Abstract

Data Warehouse is an information system mainly used in decision making process. Business organizations leveraging data warehouse, analyze their data to stand up in highly competitive environment. The usage of multimedia data has considerably increased and increasingly increasing further. In Business organization, a need has been generated to manage and utilize well organized multimedia data in decision making process. The well organization of multimedia is leading towards multimedia data which is a collection of images, audio, video and text data. Data management includes the access and storage mechanisms that support the data warehouse. The storage, access and analysis of multimedia data are critical issues for the overall system's performance and functionalities. The logical and physical architectures of multimedia data are critically studied in dynamic environment which provides platform supporting efficient storage, access and analytics.

The critical issue in building multimedia data warehouse is optimization in the structural storage, the improvement in access latency occurring in the query processing and analysis of multimedia data still prevail as focus of research. The study finding leads to specifying need of improved model that leads to the storage of multimedia data in improved and efficient manner, provide more efficient access mechanism with improved permanence of query processing for access of data and subsequent analysis to enhance depth.

The undertaken research documented in this thesis depicts the proposed model based architectural framework to build multimedia data warehouse with intended level of efficiency in performance. To achieve better storage, access and analysis performance certain techniques such as compression, indexing, partitioning and materialized views are incorporated. The implementation of the prototype mapped to the proposed model is operational in three phases. Three phases are: The Multimedia data Extraction and Integration, The Multimedia Data Modeling and Warehousing and The Multimedia Data Analysis.
In the first phase of Multimedia Data Extraction and Integration, multimedia data is extracted. These multimedia data are represented by different levels of features. Therefore, proposed model extracts business domain specific different levels of features. To achieve storage performance, only multimedia data is compressed in this phase. Multimedia data compression has become necessary part of Multimedia Data Warehouse. Data compression helps reduces the size of data and improves query performance.

In the second phase of the Multimedia Data Modeling and Warehousing, logical and physical model is presented. To model multimedia data warehouse, dimensional modelling technique is used. Star schema is used to build multimedia cube. Appropriate aggregation functions in terms of measure are provided. To achieve better performance, indexing techniques has been used on appropriate fields. To further enhance the performance, partitioning and materialized view techniques have been incorporated. Partitioning techniques helps to manage storage and access efficiency.

The third phase helps to analyze multimedia data which are stored in multimedia data warehouse. User can analyze multimedia data from different perspective and can use appropriate measure to analyze data.

To validate the undertaken approach, the prototype is implemented and tested against the biometrics image data, geographic image data and e-learning video data. Prototype allows user to access and analyze multimedia data by selecting data from multiple perspective. The results obtained by way of implementation are analyzed to justify and validate the set the research targets.