



## A Data Mining Tool for Analysing the Performance of an Enterprise CRM System

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**Abstract**— Data Mining is a methodology which improves the quality, effectiveness and decision-making processes of a business. It discovers new information from unknown data which is further used for predicting the future. The applications of data mining are widely used in Forex companies with Customer relationship management. CRM is a strategy that combines information technology with marketing strategies. In this paper, linear regression algorithm is used for the prediction of selling and buying of currency pairs based on exchange rates. The predication results are compared with the actual and real world values in order to validate the results. CRM helps the organizations to make a interaction between their customers so that they can understand properly. In this thesis, CRM tool has been designed and implemented to predict currency exchange rates, future values and trends using data mining techniques and algorithm.

**Keywords**— Include at least 5 keywords or phrases

### I. INTRODUCTION

Data base mining or Data mining (DM) (formally termed Knowledge Discovery) is a process that aims to use old data to create new facts or records and to find new relationships previously not known even to those who are familiar with the data. In Traditional DBMS, a particular query is used to return a response for a particular database record; while in knowledge discovery, whatever is retrieved, that is not explicitly shown in the database. Rather, these are implicit patterns or records. Data Mining is a new technology which help companies to focus on the most important information in their data warehouses. It extracts hidden predictive information from large databases. Data Mining techniques can be applicable on every existing software and hardware platforms to increase the value of existing information resources, and can be coordinated with new products and systems as they can be put online. There are six types of models in data mining, which are used in various ways: time series, clustering, classification, regression, association and sequence discovery. Classifications and regression are used to predict future, while association and sequence discovery are used to depict behaviour. Clustering means making cluster of same data, it can be used to forecast data. Data Mining has many steps as they are shown in figure 1.1. The first step is selection of data that consists of historical or old data. After that the selection process data is cleaned and pre-processed. Cleaning process removes the discrepancies and pre-processing is responsible for relevant information. The next steps is data analysis, in this step the data is analysed to identify the patterns. In the last step data is finally validated with new data sets. The mining process continues until it's not extracts the meaningful knowledge or information. This data collection process makes the organization rich in data but poor in knowledge. The main purpose of data mining process is to transfer the data to the knowledge by extracting the data patterns from the data at hand by increasing its intrinsic values.

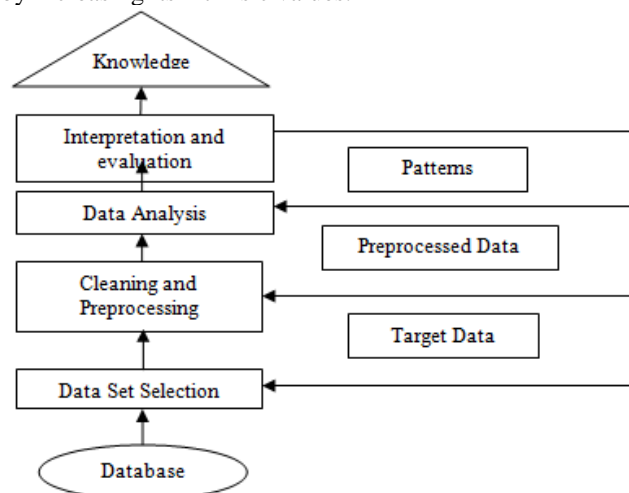


Figure 1: An overview of data mining process

## II. KNOWLEDGE DISCOVERY IN DATABASE

The KDD process or knowledge discovery in database refers to the process of searching knowledge or information in data and emphasis on various data mining methods. It is of interest to researchers in many areas like, pattern recognition, databases, knowledge acquisition for expert systems, artificial intelligence, machine learning, and data visualization. It refers to the process of discovering or finding useful knowledge from existing data. It makes decisions that which patterns are qualify as knowledge on the basis of evaluation. For this it uses data mining algorithms (methods) to extract the desired information according to the exact information of measures, using a database along with any required preprocessing, sub sampling , and transformations of that database.

