

## **Data Mining Techniques for Banking Applications**

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**Abstract:** *Financial segment is the core division to decide the country's gross domestic product (GDP). The considerable and constant development of any country is based on the financial strength of the country. Last few decades observed the increase of financial reforms, liberalization and globalization of Indian financial system coupled with rapid revolution in information technology (IT). The paper presents the advantages of applying data warehousing and data mining (DWDM) techniques in customer relationship management (CRM) of the financial divisions like banking. It is a procedure of analyzing the data from various perceptions and summarizing it into precious information. Data mining (DM) aids the banks to look for unknown pattern in a group and determine unknown relationship in the data. These methods facilitate useful data analysis for the banking division to avoid customer harassment. And also fraud is an important problem in banking domain. Identifying and preventing fraud is hard, because fraudsters develop new techniques all the time, and the techniques grow more and more difficult to avoid easy finding.*

**Keywords:** *Integrated system, Networking, Banking Data Mining, Operational Data.*

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### **1. INTRODUCTION**

Technological improvements have enabled the banking domain to open up competent delivery channels to the community. IT has helped the banking domain to deal with the challenges the new economy poses. Currently, banks have recognized that customer relationships are a very important issue for their success in the market. Initiation of IT and cyber devices indicated a new world and brought marvelous change in all the sectors of the wealth. For this banks are exploring new financial products and tune options that would help them grow without losing current customers. Financial services are the cost-effective services provided by the finance business, which includes a broad range of societies that handle money, including unions, banks, credit card organizations, insurance companies, finance companies, investment funds and some government sponsored ventures.

Allow financial operations at branches or by using Automatic Teller Machines (ATMs). Provide wire transfers of funds and Electronic fund transfers (EFTs) among banks through internet. Provide charge card advances of the bank's own money for customers wishing to settle credit advances monthly. Provide a check secured by the bank itself and prepaid by the client. Accepting the deposits from client and provide the credit facilities to them. The various applications in banking are Data Warehousing, Data Mining, Electronic Data Interchange, Corporate Web Sites, and Management Information System [1, 2].

### **2. DATA WAREHOUSING AND DATA MINING**

#### **2.1 Data Warehousing and Data Mining**

In computing, an enterprise data warehouse (EDW), it is a method used for reporting and data analysis. Integrating data from one or more distinct sources creates a central repository of data, a

data warehouse (DW). Data warehouses store current and historical data and which are used for creating reports for senior management individuals such as yearly and quarterly evaluations. DM an interdisciplinary sub-field of computer science (CS), is the computational procedure of discovering models in large data sets (DSs) involving techniques at the junction of artificial intelligence (AI), machine learning (ML) [5, 6] and database systems (DBs). The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Aside from the rare analysis step, it involves database and data management characteristics, data pre-processing, model and inference considerations, complexity considerations, post-processing of discovered structures, and visualization.

## 2.2 Data Warehouse Architecture

Banks need a diversity of solutions ranging from a fully integrated global data warehouse (DW), to not integrated data marts (DMs) for the rising needs of the divisions. Both of these extreme solutions have important disadvantages along with their advantages, so it is worth considering the indirect alternative presented here based on Operational Data Store (ODS), a global DW and DMs. The architecture is shown in the Figure 1.

