A New Method for Performing On-line Sequential Data Analysis

Patent Title: Sequence Online Analytical processing System
Versitech Ref No: IP00287
Legal Status: Published
Priority Date: February 2, 2009

This invention relates to a new method for implementing the concept of Sequence OLAP (S-OLAP) for supporting on-line sequential data analysis. It allows users to interactively explore different levels of summarization of the sequence data through a user-friendly interface. The on-line approach of sequential analysis greatly facilitates the managerial decision process.

Market Opportunity
Many kinds of real-life data exhibit logical ordering among their data items and are thus sequential in nature. Examples of sequence data include stock data, web server access logs and various kinds of RFID logs such as those generated by a commodity tracking system in a supply chain. However, traditional on-line analytical processing (OLAP) systems and techniques were not designed for sequence data and they are incapable of supporting sequence data analysis. This has implications for managerial decisions. Currently, whenever a manager has business sequence queries, he/she has to request the IT department to write customized programs. Given the huge volume of data and the administrative overhead, it may take weeks for the manager to get the query results. Furthermore, if the manager is interested in certain query results and wishes to perform deeper analysis, he/she has to request the IT department to write new programs to answer his/her new business queries. This inefficient method of sequence data analysis severely hampers the managerial decision process.

To address this, we have proposed the concept of Sequence OLAP, or S-OLAP for short, in which a sequence can be characterized not only by the attribute values of its constituent items, but also by the subsequence/substring patterns it possesses. Our invention includes a suggested model to implement the S-OLAP concept as well as algorithms to implement the proposed model.

According to Frost & Sullivan, the North American Enterprise Analytics Software Market was US$2.2 billion in 2005 and is expected to grow at a Compound Annual Growth Rate (CAGR) of 10.8% from 2006 to 2012. The market consists of Business-Intelligence (BI) Reporting, Enterprise-Report-Planning (ERP) Analytics, Supply-Chain-Management (SCM) Analytics and Customer-Relationship-Management (CRM) Analytics. All these applications can benefit from the new S-OLAP method in making efficient and effective sequential data analysis. Major players in the market include Business Objects, Oracle, IBM, SAS, Cognos, Hyperion and SAP.
The HKU Invention
We have implemented the concept of Sequence OLAP (S-OLAP) to support on-line sequential data analysis. As shown by the figure, it allows users to interactively explore different levels of summarization of the sequence data through a user-friendly interface. The on-line approach of sequential analysis greatly facilitates the managerial decision process.

In addition to the basic S-OLAP concept, the invention also includes the notions of Sequence Cuboid and Sequence Data Cube; these two components together form a novel model to implement the concept of S-OLAP. In contrast, traditional OLAP models such as Relational OLAP (ROLAP) and Multidimensional OLAP (MOLAP) are incapable of supporting the main features of S-OLAP.

About the Lead Inventors
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