OLAP Based Analysis and Visualisation System for Multidimensional Child Welfare Data

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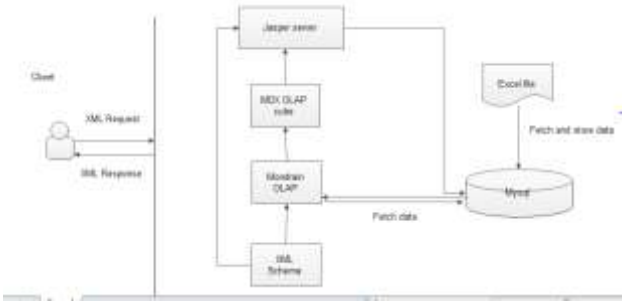
Abstract:

Child welfare data, such as health, nutrition and education, is surveyed periodically and analysed by researchers from the government and non government organisations. Currently these researchers employ traditional database management and analysis tools such as spread sheets and tables. OLAP is one of the technologies widely used to analyse and view multidimensional data sets specifically designed for the analysis of large data volumes and for flexible aggregations along multiple dimensions. Multidimensional modelling of such data combined with On-Line Analytics Processing (OLAP) will enable a better representation and help the researchers to carry out detailed analysis in an efficient manner.

In this project, a multidimensional modelling, querying, analysis and graphical visualisation of child welfare data is carried out. Appropriate dimensions, levels and measures are identified to represent the various facts of survey to include welfare factors such as health, nutrition and education across year and region. The multidimensional design is represented as an OLAP cube and the corresponding relational database is designed and implemented using MySQL RDBMS. A basic set of MDX based multidimensional queries were developed to test and validate the developed multidimensional database design. Aggregation tables were created as part of the hierarchy. This has lead to improved performance of the database. The generated schema and cube are loaded into OLAP Jasper server to create charts to analyse the data according to user needs and produce results based on MDX query written.

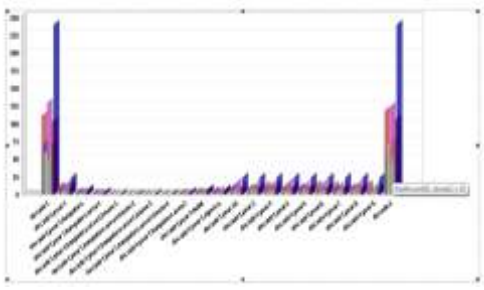
Multidimensional exploration and analysis techniques of drill-down/up and aggregation are employed to analyse the data with the help of the Business Intelligence (BI) software. The results are represented in terms of reports and graphical visualisation. Plots, charts and graphs were employed to provide visualisation of the analysis results. The results have demonstrated the efficacy of multidimensional modelling, aggregation and analysis of child welfare data.



Block diagram of data analytics component

OLAP View

Drill down OLAP view



Graph of OLAPview