AnswerFinder at TREC 2004

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Abstract

AnswerFinder combines lexical, syntactic, and semantic information in various stages of the question answering process. The candidate sentences are preselected on the basis of (i) the presence of named entity types compatible with the expected answer type, and (ii) a score combination of the overlap of words, grammatical relations, and flat logical forms. The candidate answers, in turn, are extracted from (i) the set of compatible named entities and (ii) the output of a logical-form pattern matching algorithm.

1 Introduction

This document describes the AnswerFinder system as it stood at the time of the TREC 2004 question answering track.[1] Section 2 describes the architecture of the system as a whole, Section 3 details the function of each module within the AnswerFinder system, Section 4 gives the system performance on the TREC 2004 question set and Section 5 gives the conclusions and future work.

The AnswerFinder question answering system is designed to answer TREC-style factoid questions with an exact answer as below:

Q: *How far is it from Mars to Earth?*

A: *416 million miles*

[1]This work is supported by the Australian Research Council, ARC Discovery grant n. DP0450750.

In 2004, TREC questions consisted of factoid, list, and "other" questions and they were XML-formatted in groups of questions about a single topic as shown in Figure 1.

All the questions in the example of Figure 1 refer to *Fred Durst*, so question with ID number 2.2 is a factoid question asking *What record company is Fred Durst with?*. Question with ID number 2.3 is a list question in which all correct factoids should be listed in response, and question with ID number 2.5 is an "other" question in which relevant nuggets of information not given in response to earlier questions should be returned.

We spent most of our effort to handle the factoid questions and very little effort was done for the list and "other" questions. In this paper we will therefore focus on AnswerFinder's handling of factoid questions.

2 System Overview

The question answering procedure used by AnswerFinder follows the pipeline structure that is typical of rule-based question answering systems. The process is outlined in Figure 2 and is as follows:

1. The questions are normalised by resolving pronominal anaphora, so that *What record company is he with?* becomes *What record company is Fred Durst with?*

2. The questions are classified into types based upon their expected answer. So the question *How far is it from Mars to Earth?* would be

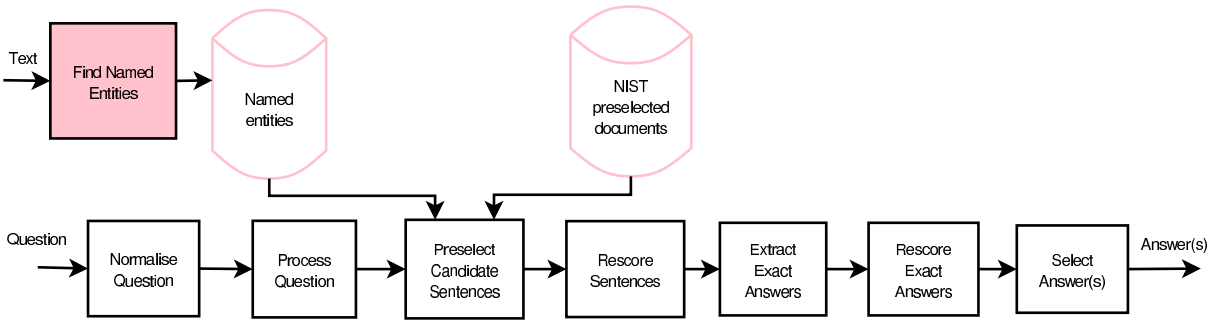

Figure 2: System overview

```
<target id = "2" text = "Fred Durst">

<qa>
 <q id = "2.1" type="FACTOID">
  What is the name of Durst's group?
 </q>
</qa>

<qa>
 <q id = "2.2" type="FACTOID">
  What record company is he with?
 </q>
</qa>

<qa>
 <q id = "2.3" type="LIST">
  What are titles of the group's releases?
 </q>
</qa>

<qa>
 <q id = "2.4" type="FACTOID">
  Where was Durst born?
 </q>
</qa>

<qa>
 <q id = "2.5" type="OTHER">
  Other
 </q>
</qa>

</target>
```

Figure 1: An example of a group of questions using the TREC 2004 format

classified as a "Number" question as it expects a numeric value in response.

3. 100 candidate answer sentences are extracted from the corpus.

4. The 100 sentences are re-scored based upon their word overlap, grammatical relations overlap, and flat logical form overlap with the question text.

5. Exact answers — fragments like *416 million miles* — are extracted from the candidate answer sentences.

6. The exact answer list is sorted, re-scored and filtered for duplicate exact answers.

7. A number of exact answers from the top of the list are selected, depending on the question being factoid, list, or "other".

AnswerFinder uses the following knowledge sources to analyse the question and to select from among possible answers: