Make it Simple, But Significant: Improved Text-to-Pictograph Translation for People with Intellectual Disabilities

Leen Sevens¹, Vincent Vandeghinste¹, Ineke Schuurman¹ and Frank Van Eynde¹
¹Centre For Computational Linguistics, KU Leuven, Leuven

Background
In order to enable or facilitate online communication for people with Intellectual Disabilities, the Text-to-Pictograph translation system automatically translates Dutch, English, and Spanish written text into a series of Sclera or Beta pictographs. Our baseline system presents the reader with a more or less verbatim pictograph-per-word translation, without changing the order of the pictographs, and not removing any redundant information in the output pictograph sequence. As a result, long and complex input sentences lead to long and complex pictograph translations, which often leave our end users confused and distracted.

Method
In order to formulate a set of objectives for pictograph output simplification, we study a number of guidelines and inspiration sources: the Chinese writing system, easy-to-read news messages for people with Intellectual Disabilities, and the “Klare Taal” checklist for clear language. We build an inventory of syntactic phenomena to be treated by the simplification module and introduce deep linguistic analysis into the translation process. The simplification module splits long and complex sentences into several shorter units, and deletes pictographs that do not contribute to the essence of the message. This leads to shorter, clearer, and more consistent pictograph conversions.

Results
We perform automated evaluations using gold standard simplifications. The system does not perform any unnecessary syntactic simplification operations and high accuracy scores were obtained.

Conclusions
Applying syntactic simplification for Text-to-Pictograph translation is a complex, yet necessary step toward making our system more user-friendly and usable. Simplification systems are ideally tested with the intended users. Future evaluations within the framework of the European Able to Include project will involve human judgements. We expect these experiments to reveal the merits and disadvantages of our proposed solutions.