

# On-Line Analytical Processing on Graphs Generated from Social Network Data

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**Abstract.** Social Network services have quickly become a powerful means by which people share real-time messages. Typically, social networks are modeled as large underlying graphs. Responding to this emerging trend, it becomes critically important to interactively view and analyze this massive amount of data from different perspectives and with multiple granularities. While On-line analytical processing (OLAP) is a powerful primitive for structured data analysis, it faces major challenges in manipulating this complex interconnecting data. In this paper, we suggest a new data warehousing model, namely *Social Graph Cube* to support OLAP technologies on multidimensional social networks. Based on the proposed model we represent data as heterogeneous information graphs for more comprehensive illustration than the traditional OLAP technology. Going beyond traditional OLAP operations, *Social Graph Cube* proposes a new method that combines data mining area and OLAP operators to navigate through dimension hierarchies. Experimental results show the effectiveness of *Social Graph Cube* for decision-making.

## 1 Introduction

Business Intelligence (BI) represents a set of technologies and systems that play a major role to deliver the right information extracted from large amounts of data for decision-making. One of the most important technologies in BI is on-line analytical processing which represents a very powerful and flexible tool to mine and analyze data deeply. Using operations such as roll-up and drill-down, the result of OLAP is visualized as a data cube which allows decision makers to analyze quickly and navigate through the data from different perspectives and with multiple granularities. The multidimensional model used in OLAP supports handling of user defined views of data.

Over the last few years, social network sites such as Twitter and Facebook have quickly become a rich source of real time information by which people share short microblogs including daily conversations, cultural trends and information news without any concern about writing style, which make them able to exchange information about their personal point of views and interests. This imposes new challenges in the social networks and the microblogging data