Answering Unions of Conjunctive Queries with Ideal Time Guarantees

Nofar Carmeli
DI ENS, ENS, CNRS, PSL University, Paris, France
Inria, Paris, France

Abstract

The holy grail we strive for is, given a query, to identify an algorithm that answers it over general databases with optimal time guarantees for the specific query. In this tutorial, we focus on what can be seen as ideal time guarantees: linear preprocessing (needed to read the input) and constant time per answer (needed to print the output). We seek to understand which queries can be solved with these (or almost these) time guarantees and how.

We start with the basic building blocks of database queries: joins, and slowly increase the expressivity by introducing projections and unions until we cover positive relational algebra. We first consider the task of enumerating all query answers and then discuss related, more demanding, tasks such as ordered enumeration and direct access to query answers. We investigate the challenges in answering such queries and provide algorithms and conditional lower bounds

2012 ACM Subject Classification Theory of computation → Database query processing and optimization (theory)

Keywords and phrases query evaluation, enumeration, fine-grained complexity, constant delay, union of conjunctive queries

Digital Object Identifier 10.4230/LIPIcs.ICDT.2022.3

Category Invited Talk