### Step1--- Developing an understanding of the application domain

This is the first initial step. It prepares the plan for making decisions about transformation, algorithms, representation, etc. It includes developing an understanding of the application domain and relevant prior knowledge and identifying the goal of the KDD process from the customer's viewpoint.

### Step2--- Selecting and creating a target data set

After defining the goals, it is determined that what data should be used for knowledge discovery. This process selects a data set or data record for determining the discovery. It also finds that what data is available and what is required then it integrates all the data for knowledge discovery process. This is very important process because the Data mining learns and discovers from the available data.

### Step3--- Data cleaning and preprocessing

It includes data clearing , such as handling missing values and removal of noise. After cleaning, it collects the desired information to model, deciding on strategies for handling inappropriate data fields and records, and other changes as well as DBMS issues, such as data types, schema, and mapping of missing and unknown values.

### Step4---Data transformation

In this stage, the generation of better data for the data mining is prepared and developed. Depending on various tasks, it finds some useful features to represent data, and using reduction or transformation methods it reduces the effective number of variables under considerations.

### Step5--- Choosing the appropriate data mining task

This includes deciding the purpose of the model derived various data mining algorithm such as clustering, regression, summarization and classification. This step mostly depends on the knowledge discovery goals, and also on other previously mentioned steps. Data mining has two main goals: predictive and description. Prediction is used to detect future results or can say it is a supervised Data Mining, while descriptive Data Mining is unmanaged or unsupervised and includes visualization aspects of Data Mining.

### Step6--- Choosing the data mining algorithm

This stage includes selecting the specific method to be used for searching patterns, such as deciding which models and parameters may be suitable for data mining. Then it matches a particular mining method with the knowledge discovery process. Thus, this approach attempts to understand the conditions under which data mining algorithm is most appropriate.

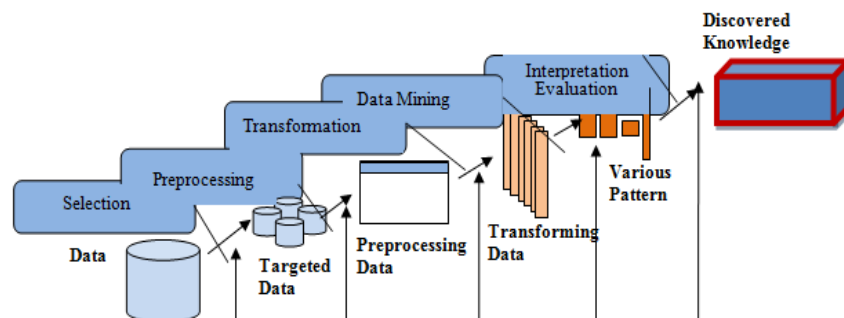


Figure 2: Steps of KDD

### Step7---Data Mining

In this step the implementation of the Data Mining algorithm is done. The algorithm might be need to provide work several times until a satisfactory result is obtained, once adjusting the algorithm's control parameters, such as the minimum number of parameters in a single leaf of a decision tree.

### Step8--- Interpretation or evaluation

In this stage, the mined patterns are evaluated and interpret with respect to the goals defined in the first step. Here the preprocessing steps with respect to their effect on the Data Mining algorithm results are considered. This step focuses on the comprehensibility and usefulness of the model. This mined knowledge is used for future purposes.

### Step9--- Uses of discovered/ mined knowledge

It includes incorporating the knowledge into another system for future action. The system becomes rich in knowledge and we can make changes in system through this knowledge and can measure the effectiveness of system.

## III. TECHNIQUES OF DATA MINING

Data mining has several major techniques and is used in many mining projects including classification, prediction, clustering, regression, association. These are explained as follows.

### (i) Association

In data mining techniques, association is the best known mining technique. Association technique is also known as relation technique because it discovers a pattern using relationship between items for a single transaction. Market basket analysis uses association technique to identify which set of goods or products are purchased usually by customers together. Association technique has many applications like application in marketing, in medicine sector, in customer segmentation, in e-commerce, in bioinformatics etc. In this technique, association rules are used to discover patterns.

