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Designing a Data Warehouse for an ERP Using Business Intelligence

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Abstract : *To make the process of fetching of the data from the data base faster the system is proposed in this paper. It takes the data regarding various products into consideration so as to demonstrate the processing of the recommendations to the user based on the transactions of the previous users. The system forms the various schemas to fetch the data at much faster rate. While the previously Organizations used the single database to retrieve and fetch the data, making the process slower. Thus this paper put forth the system of the fetching the data at the faster rate and so as to recommend the products to the users using rule based and apriori algorithm.*

Keywords: *ERP, Data Warehousing, Recommendations, Data Mining, Business Intelligence.*

I. INTRODUCTION

The successful implementation and application of enterprise resource planning (ERP) in a number of manufacturers effectively improved the internal management of these enterprises, promoted the enterprise information degree. On the basis of a full investigation of the production-type business inventory analysis, existing information environment of the enterprise, data source structures, this paper builds business inventory analysis strategy to support the data warehouse architecture, and carries out the data warehouse model design with the theme of product sales, data pre-processing process model design.

Multi-tenancy, which allows a single application to emulate multiple application instances, has been proposed as a solution to this problem. In this paper, we present an architecture for achieving multi-tenancy, which enables users to run their services in a multi-tenant SOA framework as well as provides an environment to build multi-tenant applications. Primary contributions are motivating multi-tenancy, and the design and implementation of a multitenant and so as to use the rule based algorithm and apriori algorithm together forming the modified apriori algorithm.

To design a data warehouse for the database using the business intelligence in such a way that it takes lesser time in fetching the data from databases and be used by the ERP and provide many more recommendations based on transactions. The Data warehouse is designed in such a way that the products are located at unique schemas which makes the execution of DDL statements for feasible. This can be used by the different ERP systems in analyzing the database and provide recommendations on their respective ERPs as per the requirements. The proposed ERMS model can be used by any enterprise for developing their own ERMS that works efficiently in all browsers and devices. ERMS plays a key role in every enterprise and can be used to manage its entities and modules easily.

II. PROPOSED SYSTEM

The Proposed System shows storage of data efficiently. Ideally a data could be stored in a single database. And the corresponding tables of the Database could be normalized. But the proposed System stores the data at Schema level so that the stored data is fetched efficiently. The system considers an E-Commerce website as an ERP. The following are the features provided by the system.

- The products are segregated according to the categories and located at individual schemas which nullifies the interdependency.
- Product Data can be fetched at a comparatively faster speed which indicates improvised performance of the system.
- New product categories can be added to the system in runtime without any disturbances because of decreases dependencies.
- The transaction of the user will be recorded for further analysis of the sales of the product.
- Based on the sales of the product Ranks are allotted to the products which is used while suggesting the most relevant product to the Customer.
- The Transaction data is stored on the Nearest server based on the location of the system

- Related Products are suggested to the Customer based on the Mostly bought together Products.

As shown in fig1, we can form the product data with the help of various categories. These categories can help form the various schemas for the different products, making the process of fetching the data faster.

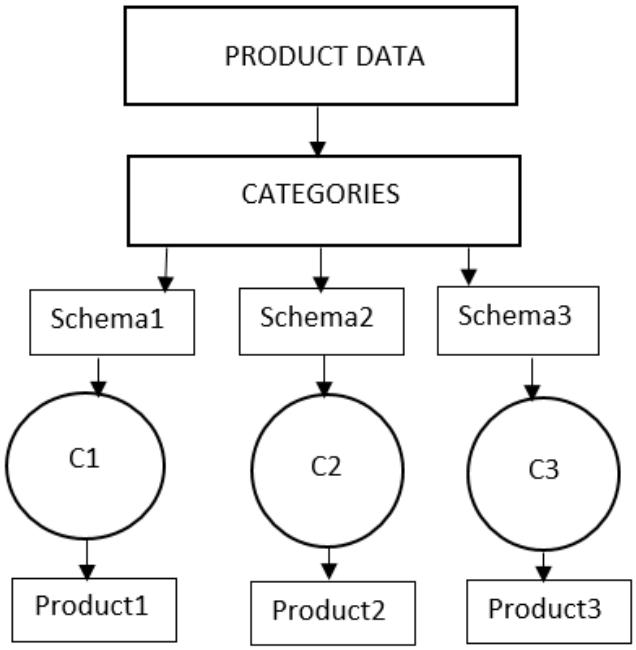

Fig1: Proposed System

III. METHODOLOGY

1.1 Admin Module

This module takes into consideration the users data and how the data should be managed into the various schemas so as to fetch the data in less amount of time. It looks after the system is working as per the requirement or not. Admin is responsible for the proper working of the website and so as the warehousing of the data.

1.2 Client Module

Client Modules manages client data. It has mainly Client Details and Project Details sub modules. Client details sub module is for storing clients personal details while Project details sub module is for managing the project requirements put forward by the clients. The details of clients are displayed in the client details page, with an edit button to edit their details as well as search button to find client.

1.3 Transaction Module

Transaction Modules manages financial accounts. This is extremely important for the growth of the company. Accounting module has the following sub modules- most required products, recommendation of products, budget of customers, products mostly preferred by the users. This module helps manage the business and when which product recommendations will help make the business, through the analysis.

1.4 Product Module

Production Modules manages the production information of products or services with sub modules such as Sales Management System, Product Management System. Sales Management System manages the orders placed by the customers with features to calculate net amount using product base price and quantity. All orders by customers can be viewed through the order details listing. Product Management System helps to keep track of product stock and automatically informs the administrator through email if the product goes out of stock.