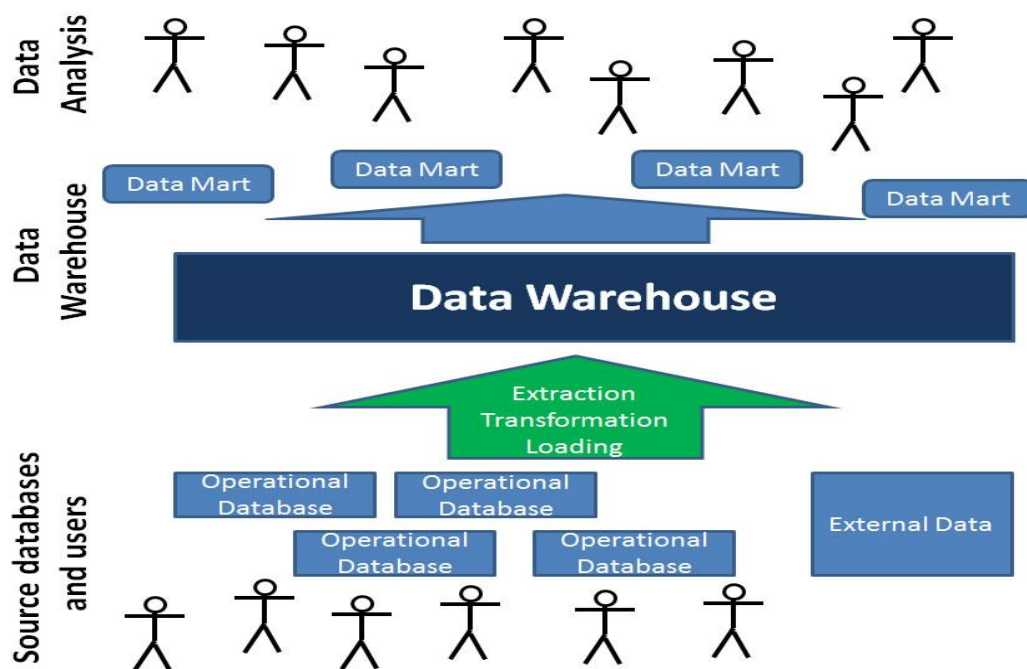


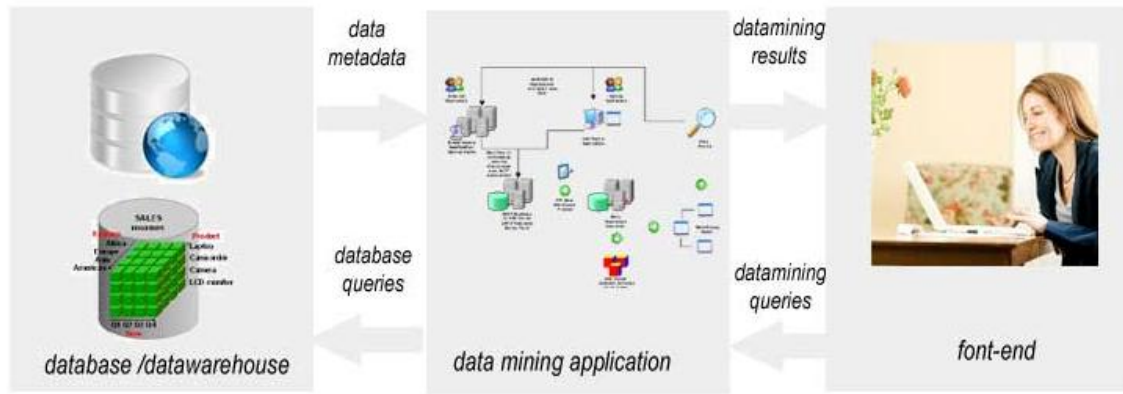
Figure 1. Architecture of Data Warehousing

- a. Data Sources (operational systems and flat files)
- b. Staging Area (where data sources go before the warehouse)
- c. Warehouse (metadata, summary data, and raw data)
- d. Data Marts (purchasing, sales, and inventory)
- e. Users (analysis, reporting, and mining)

## 3. ARCHITECTURE OF DATA MINING

DM is described as a process of discover or extracting interesting knowledge from large amounts of data stored in multiple data sources such as file systems, databases, data warehouses etc [4]. This knowledge contributes a lot of benefits to business strategies, scientific, medical research, governments and individual. The architecture is shown in the Figure 2 and the steps involved in architecture are:

- a. Client gives the data
- b. Data assembling is done
- c. Data verification
- d. Task assignment by team leader to employees
- e. Finally data is dispatched



**Figure 2.** Architecture of Data Mining

To best apply these advanced methods, they must be fully integrated with a DW as well as flexible interactive business analysis tools. Many DM tools at present function outside of the warehouse, requiring extra steps for extracting, importing, and analyzing the data.