### (ii) Classification algorithms

Classification is one of the classic techniques of data mining and it relates to machine learning. It is used to classify set of data in to predefined classes or groups. Classification technique mainly uses mathematical techniques such as linear programming, statistics, neural network and decision trees. Software is developed to learn that how data items are classified into groups. For example, classification can be applied in application that “given all records of customers who will buy milk, and who will bread.” In this case, we divide the records of customers into two groups. And then we can ask our data mining software to classify the customers into separate groups.

### (iii) Clustering

Clustering technique uses automatic technique for making useful clusters of objects having similar characteristics. Classification technique has predefined classes and objects are assigned to them, while clustering defines the classes and then give the objects to each class. The clustering technique uses iterative methods for grouping the cases in a dataset. These groupings are further used for explore, identify, and predicting future. For example, you can logically recognize that people who likes to eat milk with bread. This algorithm, can find other characteristics like some people likes to eat eggs with bread.

### (iv) Prediction

The prediction technique is used to discover relationship between dependent and independent variables. It can be used to predict future values for any organization using previous year data. Based on that, we can draw a regression curve to predict future profit.

### (v) Regression algorithm

Regression algorithm can be used to predict sales, any number, profit, any mortgage rates, temperature, square footage, house values or distance. For example, it could be used to predict the value of a sale based on loses, profit, previous year profit and loses and other factors.

Regression is also known as statistical technique and also one of the oldest models. It develops a mathematical formula by taking numerical datasets (Eg:  $x = a + by$ , here  $x$  is the dependant variable and  $y$  is the independent variable) that fits the data. If you want to predict the future behavior, put the data into the formula, you've got a predication. Regression technique has one limitation that is, it only work with continuous related data .

It determines the parameter values for a function that provides a set of data observations. This relationship can be expressed in symbols in the following equations. It has a continuous target ( $x$ ) as a function ( $F$ ) of one or more predictors ( $y_1, y_2, \dots, y_n$ ), a set of parameters ( $\theta_1, \theta_2, \dots, \theta_n$ ), and a measure of error ( $e$ ).  $x = F(y, \theta) + e \dots(1.1)$

### Types of regression methods

#### a) Linear regression

If we draw relationship between predicted value and target value on a graph, and it gives an approximated straight line then a linear regression technique is used. It is easy to visualize a single predictor. The following figure shows a linear regression with a single predictor:

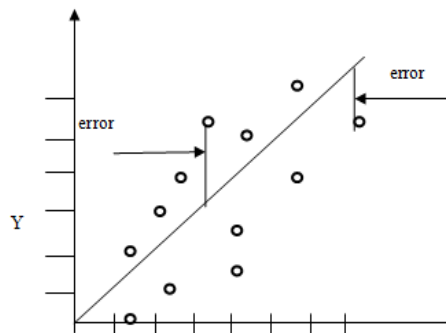


Figure 3: Linear Regression with a Single Predictor

The following equation gives a expression for linear regression with a single predictor.

$$y = \theta_2 x + \theta_1 + e \dots(1.2)$$

The parameters in simple linear regression with a single predictor are:

- The  $\theta_2$  represents the slope of the line and angle between regression line and data points.
- The  $\theta_1$  is the  $y$  intercept. It is a point where  $x=0$  and it crosses  $y$ .

### b) Multivariate Linear Regression

In multivariate linear regression two or more predictors ( $x_1, x_2, \dots, x_n$ ) used. In two-dimensional space regression line cannot be visualized properly because of multiple predictors. The line can be computed if we include parameters for each predictor in a single predictor linear regression.

$$y = \theta_1 + \theta_2 x_1 + \theta_3 x_2 + \dots + \theta_n x_n + e \quad \dots (1.3)$$

### c) Nonlinear Regression

A straight line always doesn't give an approximated values for the relationship  $x$  and  $y$ . In such case, a nonlinear regression technique is used. To make the relationship linear data is preprocessed. It defines  $y$  as a function of  $x$  using an equation. The following figure shows a nonlinear regression for  $x$  and  $y$ .

