Well-organized association Pattern Mining using Multi-relational Data Cubes

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Abstract

A large class of data mining applications involves data sets that pertain to multiple entities and relationship. This has led to the suggestion of multi-relational data mining (MRDM) that aims to incorporate and exploit the heterogeneous and semantically rich relationships that exist among entity types. Specially, given a database consisting of multiple tables linked through foreign key joins, a target table (that typically represents a certain real-world entity type) and, optionally, a target attribute (e.g. a class label attribute), MRDM aims to discover patterns and models spanning all the tables and links that either describe or predict the target entity or attribute. In this paper, we study one class of MRDM task, namely multi-relational association rule mining. For this task, we distinguish two types of target tables, namely entity *and* relationship *target tables. For the case of entity target tables, we cast the computation of frequent patterns as multi-relational iceberg cube com-putation and propose an ef cient algorithm for it. Then, we study the application and peculiar requirements of tar-get tables that are relationship tables. This study reveals a new mining task, dubbed* linkage mining*, where the mere instances of relationships are the objects of mining. We then show how our multi-relational iceberg computation algorithm is extended to do linkage mining. In the end, we present performance studies of our algorithms.*

Key words *MRDM,* WARMR, Iceberg Cube Trie, MICube trie, DAG