#### 4. BANKING SERVICES

The quality assurance in data mining architecture is shown in the Figure 3.



**Figure 3.** Architecture for Quality Assurance in Data Warehousing

a. *Capital markets services* - underwriting liability and equity, assist company deals, and restructure liability into structured finance artifacts.

b. *Private banking* - private banks provide banking services entirely to high net worth individuals.

c. *Brokerage services* - facilitating the buying and selling of financial securities between a consumer and a vendor.

##### A. Foreign exchange

a. *Currency exchange* - where clients can buy and sell overseas currency banknotes.

b. *Wire transfer* - where clients can send funds to global banks abroad.

c. *Allowance* - where client those are immigrant workers send money back to their home country.

#### 5. FINANCIAL AND INVESTMENT SERVICES

a. *Asset administration* - the word usually given to describe companies which run collective asset funds.

b. Hedge fund administration - Hedge funds often employ the services of "prime brokerage" divisions at major investment banks to execute their trades.

c. Custody services - the safe-keeping and processing of the world's securities trades and servicing the associated portfolios.

The following services are obtained by the user in the financial system.

- a. Bank cards.
- b. Credit card machine services.
- c. Advisory services.
- d. Private equity.
- e. Venture capital.
- f. Financial market utilities.
- g. Debt resolution.

## 6. CENTRALIZED INFRASTRUCTURE

Integration using a data center has helped a lot in improving and simplifying the network from the operations, user, cost perspective and administration perspectives are very effective. The integrated architecture is shown in the Figure 4.



**Figure 4.** Architecture for Integrated Infrastructure of banking

a. Decentralization is the early days of banking expertise. This meant that each division had its own server, banking applications and database.

b. Decentralized networks had their own set of difficulties in terms of the cost and administration fronts.

c. There came the need for an integrated database. The database had to be updated immediately irrespective of the branch of the customer.

d. when banks realized the cost advantages of exchanging the decentralized model to centralized data center architecture.

e. When one or two private division banks showed that it can be done efficiently, other banks began to show an interest they also began consolidating their DBs into a single large DB.

f. It is not just the data center which contributed to centralization. The network has also evolved into a unified IP network.

### 7. MINING FOR INTELLIGENCE

- a. Another significant issue banks face is in proper analysis of fiscal data to identify business prospective.
- b. CRM backing with your DW solution, streamlines the channels, but also tells you where to move. It tells you which client to focus on [3].
- c. A DW can help the bank get a single view of its data across dissimilar systems.
- d. DW solves these by integrating all the data into a general warehouse usually an RDBMS.
- e. DM can help you recognize models in the data you have.

DM will be the keystone of the competitive; if not the survival plan for the next millennium in banking. Banks which disregard it are giving away their future to opponents which today are busy mining [7, 8].

- a. Managing clients is one of the main issues that banks face in today's overexcited competitive environment.
- b. Before banks go for a CRM solution, they need to ask themselves one query: How well do they know their client?
- c. For that matter how many clients have moved in the past? Or how existing clients use diverse services that the bank provides.
- d. In banking, being the first to market alone is not sufficient since products can be copied very fast.
- e. This excerpt from DM: Know It all includes examples that show how DM algorithms and DSs work.

### 8. CONCLUSION

DWs are costly and difficult undertakings with the main purpose of supporting the organization. Development should be determined by the rules of efficient business, not the goals of technology people. Essential to success is the formulation of business targets and information necessities, the quality of the input data and the proper use of the potential of modern knowledge. As banking rivalry becomes more and more global and intense, banks have to fight more creatively and proactively to expand and maintain market shares.

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