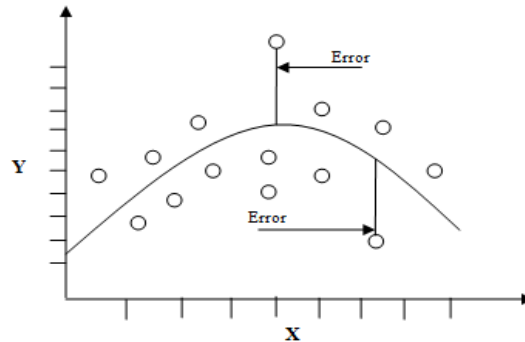


Figure 4: Nonlinear Regression with a single Predictor

### d) Multivariate Nonlinear Regression

In multivariate nonlinear regression two or more predictors ( $x_1, x_2, \dots, x_n$ ) are used. The nonlinear relationship cannot be visualized in two-dimensional space, when used with one or more predictors.

## IV. CUSTOMER RELATIONSHIP MANAGEMENT

Customer relationship management (CRM) is a process of making relationship between customers and their organization. CRM is plan of actions that combines marketing, sales and services so that customers can be better understood. CRM coordinates supply chain management and makes better design and marketing activities for understanding the customer.

Customer relationship management builds a relationship with customers for providing them better products and increases the customer services. It creates a database of customer purchases, their contacts and also creates a database of technical support. Through this database, the companies present a uniform face to customers, and also improves the quality of their relationship. CRM is a two-stage concept. The first stage builds customer basics for market strategy. It mainly focuses on customer needs and customer satisfaction. In the second stage customer relationship management develops a real time customer management and constantly increases their value proposition.

### 1.1.1 Types of CRM

There are three possible classifications of customer relationship management:

- a) Operational CRM
- b) Analytical CRM
- c) Collaborative CRM

#### a) Operational CRM:

It focuses on improving processes, automating processes and increasing the quality of processes which depends on customer support. It provides support to marketing sales and service. In operational CRM a data base is used to retrieve customer's information which was added earlier to customer's history. The goal of CRM system is to make the processes automated like selling servicing and marketing. The operational CRM systems are combined with Customer service and support, Sales force automation, Enterprise marketing automation for making the processes automated.

#### b) Analytical CRM:

Analytical CRM gathers data from many sources and then analyses the data to identify company's relationships with their customers. It supports company's back office operation and analysis the operations. Analytical CRM deals with operation and processes that not deal with clients. It analyses customer information and data.

#### c) Collaborative CRM:

The third form of CRM is Collaborative CRM. It is the best method of communication because it directly interacts with customers. Interaction can be done through email, automated voice response and web pages. It helps to improve services offered like marketing sales and technical support.

## V. FX MARKET

In this market the clients can buy, sell, exchange and invest on stock on currencies. The FX markets are integrated with various firms and organizations such as central banks, hedge funds, banks, retail forex brokers, investment management firms and investors. It is the largest financial market in the world because the currency markets are liquid and are very large. These currency markets are very efficient financial markets.

The currencies are traded in the foreign exchange market (FX). An individual can buy or sell any other countries' currencies when doing any business in that country. The investors can also invest stock in the market. They bid on any particular currency for either increases or decreases its value. When investors buy a currency pair and that pair increases its value, then a profit is made. The profit also generate when they sell a pair and that pair decreases its value. There are various currency pairs which traded in the FX market. The mostly traded currency pairs reported by Bank of International Settlements are the U.S. dollar (USD) against the euro (EUR), USD against the Japanese yen (JPY), USD against the British Sterling (GBP).

These pairs generate historical price data. This data can be recorded as daily, weekly, monthly and hourly etc. This can be easily available on the Internet through various links. Companies and individuals use this data for trading purposes in the FX market.

The following diagram has three iterations. Iteration 1 describes the overall architecture in which application is implemented. The Iteration 2 predicts the rates developed. Finally, last Iteration predicts the trends.

