Long papers

Higher Powers: Authority, Metaphor, and Sacred Space

Modeling a Knowledge Graph of Religious Metaphors

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Introduction

Religious language is ripe with metaphors, from 'The Lord is my Shepherd' of the Psalms to the 'Wheel of Dharma', from the Manichean 'Light Soul' to the Daoist 'Way'. But also the idea of 'metaphor' itself possesses a conceptual history spanning several thousand years. Metaphor has been understood as a linguistic phenomenon, as a rhetorical device of communication, and even as a fundamental building block of human cognition. Any study of metaphor in the humanities thus needs to start with explicating its understanding of metaphor.

In our CRC "Metaphors of Religion"[1], we examine metaphors as fundamental instruments of religious meaning-making. We understand religion as a socially mediated system that relies on mediating between the transcendent and the immanent through communication. For our comparative work on the dynamics of this process, we collect religious metaphors within a knowledge graph following Open Linked Data principles (**berners-lee_linked_2006**; **Bizer2009LinkedD**). In this paper, we will present our

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domain ontology that reflects our understanding of metaphor, and demonstrate how it allows us to address our research questions across linguistic boundaries and different religious traditions.[2]

Metaphor Theories

Formal modeling in the digital humanities represents an act of operationalization that explicates underlying theoretical assumptions. Metaphors can be modeled as knowledge graphs in various ways (we will discuss some examples in more detail in section 3). What is appropriate depends largely on one's own concept of metaphor.

Much contemporary metaphor research builds on the model introduced by (**lakoff_metaphors_2003**) who state that "metaphors allow us to understand one domain of experience in terms of another". The bottom line of this conceptual metaphor theory (CMT) is that metaphors permeate the very basis of our thinking on a foundational level. As a result, the conceptual structure of a culture can be captured by a finite number of conceptual metaphors like LOVE IS A JOURNEY (**lakoff_master_1991**). These conceptual metaphors can then be expressed linguistically in potentially infinite ways. As conceptual metaphors operate on a very basic level of cognition, their expressions are ubiquitous and often go unnoticed. In contrast, Gerard Steen has developed deliberate metaphor theory (DMT) that focuses on those cases of metaphor use where metaphor is visibly used as metaphor (**steen_three_2011**; **steen_slowing_2023**). In formulating DMT, Steen complements language and thought with a third dimension, i.e., communication. While CMT finds exemplary manifestations of a fixed set of higher-level, conceptual metaphors in language and thought, DMT takes a bottom-up approach and focuses on distinctive communicative acts that express specific mental models as metaphorical mappings. This establishes a model of metaphor that is a middle ground between the linguistic and the conceptual metaphor. Both theories complement each other. A deliberate metaphor can still be based on a conceptual metaphor and even presuppose it.

2 In this paper, we will not focus on implementation details and our software infrastructure. For details on that see (togel_data-rich_2025) and (jha_text_2025).

Our own working definition of religion as a fundamentally social fact that is established via communication makes DMT a useful point of reference. In order to analyze the dynamics of religious meaning-making, we are particularly interested in the specific mappings that are manifested in a text passage and that initially only claim validity in concrete communicative acts.[3]

Related Work

Among the few attempts to create knowledge graphs of metaphorical mappings, MetaNet occupies a prominent position (**sweetser_metanet_2019**; **dodge_metanet_2015**). Their ontology extends conceptual metaphor theory by mapping not domains but rather two frames which themselves consist of several semantic roles. However, due to its strong reliance on CMT, this approach does not align particularly well with our way of working. Furthermore, their approach of modeling the metaphors themselves hierarchically can pose problems for multilinguistic research, since the metaphors that are present or absent in different languages suggest different hierarchies (**brdar_metaphor_2019**).

In a recent article, (**panayiotou_ontological_2024**) presents an approach that aligns with ours in many respects. Like us, she uses concrete linguistic expressions as the starting point for her modeling. She also employs a controlled vocabulary of concepts for cross-linking similar metaphors. However, she understands metaphorical expressions as materializations of conceptual metaphors and only models concept mappings on the abstract level, subscribing to a CMT view.

Furthermore, she not only annotates the metaphorical expressions themselves, but also 'the ground' of the conceptual metaphors, i.e., the term that is represented as corresponding to the 'Metaphor Related Word'. This is undoubtedly an indispensable part of metaphorical mapping, however, it has turned out that it is often not explicitly included in our text material, but must instead be supplemented interpretatively in the analysis.

3 This could lead to the identification of shared conceptual patterns and thus the formulation of conceptual metaphors, but this is not the primary aim at this point.

MetOnt: A Metaphor Ontology

In contrast to approaches that focus on modeling abstract conceptual metaphors and their textual manifestations, we model the metaphorical mappings expressed in concrete expressions.

When we talk about 'metaphors' as a communicative phenomenon in between linguistic and conceptual metaphors, from a modeling standpoint, very little is assumed about these entities except that some kind of cross-domain mapping is expressed in a given text.

Take the following example:

> Our Lord is a zookeeper who cares for his animals. (**elwert_god_2025**)

This is a novel metaphor that does not correspond to an established conceptual metaphor. However, we can reconstruct the conceptual mappings using DMT (**steen_three_2011**; **dipper_annotating_2024**). The analysis highlights two conceptual mappings:[4]

1. GOD IS A ZOOKEEPER
2. HUMANS ARE ANIMALS

In our domain ontology, such an analysis is modeled as an instance of the MetaphorAnalysis class, which links to one or more instances of the Mapping class (see Figure 1). Mappings capture concrete aspects of domain comparisons identified through metaphor analysis by specifying source and target DomainElements. Each DomainElement has a corresponding term in the form of a string literal. This term is provided by the researcher and can correspond to a part of the original text, but this is not necessarily the case: In the example, the concept 'human' is only implicit in the text and thus has no direct equivalent.[5]

Additionally, each DomainElement is linked to at least one instance of skos:Concept. These concepts are taken from an extensive conceptual thesaurus modeled using SKOS, an RDF framework for knowledge organization systems (**miles_skos_2009**). It serves as an abstract reference system that enables identification of metaphorical elements across languages.[6]

The name DomainElement stresses the fact that they are not 'domains' in the sense of CMT. Instead, the source concepts (zookeeper, animal) taken together can be assumed to be from the same domain, as can the target concepts. Since domains are notoriously under-defined, and not strictly required for the analysis, we do not explicitly model them.[7] To a certain extent, more abstract aspects of the metaphorical mappings can be identified through the hierarchical structure of the conceptual thesaurus, which groups related concepts under broader thesaurus entries. E.g., in the thesaurus the concept 'Animal husbandry' is a subconcept of 'Work and occupation'. As a consequence, it is easy to retrieve the example analysis from Figure 2 by searching for the more general concept without the need to link it explicitly.

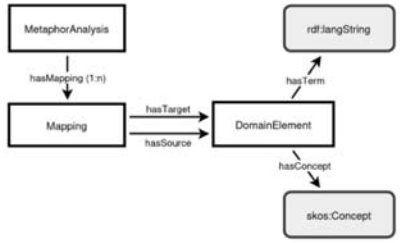

Figure 1: Core classes of the metaphor ontology

4 This analysis depends on another mapping, GOD IS A LORD, which constitutes a separate analysis in our understanding because it maps different domains.

5 Another common scenario where a supplement is desirable is when the original text contains a pronoun instead of proper names which are not useful without further context.

6 Mappings that link to the same concepts can of course *not* be understood as semantically identical. Their meanings and implications frequently differ, often substantially, across languages and contexts. They are, however, thus highlighted as potentially relevant for further comparative analysis, as is our research focus.

7 As such, DomainElements are reminiscent of the semantic roles in the MetaNet ontology. Arguably, there is a notion of a frame-like connection between DomainElements when they are part of the same MetaphorAnalysis instance. However, in contrast to frames, these structures are emergent features of the respective analysis and specific for the annotated segment of text.

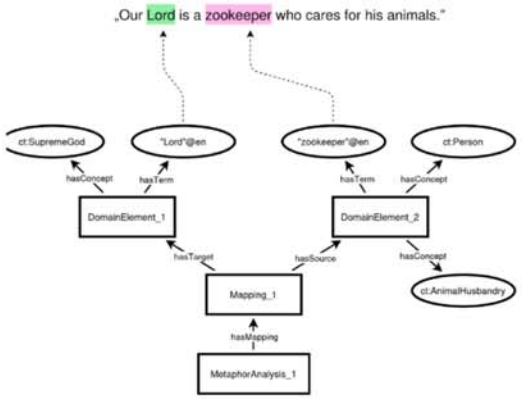

Figure 2: Mapping instances representing "'Lord' is 'zookeeper'".

Querying the Knowledge Graph

Because we chose RDF and LOD principles as the basis for our modeling, we can leverage the rich query capabilities of SPARQL (**the_w3c_sparql_working_group_sparql_2013**). Metaphor analyses and the linked thesaurus can be seamlessly integrated and utilized for comparative research across languages and religious traditions (see Figure 3). For example, we can query for other metaphorical mappings containing the target concept 'supreme god', or, leveraging the hierarchy of the conceptual thesaurus, deities in general.

```
PREFIX more:<http://example.org/MetOnt/>
PREFIX skos:<http://www.w3.org/2004/02/skos/core#>
SELECT DISTINCT ?sourceLabel { GRAPH ?g {
    ?metaphorResource a more:MetaphorAnalysis ;
        more:hasMapping ?mapping .
    ?mapping more:hasTarget/more:hasConcept "http://example.org/conA" .
    ?mapping more:hasSource/more:hasConcept/skos:prefLabel ?sourceLabel .
} }
```

Figure 3: Simple example query for all text paragraphs of metaphor analyses that include "Supreme God" as target concept, and their respective source concepts.

