

Achieving Ontology-Assisted Query of Graph Databases

David Silberberg, Wayne Bethea, Dennis Patrone, Paul Frank,
David Patrone, John Gersh, Elisabeth Immer
Johns Hopkins University Applied Physics Laboratory
11100 Johns Hopkins Road
Laurel, MD 20723-6099

Abstract

We describe an approach for enabling ontology-assisted queries onto existing schema-based graph database systems without altering the graph query language or the corresponding graph database system. Typical schema-based graph database systems enable analysts to formulate queries using terms from a schema. Our approach enables analysts to formulate queries using terms from a *virtual schema*, which is composed of an ontology, a graph schema, and mappings between them. A software system can then assist the analyst by extracting the predicates and terms from queries, and in conjunction with the ontology and a reasoner, produce a set of corresponding graph queries that contain only terms from the graph schema. These queries are then sent to the graph database for evaluation. This approach enables intelligence analysts to focus on analysis that is more complex while the ontology-assisted query capability performs lower level reasoning. A distinction is maintained between the ontology reasoning and graph query systems to 1) take advantage of the performance of graph query engines while exploiting the semantics of the ontologies, 2) provide multiple analysts with an explicit and consistent semantic model of the graph data, and 3) enable multiple analysts with different semantic models of the data to use their own personal ontologies for analysis.

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