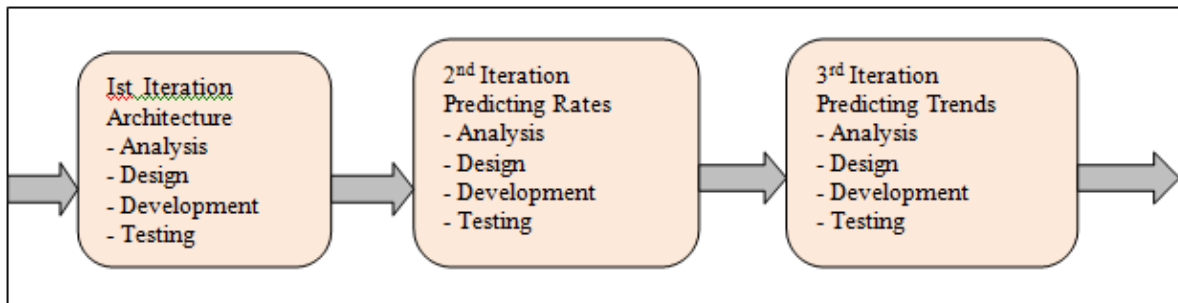


Figure 5: Iterations

#### (i) Predicting Currency Rates

The following four terms are used while predicting the rates.

1. We can predict new currency rate using previous data.
2. The data can be viewed in any textual form.
3. A list of old data and predicted values can be generated.
4. Finally, the accuracy of past data is tested to predict the new values.

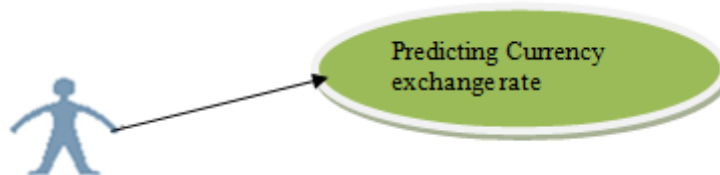


Figure 6: Predict Currency Exchange Rate Use Case

#### (ii) Predicting Currency Trends

When predict trends, the same four terms are used as in the prediction of rates use case.

1. We can predict new currency trend using previous data.
2. The data can be viewed in any textual form.
3. A list of old data and predicted values can be generated.
4. Finally, the accuracy of past data is tested to predict the new values.

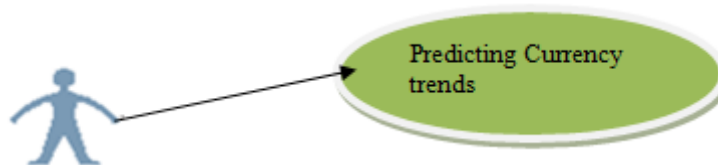


Figure 7: Predict Currency Trend Use Case

## VI. METHODOLOGY

The methodology has the following steps:

**1) Find the data and design parameter of software:** the information is gathered regarding data of registered clients of Forex companies in previous years from various magazines, journals, blogs, websites etc. The purpose of data collection is to maintain a record, to make decisions about important issues. It is collected to provide information regarding a specific topic.

**2) Select suitable parameter value:** After the collection of data, suitable parameter values are selected which is further used in a tool for prediction. For the prediction of number of Customer Registration and Switching of customers parameter values are used with various companies and Registration of same Customer with different companies.

**3) Store in database:** SQL server is used for storing the data for further use in prediction for annual and monthly Registration of customer and daily, monthly and annually exchange rates of currencies. The stored information will be

used for prediction future trend for customer of Forex Company wise. Data is organized in a way that it supports processes requiring this information. A database is an integrated collection of data such as records, files, and other objects. Microsoft SQL Server, MYSQL, Microsoft Access, FileMaker Pro, Oracle, dBase, FoxPro are the examples of database management systems.

**4) Implement Linear Regression Algorithm:** Linear Regression Algorithm is implemented by Microsoft visual studio C# language and also is used for designing the software. Microsoft integrated development environment (IDE) is used to develop console and graphical user interface applications along with Windows Forms applications and other applications which are further supported by Microsoft Windows, Windows CE, Windows Mobile, Microsoft Silver light, .NET Framework, and .NET Compact Framework. Microsoft Visual C# is a simple language which is used to develop applications by using .NET Framework. It inherits many features of C++ and Microsoft Visual Basic and adds further more features, such as extension methods. The Microsoft Visual Studio 2008 helps to make features easy to use and has many new wizards and enhancements which helps to improve productivity as a developer.

