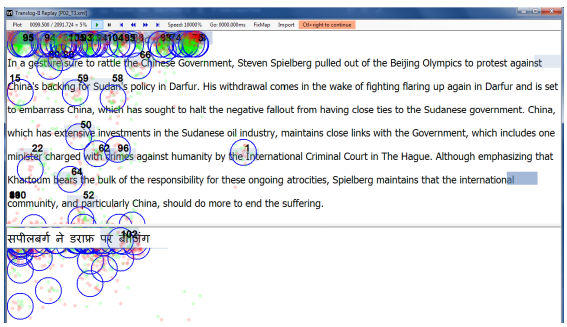
Cognitive NLP



Cognitive NLP research at the Centre for Indian Language Technology (CFILT), attempts to gain insights into the cognitive underpinnings of human language processing and understanding. The insights are then translated to methods and models that contribute to the field of NLP by achieving the following objectives:

(1) Optimising human annotation effort for better annotation management, and (2) Improving existing NLP systems by introducing cognitive features.

Today's NLP is highly statistical in nature and needs massive amount of human annotated data. In a typical cognitive NLP setting, apart from collecting the annotations, we aim to record annotators' activities in the form of their eye movement patterns, key-strokes and neuro-electric signals obtained using EEG. Through a series of studies using eye-tracking alone, we show that data of such kind, can be used to model complexities of tasks like translation and sentiment annotation, where eye-movement data is used to train classifiers that model annotation effort for the specified tasks. This can be useful for better annotation management (for example, proposing better annotation cost models in a crowd-sourcing scenario).

This research also showed that eye movement data can be used to extract cognition-driven features, to be used for difficult NLP tasks like sentiment analysis and sarcasm detection. The proposed approaches consistently perform better than state-of-the-art sentiment and sarcasm classifiers, showing that cognitive features can be useful for tasks that are nuanced by linguistic subtleties.

The Cognitive NLP group at CFILT has collaborated with Copenhagen Business School, Copenhagen, and IBM Research Lab, Delhi, on several projects. The Cognitive Lab at CFILT is equipped with a high-end 'SR Research EyeLink 1000 Plus' eye tracker for experimentation.

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