

Close to or Far Away? Exploring Vague Spatial Adverbials

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Spatial adverbial phrases such as *far away*, *around*, or *close to* serve a distinctive function in both communication and cognition, especially when conveying spatial distances. For instance, when someone stands 1 meter from a car, would he be considered far away or close to the car?

When presented with such a scenario, we can choose with remarkable precision a vague adverbial to describe the situation. These vague adverbials are less specific than numerical descriptions like *1 meter away*, yet conversational participants still form a mental image of the distance implied by these terms.

A similar phenomenon occurs with vague temporal adverbials like *just* or *some time ago*. For example, if someone says, *I just had my birthday*, the listener typically congratulates them, forming a mental image of the event's timing, despite the imprecision of the word *just*. In my recent research, I investigated these mental images through fuzzy set theory [1] and applied a scale-invariant model to represent the results. Fuzzy sets mathematically represent uncertainty and vagueness by allowing degrees of membership in a category (e.g., "tall people") on a continuous scale from 0 to 1 [2].

This bachelor's thesis will focus on developing a system that converts vague spatial adverbials in natural language sentences into specific spatial distances. To achieve this, the adverbials and their related objects must first be identified using techniques such as Part-of-Speech (POS) tagging. Additionally, a study must be conducted on vague spatial adverbials to model the distances they imply. Furthermore, sentences containing such adverbials should be analyzed for their syntactic structure. Familiarity with Python is required. The thesis should be taken in English but can also be taken in German.

Related literature

- [1] Kenneweg et al. "An Empirical Study on Vague Deictic Temporal Adverbials". In: Proceedings of the Workshop on CoGAL at LREC-COLING. (2024), <https://pub.uni-bielefeld.de/record/2990676>
- [2] Zadeh "Fuzzy sets". In: Information and Control, 8:338–353 (1965), <https://www.sciencedirect.com/science/article/pii/S00199586590241X>

The Semantic Computing Group researches and develops methods that enable machines to acquire relevant knowledge as well as linguistic capabilities. Using methods from *natural language understanding* and *machine learning*, we are aiming at machines that are capable of knowledge acquisition by reading unstructured textual data. In particular, the group focuses on methods for information extraction, semantic parsing, ontology learning, sentiment analysis, entity linking, as well as question answering.

More information is available at:

<https://uni-bielefeld.de/fakultaeten/technische-fakultaet/arbeitsgruppen/semantic-computing>

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