**a) Linear Regression Algorithm:** The multiple linear regression models are the most popular mathematical model for making predictions. It can be used in numerous data mining situations. Examples are : predicting the time to failure of equipment based on environment conditions, predicting staffing requirements at help desk using historical data, predicting expenditures on vacation travel based on historical frequent data.

**b) A Review of Multiple Linear Regression:** There is a dependent variable Y, which is a continuous random variable, and have number of independent variables,  $x_1, x_2, \dots, x_p$ . The value of a dependent variable is predicted using a linear function of independent variables. The independent variables which are also referred as predictor variables, regressors, are known quantities of prediction. The model is:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p + \varepsilon \quad (2.1)$$

where  $\varepsilon$  is the noise variable which is a distributed random variable whose mean is equal to zero and has a standard deviation  $\sigma$  whose value is not known. The values of the coefficients  $\beta_0, \beta_1, \beta_2, \dots, \beta_p$  are also not known. These (p+2) unknown values are estimated from available data.

The data has n rows of observations which give values  $y_i, x_{i1}, x_{i2}, \dots, x_{ip}; i=1, 2, \dots, n$ . The  $\beta$  coefficients are estimated to minimize the sum of squares of difference between predicted values. The sum of squared differences is given by

$$\sum_{i=1}^n (y_i - \beta_0 - \beta_1 x_{i1} - \beta_2 x_{i2} - \dots - \beta_p x_{ip})^2$$

The values of the coefficients that minimize the expression can be denoted by  $\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2, \dots, \hat{\beta}_p$ . These four estimates are called ordinary least squares (OLS) and are used for the unknown values. Once the estimates  $\beta_0, \beta_1, \beta_2, \dots, \beta_p$  have been computed, an unbiased estimate  $\hat{\sigma}^2$  for  $\sigma^2$  can be calculated using the formula:

$$\hat{\sigma}^2 = \frac{1}{n-p-1} \sum_{i=1}^n (y_i - \hat{\beta}_0 - \hat{\beta}_1 x_{i1} - \hat{\beta}_2 x_{i2} - \dots - \hat{\beta}_p x_{ip})^2$$

$$= \frac{\text{Sum of the residuals}}{\text{\#observations - \#coefficients}}$$

We can put the values  $\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2, \dots, \hat{\beta}_p$  in the linear regression model(1) for predicting the values of dependent values from independent values  $x_1, x_2, \dots, x_p$ . The predicted value Y can be calculated from the following equation:

$$Y = \hat{\beta}_0 + \hat{\beta}_1 x_1 + \hat{\beta}_2 x_2 + \dots + \hat{\beta}_p x_p$$

The predictions which are using this equation are the best predictions because they are equal to true values on the average. If the following assumptions are made the smallest expected error will be occurred compared to any unbiased estimates.

1. **Linearity:** In this, dependent variable's expected value is a linear function of independent variables, i.e.  $E(Y|x_1, x_2, \dots, x_p) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p$ .
2. **Independence:** The random variables  $\varepsilon_i$  are independent in all rows. Here  $\varepsilon_i$  is the "noise" variable for  $i=1, \dots, n$ .
3. **Unbiasness:** The  $\varepsilon_i$  has zero mean, i.e.,  $E(\varepsilon_i) = 0$  for  $i=1, 2, \dots, n$ .

