TransDig

Kavitha D[1] Dr. Krishna A N[2]
[1,2]Department of Computer Science & Engineering
[1,2]SJB Institute of Technology, Bengaluru, India

Abstract— TransDig is a business intelligence (BI) project implemented using an open business intelligence tool OLAP (Online Analytical Processing). Project answers multidimensional analytical queries swiftly. It encompasses of relational database, data mining and report writing. Report writing is with respect to sales, production, marketing, budgeting and process management.

Key words: OLAP, BI, A-priori Algorithm, ERP

I. INTRODUCTION

TransDig is a business intelligence project implemented using an open business intelligence tool OLAP (Online Analytical Processing). Project answers multidimensional analytical queries swiftly. It encompasses of relational database, data mining and report writing. Report writing is with respect to sales, production, marketing, budgeting and process management.

TransDig analysis provides accurate management information using the online analytical processing operations relating to sales activity which helps in increasing profit and forecasting and planning a customer and product class levels. This also helps in determining to what extent the customer needs have been fulfilled. The analysis can be displayed as a formatted report or a graph. It provides multidimensional views to the users.

The project "TransDig" whose backend is mainly developed using PHP and front end is developing by using HTML5, CSS3, and AJAX. The main objective of this project is analyzing and reporting for sales, marketing, budgeting and financial reporting and answering multidimensional analytical queries swiftly. It is written on a 64-bit Windows operating system and Linux operating system but it is compatible with other operating systems as well, as its results are displayed with the help of a browser as web application.

The system is simple to use for both user(s) and administrator(s). The user view and administrator view is mentioned as below:

- The user should be able to manage their accounts and place or manage orders. The user should be given recommendations about the frequently used products based on daily basis, monthly basis, and location.
- The administrator should be able to view the revenue and sales analysis, number of visitors, financial and business news, view and control inventory and production and also view the customer reviews.

II. LITERATURE SURVEY

In what follows, the related work on BI and OLAP is reviewed first. Next, some works carried out by other authors are been discussed.

A. Business Intelligence

Business intelligence is one of the hottest buzzword for last 4-5years in business administration and information management fields [1]. Business intelligence is a set of methods and tools for accession and conversion of raw data into useful information. Business intelligence is also termed as to narrate set of concepts and techniques to refine business decision making. With the help of business intelligence techniques the corporate data can be organized, analyzed in a better way and converted to a useful knowledge of information. Business intelligence system help the enterprise identify market trends and spot business problems that need to be addressed. Business intelligence data usually includes historical information as well as new data gathered from source systems as and when it is generated, enabling business intelligence analysis to support both strategic and tactical decision-making processes.

B. OLAP

Online analytical processing is a computer processing that allows user to effortlessly and selectively extract and view data in different viewpoints [2]. The data of online analytical processing is stored in multidimensional database. Data mining techniques can be used in online analytical processing and can also identify previously unidentified relationships between data items.

The central component of any online analytical processing system is a OLAP cube also termed as hyper cube or multidimensional cube. Matrix interface is used to control an OLAP cube.

The operations that can be performed include the following:

- Consolidation: Consolidation is the gathering of data that can be collected and computed in one or more dimensions.
- Drill down: Drill down is a method that allows users to browse through the details.
- Slicing and Dicing: Slicing and dicing is a quality where the users can take out (slicing) a specific set of data of the OLAP cube and view (dicing) the slices from different viewpoints. These viewpoints are sometimes called dimensions.
- Document Printing: Orders and Invoice Printing, Inventory Movement, Payments.
- Advanced Reporting: Aging Analysis, Cash Flow Analysis, Budgetary Reporting.

Researchers [2] have worked on how online analytical processing serves as a best solution for a multidimensional query store. So the main purpose of this research was to design and compare the online analytical processing solutions that were applied on the grocery business data. Hence based on the analysis made three solutions were drawn from it:

SQL+ excel, OLAP+ excel and OLAP+ ProClarity and out of these three solutions OLAP+ ProClarity was found to be the best solution as it was flexible and user

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friendly. And also it was very effective in handling the process with less or more amount of data and was also more precise than the other two solutions.

Research has been done on how business intelligence models helps to improve the performance of a business. In this work they have developed a business intelligence model which helps in finding business performance by making use of bankruptcy predictions and also help to find important features to improve the prediction accuracy [3]. In the proposed model they have used quantitative bankruptcy prediction model and qualitative bankruptcy prediction model and also the best features of the business intelligence models.

