Generating Multilingual Grammars from OWL Ontologies

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Abstract. This paper describes a tool which automatically generates productions for context–free grammars from OWL ontologies, using just a rule–based configuration file. This tool has been implemented within the framework of a dialogue system, and has achieved several goals: it leverages the manual work of the linguist, and ensures coherence and completeness between the Domain Knowledge (Knowledge Manager Module) and the Linguistic Knowledge (Natural Language Understanding Module) in the application.

1 Introduction

1.1 Automatic Grammar Generation

The problem of manually generating grammars for a Natural Language Understanding (NLU) system has been widely discussed. Two main approaches can be highlighted from those proposed in the literature: Grammatical Inference and Rule Based Grammar Generation.

The Grammatical Inference approach (http://eurise.univ-st-etienne.fr/gi/) refers to the process of learning grammars and languages from data and is considered nowadays as an independent research area within Machine Learning techniques. Examples of applications based on this approach are ABL [1] and EMILE [2].

On the other hand, the Rule Based approach tries to generate the grammar rules from scratch (i.e. based on the expertise of a linguist), while trying to minimize the manual work. An example of this approach is the Grammatical Framework [3], whose proposal is to organize the multilingual grammar construction in two building blocks: an abstract syntax which contains category and function declarations, and a concrete syntax which defines linearization rules. Category and function declarations are shared by all languages and thus appear only once, while linearization rules are defined on a per–language basis. Methods which generate grammars from ontologies (including ours) may also be considered examples of the Rule Based approach.

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