Chapter V

Intelligent Support for Building Knowledge Bases for Natural Language Processing

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Abstract

In this chapter we discuss ways of assisting experts to develop complex knowledge bases for a variety of natural language processing tasks. The proposed techniques are embedded into an existing knowledge acquisition framework, KAFTIE, specifically designed for building knowledge bases for natural language processing. Our intelligent agent, the rule suggestion module within KAFTIE, assists the expert by suggesting new rules in order to address incorrect behavior of the current knowledge base. The suggested
rules are based on previously entered rules which were “hand-crafted” by the expert. Initial experiments with the new rule suggestion module are very encouraging as they resulted in a more compact knowledge base of comparable quality to a fully hand-crafted knowledge base. At the same time the development time for the more compact knowledge base was considerably reduced.

Introduction

Domain experts face a number of challenges in building knowledge bases. These include the articulation of their knowledge in a given knowledge representation language, as well as to ensure the integrity of the rules they enter.

In articulating their knowledge it is important that they find the right level of generality to ensure that the resulting knowledge base is performing the intended function. Furthermore, finding the proper level of generality is critically important to keep the resulting knowledge base within a manageable size and hence allowing users to build a quality knowledge base within a feasible time frame. We developed a knowledge acquisition framework, KAFTIE (Pham & Hoffmann, 2004b), which allows experts to articulate knowledge for a variety of natural language processing tasks. The knowledge is articulated in form of rules at a wide range of levels of generality. At the same time our KAFTIE ensures the integrity of the rules being entered. This chapter introduces an intelligent agent that helps the expert to articulate new rules by generating plausible rule suggestions from which the expert can choose a rule and/or edit a suggested rule to suit their intentions. We present very encouraging initial experimental results using the intelligent agent and discuss the reasons for the positive results. To introduce our intelligent agent within KAFTIE, we first need to present the basic concepts of KAFTIE and the underlying knowledge acquisition methodology.

The remainder of the chapter is structured as follows: We will first give an example application we built using KAFTIE to motivate the subsequent description of our KAFTIE framework. We will then describe the underlying methodology of our framework and illustrate the process by giving examples on how the knowledge base evolves. Subsequent sections discuss the rule suggestion techniques we have developed so far and present our initial experimental results with the intelligent assistant for the knowledge acquisition process. The final section contains a discussion and the conclusions.
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