Chapter 9
Natural Language for Querying Geographic Databases

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ABSTRACT

The amount of spatio-temporal data is growing as is its potential in improving several fields (such as hazard characterization and human diseases). Meanwhile, several problems have risen and concern specially retrieving, storing, and interpreting spatio-temporal phenomena. In fact, there is a need today to make the exploitation of this flood of information popularized for a wide range of users. Although this is not the case since now, generally managing such data requires specific skills, especially the structured query language (SQL) expertise. To profit a wide range of users from this technology, natural language is to be exploited to bridge the gap between non-expert users and geographic data exploitation. This is the scope of the chapter.

INTRODUCTION

The wide awareness and espousal at an astounding rate of the Geographic Information Systems (GIS) by the wide range of the community, has led to share, manage and interpret large amounts of spatially referenced data. Such systems are exploited to tackle panoply of real-world problems across different fields used for urban planning, criminology, resource management, environmental impact assessment, scientific

investigations etc. With the expansion at a spectacular rate of the new applications of GIS more and more users with different backgrounds are interested to profit from its outputs. Although, to be able to benefit from the technological opportunities offered by a GIS and since the Geographic information database (GDB) is its backbone one would be expected to have expertise in SQL. Indeed, this critical requirement is not meet by nomad users who are manipulating GIS. However, all users are more familiar with the natural language as a communication support.

This fact has inspired us to propose means as easy as possible to overcome all communication language hardness to interact with the GIS obviously across its embodied GDB. Hence, the user is free to express the query in the natural language without any structuring effort. Although to retrieve the response the GDB engine processes only well formatted queries and generally in an SQL fashion. Then, a pre-processing is compulsory to translate informal query to a formal SQL style. Concretely we make use of the techniques of Question Answering Systems. Given the GDB response, the user is expected to interpret it. Again to avoid all misleading interpretation even the response is a subject of a reformulation in a natural language popularly under stable. To this end we adopt the Natural Language Generation (NLG) which intends to translate data output to text. The remainder of this paper is organized as follows. The second section reviews related works to different disciplines. The third section describes the proposed approach. The fourth section details the experimental results. Finally, the last section reports the conclusion with some perspectives.

BACKGROUND

Nowadays with the information glut, there is an increasingly important need to exploit information content available in structured format. In this context, Question Answering Systems (QAS) and more precisely the Natural Language Interfaces to Database Systems (NLIDBS) have been developed to satisfy this need. These systems aim at satisfying experts as well as novice users who are more familiar with the natural language to answer specific questions. The main objective is to provide facilities to ensure the communication with the machine and the end users without leaning the formal language. In fact, a set of techniques was designed to reach this target, namely Question Answering Systems (QAS), Natural Language Generation (NLG), etc. The latter represent the subjects of a literature review since they are the scope of the main stages of the current study.

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