More multimodal and multilingual: Two novel applications for language technology in education and health communications

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In this paper, I will describe two ongoing language technology projects at the Language Processing Lab in UNSW. After presenting initial results from these related projects, I will conclude with a discussion on methodological considerations and an outline of upcoming developments.

The first project examines the use of text simplification across languages and modes in health communications and educational settings. Text simplification is a computational language processing technique that aims to (semi)automatically modify texts to make them easier to read and comprehend for humans and machines. While previous research on text simplification has shown positive global effects in monolingual and multilingual applications, the local and global efficacy of individual rules is yet to be identified. A further limitation exists in that these techniques are based on predictive approaches that have yet to incorporate empirical findings on actual human language processing across diverse samples from psycholinguistics and cognitive psychology. Using a methodology based on eye tracking and task performance, this project aims to address these limitations in order to enhance existing text simplification techniques and employ them in multilingual and multimodal applications. I will present initial results that show incremental gains on the above measures for English L1 and L2 participants, and then argue that text simplification systems can benefit from empirical data and robust sampling techniques that include cognitive and linguistic profiling.

The second project aims to investigate the short- and long-term usage of same-language and foreign-language subtitles in educational and entertainment settings. While previous research has indicated that subtitles can improve language performance, e.g., comprehension and recognition, in a viewer's first and second language, these studies have been limited by methodological issues, including single observations, limited sampling, and reliance on offline measures, all of which have curtailed their impact on practice and policy. To address these issues, this project uses eye tracking, task performance, and cognitive load measures alongside robust cognitive and linguistic profiling to chart the performance of English L1 and L2 participants over the course of an online academic course in which different forms of human- and machine-based subtitling are employed. Based on initial results, I show that the hypothesised gains on the above measures are indeed evident in the short term, and that the source and form of subtitle have significant moderating effects.