Clarification: Towards more User-Friendly Natural Language Human-Computer Interaction

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The need for clarification

Natural language (spoken or written) is seen as an attractive human-computer interaction modality. Recent applications using natural language interface include multi-modal drawing tools [1], online information retrieval [2], oral control systems, and face-to-face translation systems [3, 4].

Nevertheless, natural language input is handled with great difficulty by computers. As natural language (spoken or written) is highly ambiguous even in restricted domains, clarification is seen as the solution to produce more robust, fault-tolerant, and user-friendly systems.

In this context, the role of the clarification module is to plan interactive sessions enabling the system to recover the information the analysis module has not been able to calculate automatically.

Proposed Framework

The framework proposed is based on the manipulation of tree structures. The basic mechanism involved in the recognition of an ambiguity is a pattern matching one. A clarification module is made of two parts: an *engine* (language-independent) and *linguistic data* (language-dependent). A class of ambiguity is described with one or several pattern sets (beams).

The *engine* combines a pattern matching module, a beam matching module, the set of basic operators, and a question presentation module. Once a beam has been regognized, a question is prepared which contains as many items as the number of patterns in the matched beam. An item production method is associated with each pattern. They are described with a set of basic operators.

The *linguistic data* is made up of pattern beams (`clos objects`), item production methods (`clos methods`) and a clarification scheduler in charge of defining the order in which the beams are matched against the analysis structure.

Realisation

Two experiments have been conducted involving clarification modules: one for French, at the GETA lab (France), in the context of dialogue-based machine translation with the LIDIA project [5, 6] , and one for English, at ATR-ITL (Japan), in the context of interpreting telecommunications [7].

Conclusion

The advantages of the proposed methodology are its flexibility, allowing incremental improvements in the construction of a clarification module, and its possible extension to the use of several modalities by specializing some of the defined methods. We are currently investigating the use of probabilities to let a module learn from the history of the dialogue. The next step we are looking forward to is to experiment with users to determine how clarification sessions should be designed.

Reference

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