Automated Question Answering in Webclopedia – A Demonstration

Ulf Hermjakob, Eduard Hovy and Chin-Yew Lin

USC Information Sciences Institute

4676 Admiralty Way Marina del Rey, CA 90292-6695 {ulf,hovy,cyl}@isi.edu Tel: 310-448-8476, 310-448-8731 and 310-448-8711

1. Overview

In this demonstration we present work in our Webclopedia (Hovy et al. 2000, 2001) project on semantics-based answer pinpointing. Through a live interface, users can type in their questions in the query window or select a TREC10 question (Figure 1). The system will then parse the question and return the top 5 answers (Figure 1).

Webclopedia achieved 31% in MRR (mean reciprocal rank) score in TREC9 Q&A track and 45% in TREC10 Q&A track. The architecture includes:

- □ **Question parsing:** Using BBN's IdentiFinder (Bikel et al., 1999), the CONTEX parser produces a syntactic-semantic analysis of the question and determines the QA type.
- □ **Query formation**: Single- and multi-word units (content words) are extracted from the analysis, and WordNet synsets are used for query expansion. A series of Boolean queries is formed.
- **IR**: The IR engine MG (Witten et al., 1994) returns the top-ranked *N* documents.
- □ Selecting and ranking sentences: For each document, the most promising K << N sentences are located and scored using a formula that rewards word and phrase overlap with the question and its expanded query words. Results are ranked.
- **Parsing segments**: CONTEX parses the top-ranked 300 sentences.
- □ **Pinpointing**: Each candidate answer sentence parse tree is matched against the parse of the question. It sometimes also considers the preceding sentence. As a fallback the window method is used.
- □ **Ranking of answers**: The candidate answers' scores are computed and the topmost 5 are output as final answers.

Webclopedia classifies desired answers by their semantic type, using the approx. 140 classes. These types include common semantic classes such as PROPER-PERSON, EMAIL-ADDRESS, LOCATION, and PROPER-ORGANIZATION, but also classes particular to QA such as WHY-FAMOUS, YES:NO, and ABBREVIATION-EXPANSION. They have been taxonomized as the Webclopedia QA Typology (Hermjakob el al. 2002).

The system increasingly makes use of syntactic and semantic (world) knowledge to improve the accuracy of its results. We will identify the strength and weakness of our approach during the demonstration with examples.

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Webclopedia You Got Questions? We Got Answers! 2000, 2001 © Natural Language Group USC/Information Sciences Institute		
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Top 5 Answers Question Parse Tree Question Parse Tree (XML) IR Ranklist Raw Answers Intermediate Answers		
 Question 894: How far is it from Denver to Aspen? Qtargets: I-EN-DISTANCE-QUANTITY (check) Aspen/snowmass The Aspen/Snowmass area is about 200 miles southwest of Denver. [Score: 298.90265; 06/02/91; SJMN91-06154228] They often leave town to go shopping, getting groceries in Glenwood Springs and clothes as far away as Denver, about 200 miles away. [Score: 239.4321; 03/28/90; AP90328-0180] It's only 20 miles over the hull from Aspen, as the crow flies, but Crested Butte might as well be 2,000 miles away. [Score: 234.6893; 12/09/90; LA120990-0061] Snowmass, about 10 miles from Aspen's whirl but with arts attractions of its own the Snowmass/Aspen Repertory Theater and the Anderson Ranch (craft) Arts Center offers packages starting at \$45 per person per night in townhouses.; [Score: 233.54279; 06/02/91; SJMN91-06154228] Leadville is 60 miles east of Aspen, 40 miles south of Vai, and surrounded by some of the nation's most spectacular scenery, including two of Colorado's highest peaks, Mount Elbert and Mount Massive. [Score: 231.3247; 02/12/88; AP880212-0103] no answer Done. 		

Figure 1. Webclopedia web interface.

2. References

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