There are works done on how to increase the performance by using business performance management (BPM) [4]. According to the research BPM is the main business edge that permits a business to affiliate strategic and operational objectives to increase and manage the performance and help in better decision making. They examine the technologies, processes and methodologies and proposes a framework through which the performance of a business can be improved. So in this particular framework the IT process management and business process view has been integrated to initiate the business performance management.

Research on understanding the restraint of traditional enterprise resource planning (ERP) system and also instigates the ERP system and BI technology and also emphasis on BI technology and ERP system integration system architecture [5]. So the elements of a BI technology are the data warehouse technology, OLAP, data mining technology. So by using these elements they produce a BI and ERP system integrated architecture and also try and draw a supportive relationship connecting BI and ERP.

III. PROPOSED APPROACH

The proposed system aims in providing a system that help the managers, organizations to study and survey the data produced by making use of OLAP tool and provide a sales report and analysis by which the business managers can take the right decision at the right time

- Making customer and admin relationship more secure and friendly
- Makes order placing and invoicing management more flexible and easy
- Increase the profits and also the performance
- Help to predict the performance based on the sales analysis
- Manage inventory and production based on the demands
- Finding new strategies to cope up with the market competition and helps in taking business to a higher level
- Makes tracking and managing the orders more user friendly
- Using data mining A-priori algorithm generates frequent item sets based on order details, place, daily and monthly basis.

A. System Architecture

Architecture mainly illustrates the formal description of a system. The below figure 1 describes the system architecture. The modules of the system are:

- Process Activities: processes that are defined are supported by the BI capabilities and/or pre-processed analytic information into the process context at process runtime.
- Operational System: It deals with the management information system that gives the operational data services the implementation of the process and also assists as a data source for the BI system. The operational system in this project id the ERP system.
  Database Layer: This layer holds the database servers where the data is stored and retrieved. The data in this layer is kept individualistic from business intelligence layer. The data in this layer is stored in data warehouse and data branches. And before the data is stored on the data warehouse it has go to ETL (Extract Transform Load) tool. ETL tool is responsible for extracting the useful data from the data source and cleaning them to guarantee the accuracy of data it is then transformed and loaded on data warehouse.
- Business Intelligence Layer: It acts as a middle layer between the user and the database layer and also does the task of querying and reporting that is the formatted reports that can be viewed and saved in .pdf format and listing of reports based on date, month, duration, which help the user in decision making.

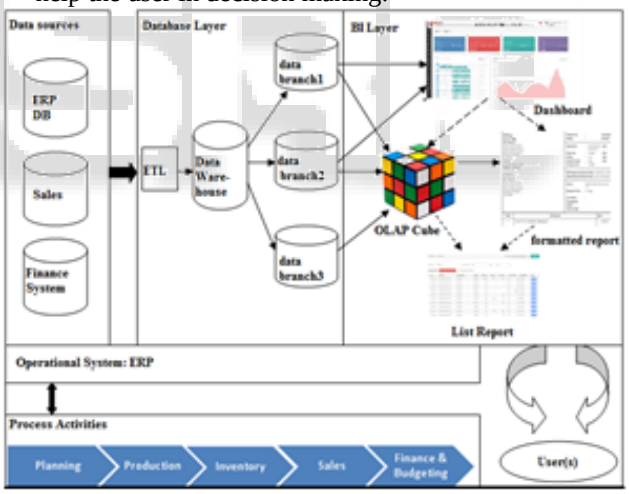

Fig. 1: TransDig System Architecture

IV. METHODOLOGY

This project is been developed using HTML5, CSS3, JSON and AJAX as front end technology and PHP as backend technology. It is developed using a adobe Dreamweaver IDE. The database used is MySQL. The below figure 2 shows the flow chart of the project. The data from data sources are extracted, cleaned, transformed and loaded on the data warehouse by using ETL tools. Then this data from data warehouse is stored on data branches and the BI layer makes use of this data and analyse the data and generate reports and graphs. And also A-priori algorithm is used to generate frequent item set. The frequent item set is generated based on the sales depending on the product, place, orders recently placed.

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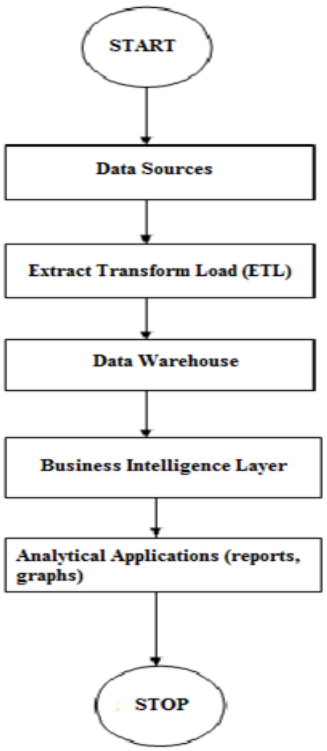

Fig. 2: Flow Chart of the System

Algorithm: A-Priori Algorithm

Input: sales database.

