

Natural Language Interfaces to Databases: Simple Tips Towards Usability

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Abstract. Natural Language Interfaces to Databases can be an easy way to obtain information: the user simply has to write a question in his/her own language to get the desired answer. Nevertheless, these kind of applications also present some problems. Many of those arise from the fact that who develops the interface does it according with his/her own idea of usability, which is sometimes far from the real interaction the interface will have to support; but even when a question is syntactically supported, it can be misunderstood and a wrong answer can be provided to the user. In this paper we present some simple tips that intend to minimize these situations.

1 Introduction

During the implementation of JaTeDigo [1, 2], a Natural Language Interface (in Portuguese) to a cinema database, we had to deal with many problems related with usability and we understood that some simple solutions can be implemented in order to minimize these problems and its effects. As so, in this paper, we focus on some tips that intend to make NLIDBs more user friendly and trustable, improving their usability.

The paper is organized as follows: in Section 2 some related work is presented; in Section 3 we present some tips towards usability; in Section 4 we evaluate one of those tips, namely the importance of presenting examples of questions that are understood by the system, as well as questions that the system is not able to answer; finally, in Section 5 we present some conclusions and future work.

2 Related Work

Communicating with the computer is a long-standing goal for Artificial Intelligence research. Although the first NLIDB emerged in the 70's, NLIDB had their golden era in the 80's and mid 90's. Nowadays, NLIDB are considered to be particular situations of question answering (QA) systems. In recent years there have been several attempts to merge QA systems with dialogue systems, improving system results by allowing interaction with the user. For instance, HITIQA (High-Quality Interactive Question Answering) [3], is an interactive question answering system that answers (complex) open domain questions in natural language, such as *What has been Russia's reaction to U.S.*

bombing of Kosovo? and narrows the search space through a clarification dialogue with the user. Another example is the RITEL (Recherche d'Informations para TEL - éphone) project [4]. Its goal is to integrate conversational and oral capabilities in information retrieval systems (made by phone) and, in particular, in QA systems. We also detach TV-Guide and BirdQuest projects [5–7]. In TV-Guide, a multimodal system is used to allow access to public domain information, namely television programming. Within this application, the user can formulate a vague question that is then refined in a dialogue; BirdQuest answers questions about nordic birds. In this system, dialogue capacities are combined with information extraction.

JaTeDigo follows some of these applications' ideas as we also believe that interacting with the user – even in a very simple manner, not implicating the development of a truly dialogue system – can improve the application results.

3 Tips

As said before, many problems arise from the fact that who develops a NLIDB does it according with his/her own idea of usability. In the following we present some tips concerning this problem:

- Before starting the NLIDB implementation, a corpus containing questions that users would like to ask should be build. This corpus can be used to identify the questions in which the developer should invest – that is frequently asked questions with the same syntax and/or topic – but also to confront developers with inventive and unusual questions. Considering JaTeDigo implementation, before starting the development of the interface, a corpus with around 80 questions was build from 8 users. At that point we understood that there was a set of questions that we could not answer, regarding the information we had in the database. For instance, the question *Qual o maior êxito de bilheteira dos últimos 5 anos?* (*Which was the major box office in the last 5 years?*) could not be answered because the database had no information concerning major box offices. Also, another problem that was detected in this phase resulted from the fact that questions were written in Portuguese and information regarding characters, was in English. As so, for instance, the question *De quem é a voz do burro no "Shrek"?* (*From whom is the donkey voice in "Shrek"?*) could not be answered, because we had no means to translate *burro* into *donkey*.
- Present examples of successful and unsuccessful questions to the user. The examples obtained in the previous step can be used to guide the user in the type of question that he/she may or may not submit.
- A first evaluation should be done as soon as possible, without embarrassments, and by as many different users as possible.
- When the interface is in use, if there is no way for the system to perform a safe disambiguation it is better to profit from the user to do it. Considering JaTeDigo, as sometimes there is no way to disambiguate without making possible wrong choices, we opt to ask user's opinion. Figure 1 illustrates this disambiguation step being given the question *Who directed King Kong?* .
- Unnecessary interactions should be avoided. For instance, consider the question *Who plays with Emma Watson in Harry Potter?* . There are two actresses with the

name *Emma Watson*, nevertheless, only one of them plays in *Harry Potter*. As a result, this ambiguity should be solved by the system as there is no need to ask the user to disambiguate: the information is all there.

- Identify situations where the user will use the “wrong” words to ask the question that he/she has in mind and adapt the system to those. For instance, the following question was asked to JaTeDigo *Quem contracenana com Hugo Weaving em The Lord of the Rings?* (*Who plays with Hugo Weaving in The Lord of the Rings?*) and an early version of JaTeDigo answered *Hugo Weaving does not participate in the movie The Lord Of The Rings*. Why? Because none of the movies from the Tolkien trilogy is called exactly *The Lord of the Rings* (but, for instance, *The Lord of the Rings, the two towers*). Besides, there is an animation movie from 1978 with that name (and *Hugo Weaving* does not participate in it). As a result JaTeDigo understood that the user was asking about that movie from 1978.
- As the previous step is not always possible, try to minimize the troubles caused by a wrong answer, by providing information that can help the user to validate the answer or to understand that the question was badly interpreted. Considering JaTeDigo, information about the film opening year is provided, as well as the main cast. If JaTeDigo answer was *Hugo Weaving does not participate in the movie The Lord Of The Rings from 1978*, the user would understand that something was wrong.

Resultado

Existe mais que um "king kong" na base de dados de filmes. Escolha um dos seguintes

King Kong (2005)
Elenco Principal

Naomi Watts
Jack Black
Adrien Brody

King Kong (1976)
Elenco Principal

Jeff Bridges
Charles Grodin
Jessica Lange

Fig. 1. Disambiguation step.

In the following we show some preliminary results of an evaluation concerning the last tip.

4 How Important are Example-questions?

JaTeDigo interface is a web page (Figure 2). As it happens with START [8], examples of successful and unsuccessful questions are presented in order to give the user a picture of the system capabilities and limitations.

By this, although this is a preliminary evaluation, we can say that the user is influenced by the examples showed (mainly influenced by its topics or syntax), but, apparently, he/she does not read carefully enough the presented examples in order to avoid misspellings. Anyway, we can say that it is worthy to invest in examples in the interface.

5 Conclusions and Future Work

We have presented some tips that intend to make NLIDBs more user friendly and trustable. First, we have detached the user's role: the NLIDB can profit from potential users feedback during the development process, allowing to understand the question that will effectively be asked to the system (and not only what the development team has in mind). Also the NLIDB can profit from the user feedback when the interface is running, for instance, for disambiguation proposes.

Secondly, we have presented some tips to increase (or at least not to decrease) user's confidence: the system should try to avoid unnecessary questions and provide information in the answers that would help the user to understand if the question was well interpreted (or not). Also, particular situations, where it is known that user will formulate the question in a "incorrect way" should be identified.

Moreover, we have presented an experiment that intended to show the importance of guiding the user with successful and unsuccessful examples and we have shown that this guidance lead to a considerable increase of successful answered questions although it does not help to avoid misspellings.

A system as JaTeDigo, as any NLIDB, needs constant improvement. As future work we intend to continue to extend its understanding capabilities and make it more robust: if only part of the request was understood, a dialogue with the user should be establish in order to refine the question. Moreover, we intend to incorporate some of these tips in a QA system.

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