While SPARQL is very powerful, it brings with it considerable complexity for users without a technical background. Fortunately, it is well established and so there are numerous tools that make working with it easier.[8] Furthermore, we build upon SPARQL to develop streamlined graphical tools that support ongoing research effectively Figure 4 and Figure 5.

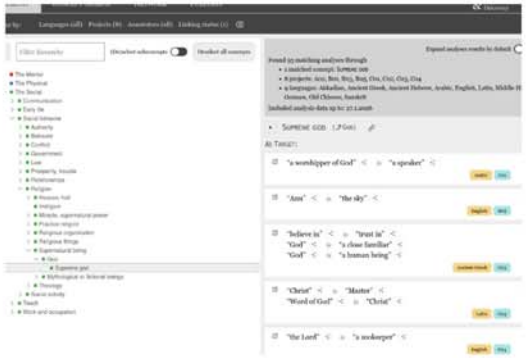

Figure 4: Querying for analyses that link "Supreme God" in prototype of graphical tool powered by the metaphor knowledge graph.

Outlook

As of now, already nearly 1000 text passages with a total of over 3100 metaphorical mappings have been annotated and analyzed by researchers within the CRC. All components of the knowledge graph, i.e. the complete annotation data (**apostel_metaphor_2025**), the conceptual thesaurus[9] (**sfb1475_conceptual_thesaurus**), and the metaphor ontology[10] (**sfb1475_metont**) are published as FAIR open data (**wilkinson_fair_2016**).

8 A prominent example is the Wikidata Query Service which provides not only a browser interface for writing SPARQL queries but also visualization options (https://query.wikidata.org).

9 https://skosmos.example.org/Redacted/

10 https://example.org/Redacted

For further development, we aim at also modeling higher-level conceptual metaphors. Due to our "bottom-up" approach, we currently focus on the conceptual mappings expressed in concrete metaphorical phrases. While we deliberately do not start from a set of more abstract conceptual metaphors, our rich data set provides a great opportunity to identify these in a data-based way. Further work will thus include modeling metaphorical structures that correspond to more than a single expression. This will also allow us to integrate our ontology more closely with other approaches like MetaNet, thus building a bridge to research in Conceptual Metaphor Theory. Still, even in the current state the potency of RDF and linked data enables our scholars to engage in comparative research of the development of religious meaning making through metaphors on an unprecedented scale.

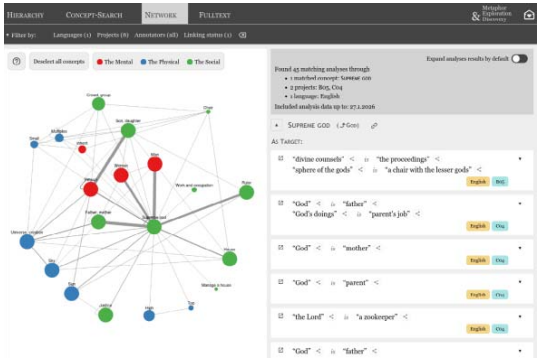

Figure 5: Network visualization of concepts that are mapped onto "Supreme God" in altered subset of metaphor analyses.

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Place-based Linking and Visualisation of Multidisciplinary Research Data: Demonstrators from the ATRIUM Project

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Spatial data, open data, visualisation, Östergötland, agraro-historical records

Introduction

As a key attribute of archaeological and heritage data, place provides significant potential for interoperability as the point of connection for data from multiple sources and disciplines. Similarly, defined by the parameters of place and location, space is inherently multidisciplinary and contextually dependent on occupation and perception over time. To some extent, spatial digital humanities have been accelerated and defined by the advent of Geographical Information Systems (GIS) (Dunn 2019), which has been crucial for both practical and scholarly visualisation and analysis of space. However, aligning spatial data from different disciplines is not without its critical challenges.

One such hurdle is accounting for the differing degrees of spatial resolution. For example, archaeological data are often precisely geo-referenced down to individual findspots, whereas data outputs from broader arts and humanities fields tend towards being more fuzzy. In attempting to address these issues, this paper presents the output from two work packages of the Advancing Frontier Research in the Arts and Humanities (ATRIUM) project,