Output: Generate frequent item set

C k: Candidate itemset of size k

L k : frequent itemset of size k

L 1 = {frequent items};

for (k = 1; L k != Ø; k++) do begin

Ck+1 = candidates generated from L k;

for each transaction t in database do

increment the count of all candidates in Ck+1 that are contained in t

Lk+1 = candidates in Ck+1 with min_support

end

return ∪k L k;

Example of A-priori algorithm is illustrated below. The minimum support count taken is 2. At the end of third iteration the frequent item set is generated.

Florsils	I1
Fr01	I2
FRCM	I3
CL	I4
Drymix	I5

Database D

Order no	List of items
1	I1,I5,I4
2	I5,I3,I2
3	I5,I1,I2
4	I4,I2,I1
5	I5,I4
6	I5,I3,I4
7	I1,I3,I4
8	I5,I2,I4
9	I5,I1,I3

SUPPORT_COUNT= 2

First iteration:

Itemset	Sup. count
{I1}	5
{I2}	4
{I3}	4
{I4}	6
{I5}	7

C1

Itemset	Sup. count
{I1}	5
{I2}	4
{I3}	4
{I4}	6
{I5}	7

L1

Fig. 3:

Second iteration:

Itemset	Sup. count
{I1,I2}	2
{I1,I3}	2
{I1,I4}	3
{I1,I5}	3
{I2,I3}	1
{I2,I4}	2
{I2,I5}	3
{I3,I4}	2
{I3,I5}	3
{I4,I5}	4

C2

Itemset	Sup. count
{I1,I2}	2
{I1,I3}	2
{I1,I4}	3
{I1,I5}	3
{I2,I4}	2
{I2,I5}	3
{I3,I4}	2
{I3,I5}	3
{I4,I5}	4

L2

Third Iteration:

Itemset	Sup. count
{I1,I2,I3}	0
{I1,I2,I4}	1
{I1,I2,I5}	1
{I1,I3,I4}	1
{I1,I3,I5}	2
{I1,I4,I5}	1
{I2,I3,I4}	0
{I2,I3,I5}	1
{I2,I4,I5}	1
{I3,I4,I5}	1

C3

ITEMSET	SUP_COUNT
{I1,I3,I5}	2

L3

Fig. 4:

