the emphasis is placed on the function of metaphors as an epistemological tool by investigating e.g. the evolution of ideas and cultural values. With regard to this theory we will annotate and automatically detect novel metaphors in the historical text collection “Natur&Staat” (1903-11).

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