1.5 User Module

User modules takes into consideration the login, wherein the users will ensure the security of their actions over the system is maintained properly. There the authentication and authorization of the users is maintained and users data is not miss used.

IV. DESIGN DETAILS

The system is designed as follows shown in the fig 2, where the web application contacts the backend where the mining is done on the warehouse database and this backend is done in the java programing language. The web application provides the different users data regarding the transactions and thus the data is stored in the databases and hence timely scheduled so to keep updating the database. The rule based algorithm is used in order to provide the recommendations to the users based on products. The data is stored in the form of the different schemas so as to fetch the data easily and avoid long processing time.

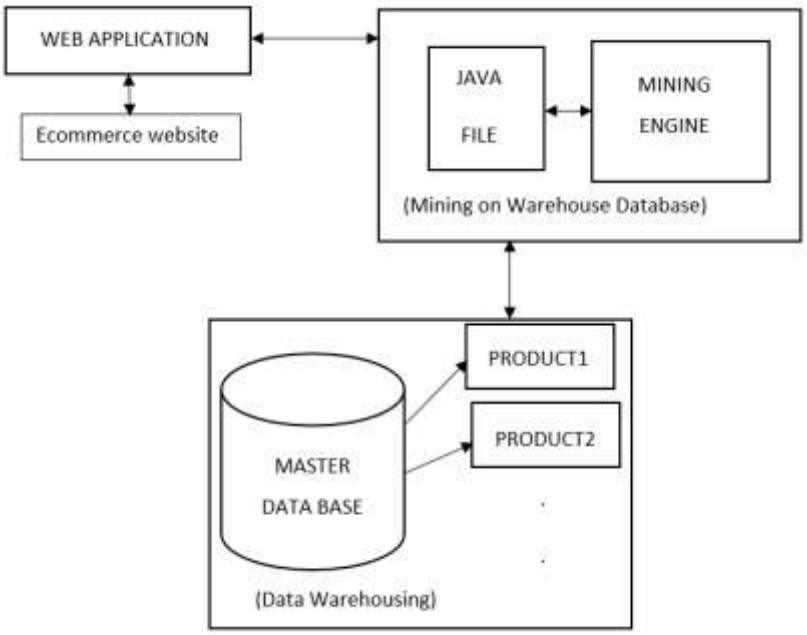

Fig2: Designed System

V. ALGORITHM

5.1 Rule-Based Algorithm:

A rule-based prediction program consists of a collection of rules. Each rule has the structure of an if-then statement. Then if part checks for some Boolean condition on the *features*of an item. When the condition is true, the then part provides something to be used in the final output. In the programs we consider, the rules will be collected in an ordered list, so that rules earlier in the list take precedence over rules later in the list if they produce conflicting outputs.

We can express a rule in the following from −

IF condition THEN conclusion

Let us consider a rule R1,

R1: IF age = youth AND student = yes THEN buy_computer = yes

Algorithm:

Input:

D, a data set class-labeled tuples,

Att_vals, the set of all attributes and their possible values.

Output: A Set of IF-THEN rules.

Method:

Rule_set={ }; // initial set of rules learned is empty

for each class c do

repeat

Rule = Learn_One_Rule(D, Att_valls, c);
remove tuples covered by Rule form D;
until termination condition;
Rule_set=Rule_set+Rule; // add a new rule to rule-set
end for
return Rule_Set;

5.2 Apriori Algorithm:

Apriori is an algorithm for frequent item set mining and association rule learning over transactional databases. It proceeds by identifying the frequent individual items in the database and extending them to larger and larger item sets as long as those item sets appear sufficiently often in the database. The frequent item sets determined by Apriori can be used to determine association rules which highlight general trends in the database. This has applications in domains such as market analysis. Apriori uses a bottom up approach, where frequent subsets are extended one item at a time. The algorithm terminates when no further successful extensions are found.

Pass 1
Generate the candidate itemsets in C_1
Save the frequent itemsets in L_1
Pass k
Generate the candidate itemsets in C_k from the frequent
itemsets in L_{k-1}
Join $L_{k-1}p$ with L_{k-1}q, as follows:
insert into C_k
select $p.\text{item}_1$, $p.\text{item}_2$, . . . , $p.\text{item}_{k-1}$, $q.\text{item}_{k-1}$
from $L_{k-1}p$, L_{k-1}q
where $p.\text{item}_1 = q.\text{item}_1$, . . . $p.\text{item}_{k-2} = q.\text{item}_{k-2}$, $p.\text{item}_{k-1} < q.\text{item}_{k-1}$
Generate all (k-1)-subsets from the candidate itemsets in C_k
Prune all candidate itemsets from C_k where some (k-1)-subset of the candidate itemset is not in the frequent itemset L_{k-1}
Scan the transaction database to determine the support for each candidate itemset in C_k
Save the frequent itemsets in L_k

Thus, this is how the algorithms are used to make the process easier and faster

VI. CONCLUSION

An Enterprise Resource Planning has been designed with modules for Products, Categories, Account, Transaction. The proposed ERP model can be used by any enterprise for developing their own ERP that works efficiently in all browsers and devices. ERP plays a key role in every enterprise and can be used to manage its entities and modules easily.

The ERP will make Independent Schemas for every product category which will make the creation and deletion of entities more convenient.

The developed ERP system is cost effective and can be scaled at economical costs. If we can develop an ERP which can customize itself based on user needs, then that ERMS can be easily consumed and installed by the company itself. In future we can see enterprises integrating virtual reality and the Internet of Things in their ERP frameworks.

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