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SEMANTIC ANALYSIS OF IMAGE-BASED LEARNER SENTENCES

An intelligent computer-assisted language learning (ICALL) system is an application to provide users instruction and practice as they learn a second language. In order to be more effective and more widely adopted, ICALL must better align with second language acquisition (SLA) research, moving away from menu-based or fill-in-the-blank exercises and toward the task-based and communicative methods the research supports.

As a first step in this direction, this dissertation presents a mechanism by which an ICALL system can judge the appropriateness of an advanced English learner's response to an image-based prompt simply by comparison with a collection of crowdsourced native speaker (NS) responses. It relies on well-established natural language processing (NLP) techniques, namely syntactic dependency parsing, lemmatization and term frequency-inverse document frequency (tf-idf). To ensure broader success, this method was designed to be flexible, expandable and low-cost by relying on readily available tools and using crowd-sourced models instead of custom rules or expert knowledge. Compared to more advanced machine learning NLP approaches, my system maintains a high degree of transparency, making it ideal for integration with an ICALL feedback module.

To evaluate my approach, I collected a corpus of over 13,000 picture description task (PDT) responses from NSs and English learners. I developed and applied an annotation scheme of five binary features intended to capture aspects of nativelikeness and semantic appropriateness, and showed these features to have a high degree of inter-annotator agreement. I used a preference task to establish feature weights and benchmark rankings of learner responses. I showed that my system output generally correlates well with the benchmark rankings and shows a promising degree of accuracy in predicting the annotations.

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