

Ancient Geography goes digital: Representation of Spatial Orientation in Ancient Texts

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Based on *Common Sense Geography* (Geus & Thiering 2014) we investigate historical texts and – if available – contemporary maps in terms of spatial cognition under the general assumption that different knowledge systems of spatial encodings and duration are implicit or tacit. Our first example is Dinoysius Periegetes' "Description of the World" (2nd C.E.), which presents an imaginary round trip through the then known three continents from different perspectives in the form of a poem. The second text is Flavio Biondo's "Italia Illustrata" (ca. 1450), which gives a detailed historiographical and geographical description of Italy. Both texts provide a number of information cues, e.g., toponyms (place names, points-of-interest), landmarks, distances, places, streets, rivers, walls, historic sites, etc., which in Biondo's case are foremost based on classical authors such as Strabo, Pliny or Livy.

Our approach is guided by cognitive semantic premises based on visual perception theories and a number of computational linguistic methods. Hence, implicit spatial information is gained by means of semi-automatic labeling, that is, annotating the various semiotic cues in texts and maps.

The procedure is as follows: a) a cognitive semantic text analysis is outlined based on spatial objects and geometrical relations, b) contemporary maps are annotated, compared and related to text-image assemblies, c) followed by an epistemological and logical modelling. In particular we are interested in d) the conception of the respective historical-topographical system with reference to the given texts. Based on these data, the long term project goal is to investigate possibilities for the reconstruction of cognitive maps. In the case of Biondo's text, we are interested in the concrete image of Italy that was developed within it and an exemplary comparison between selected chapters (Latium, Campania) and later texts. To support the interpretation of the texts in terms of cognitive semantics, in text analysis, we work bilingually (Greek and Latin, resp., with new English translations), including various word lists and frequencies, concordances, POS-Tagging, Named Entity Recognition, and semantic tagging. We use a number of tools, e.g., *Antconc*, *Voyant*, *KWIC*, *wmatrix* (Lancaster), *TreeTagger*, *Collatinus*, *Recogito* (also for maps), and *command line scripts*. Furthermore, dependency parsing of the English translations – due to the lack of appropriate language models for the classical languages – is executed with the Stanford parser, yielding constituent trees, and, particularly important from the semantic perspective, dependency relations, augmented by a visualisation of dependency trees.

With respect to the cognitive semantic analysis we apply the following cognitive semantic parameters (annotated by means of *brat*) which serve as heuristics:

1. Path: source-trajectory-goal
2. Toponyms (buildings, bridges, churches, fountains, walls, streets, squares, gates, memorial, sites, temples etc.)
3. Landmarks (hill, region, river)
4. Frames of reference (relative, intrinsic, absolute)
5. Gestalt principles (visual perception)
6. Geometrical object classifications
7. Distances (proximal, medial, distal)
8. Perspective: bird's and frog-eye, vectorial, hodological

We are not only interested in annotating toponyms, landmarks, and spatial frames of reference, but also motion events. Therefore, we select the source of the motion, that is, the point of departure of a TRAJECTOR, and the PATH. The PATH is a motion event of TRAJECTOR from a SOURCE to a GOAL (LANDMARK). Since a motion event is between a SOURCE and a GOAL, DISTANCE is another important concept.

Based on a new linguistic Greek/Latin-English sentence-by-sentence translation and word-by-word alignment, the cognitive semantics and computational linguistics approaches reveal an intricate and detailed network of implicit knowledge structures of spatial orientation.

Literature

Geus, Klaus & Thiering, Martin (eds.). 2014. *Features of Common Sense Geography: Implicit Knowledge Structures in Ancient Geographical Texts* (Vol I). Wien/Berlin: LIT.