V. IMPLEMENTATION

The below figures show the implementation of the project

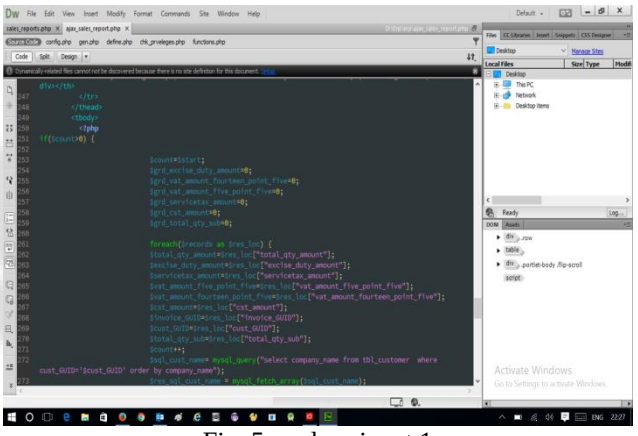

Fig. 5: code snippet 1

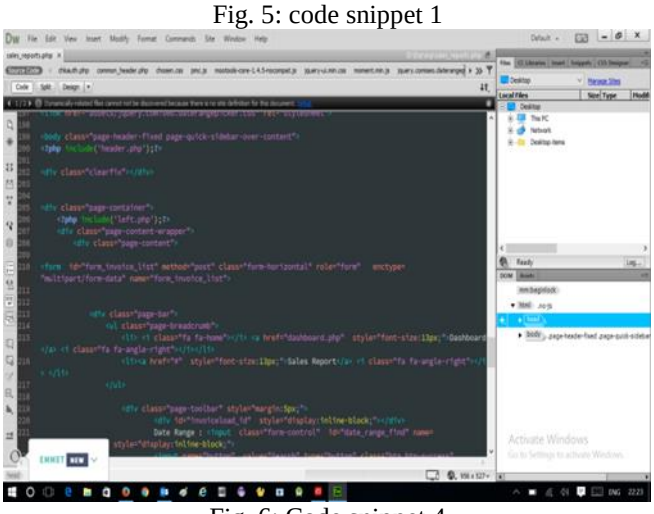

Fig. 6: Code snippet 4

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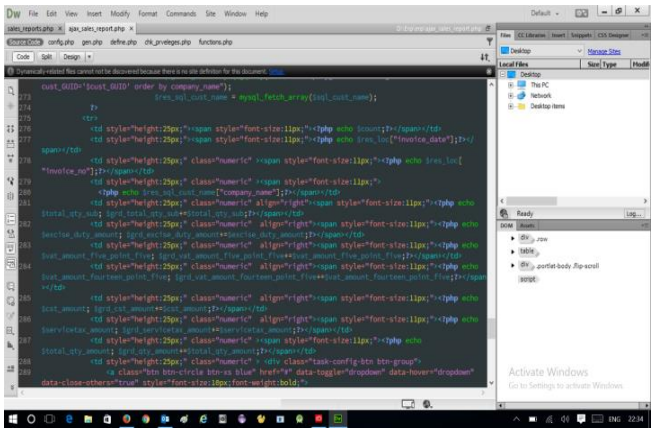

Fig. 7: Code snippet 3

VI. RESULTS

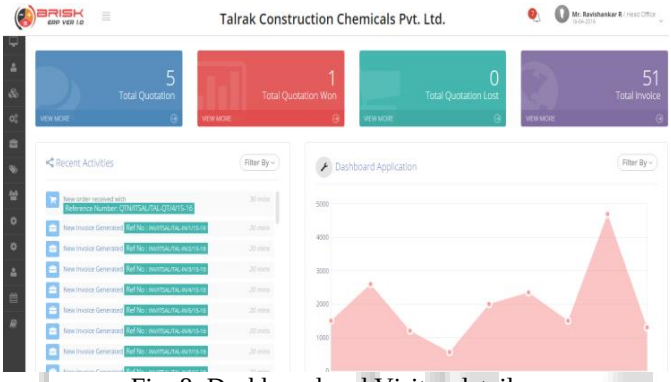

Fig. 8: Dashboard and Visitor details

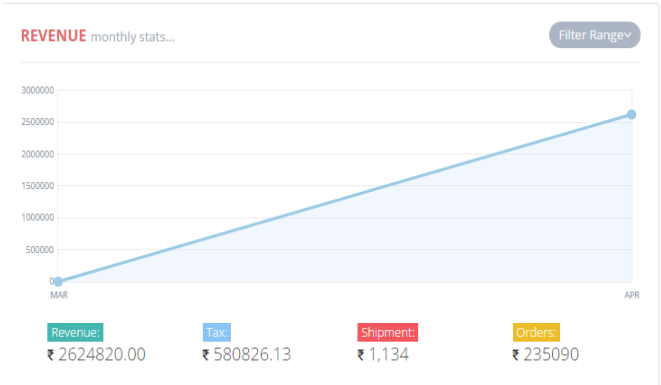

Fig. 9: Revenue Analysis

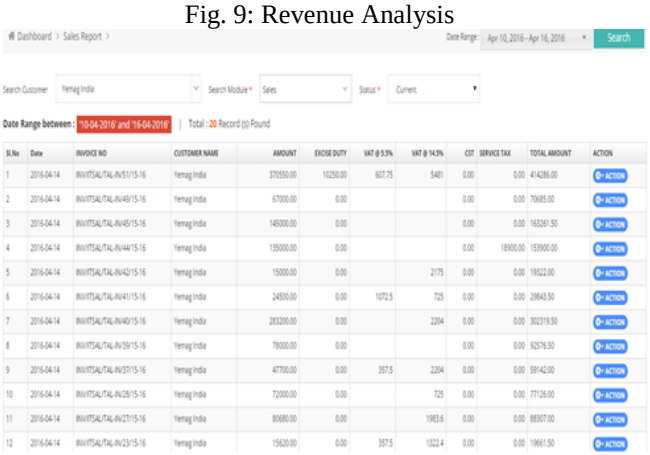

Fig. 10: Formatted Report

VII. CONCLUSION

In this paper, we have described the uses of BI and OLAP and tried and proposed model for it. And have developed a BI system for managing and analysing the sales, finance, manufacturing data using OLAP techniques and also generate a frequent item set using a data mining A-priori algorithm.

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