SQL Query Synthesis from Input Output Examples

Name1
Affiliation1
Email1

Name2 Name3
Affiliation2/3
Email2/3

Abstract

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1. Introduction

Relational database serves an important role in modern data management, and SQL is the most commonly used language in querying data from these database systems. However, though SQL is designed to be declarative, structurally complex queries remains highly challenging even for software developers: for example, in Stack Overflow, there is a tag "greatest-n-per-group" for writing SQL to solve "argmax" problems (querying the row with greatest or least values for each group), and there are more than 1,500 posts for this single problem. As for other non-expert end users including commodity traders, chemist, physicist, school administrators or even bank counters, the task querying the database system with SQL queries is even more challenging.

A traditional way to increase database usability is to design GUIs for different applications: developers predefine a set of parameterized queries, and users query data by filling a form using GUI, by which some query in the set will be instantiated and executed. This approach benefits users by hiding all details of underlying SQL queries, but on the other hand, its drawback is also obvious: the GUI are application specific and users can only query data using these predefined queries, which limits the ways for user to perform more complex query retrieval tasks.

As a matter of fact, database designers are seeking for more user-friendly interfaces to reduce users' efforts in querying databases. Visual interfaces are designed by

A. Appendix Title

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References

P. Q. Smith, and X. Y. Jones. ...reference text...