## VII. WORK FLOW DIAGRAM AND ALGORITHMS

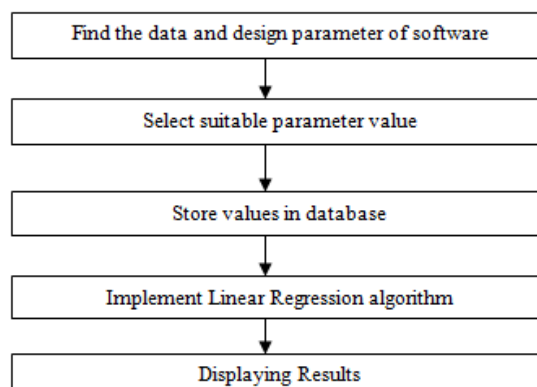


Figure: 8 Work Flow Diagram

**Algorithms**

**Algorithm(a): Fill real feed Procedure(s, i, , finpip[ ], deal[ ] deallst, finpiplst)**

**Step (1)** Set value real time value (actual value ) to array **finpip [ ]**  
 [finpip [ ] contains real time value of commodity ]

**Step (2)** Set value of client deal(client deal) to array **deal[ ]**  
 [deal[ ] contains low value of market ]

**Step (3)** Set i=0

**Step (4)** Repeat steps 5 and 6 While **finpip [i]!=NULL**

**Step (5)** Add items of finpip [i] to listbox **finpiplst**

**Step (6)** Set i=i+1

End While

**Step (7)** Set lbfinpip to i.

[lbfinpip contains current value of commodities ]

**Step (8)** Repeat steps 10 and 11 While low [i]!=NULL

**Step (9)** Add items of deallst [i] to listboxdeallst

**Step (10)** Set i=i+1

End While

**Step (11)** Set lbldeal to i

[lbldeal contain client deal on commodity]

**Step (13)** End

**Algorithm (b) : Finddeal(i,j, s[ ], answer[ ], DealFinal[ ],growthlst)**

**Step (1)** Set i=0

**Step(2)**Repeat steps 3 and 4 While **finpip [i]!=NULL && finpip[j] !=NULL**

**Step (3)** Go to Step 9 CALL finddeal(**finpip [ ],deal[ ]**)

**Step (4)** Set i=i+1

End While

**Step (8)** Set items of listbox LstAnswer and LstCAnswer to NULL.

**Step (9)** Function finddeal(G[ ]) G[i]=finpip[ ]-deal[ ]

Repeat steps 5 and 6 While G [i]!=NULL

**Step (10)** Add items of G [i] to listbox growthlst

**Step (11)** Set i=i+1

End While

**Step (12)** Set growthlst to i

[growthlst contain the profit on commidity ]

Endwhile

**Algorithm(c): Findtakeprofit(i,j, s[ ], answer[ ],finpro,takprot[ ],takprolst, reslst,ppro)**

**Step (1)** Set value real time value (actual value ) to array **takprot [ ]**  
 [takprot [ ] contains max profit value of commodity to be taken

**Step (2)** Repeat steps 3 and 4 While **takprot [i]!=NULL**

**Step (3)** Add items of takprot [i] to listbox **takprolst**

**Step (4)** Set i=i+1

End While

**Step (5)** Repeat steps 6 and 7 While **deal [i]!=NULL && deal[j] !=NULL**

**Step (6)** Go to Step 9 CALL finddeal(**deal[ ]**)

**Step (7)** Set i=i+1

End While

**Step (8)** Set items of listbox LstAnswer to NULL.

**Step (9)** Function finddeal(G[ ]) G[i]=finpip[ ]-deal[ ]

Repeat steps 5 and 6 While G [i]!=NULL

**Step (10)** Add items of G [i] to listbox reslst

```

    If(G[i]>takprot)
    {
        Set ppro=reslest
    }
    
```

**Step (11)** Set i=i+1

End While

**Step (12)** Set reslst to i

[reslst contain the profit on commidity ]

Endwhile

**Algorithm(d): Findstoploss(i,j, s[ ], answer[ ],finpro,stoprot[ ], stprolst, reslst , ppro)**

**Step (1)** Set value real time value (actual value ) to array **takprot [ ]**

[stoprot [ ] contains max loss on commodity to be taken

**Step (2)** Repeat steps 3 and 4 While **stoprot** [i]!=NULL  
**Step (3)** Add items of takprot [i] to listbox **stprolst**  
**Step (4)** Set i=i+1  
 End While  
**Step (5)** Repeat steps 6 and 7 While **deal** [i]!=NULL && **deal[j]** ]!=NULL  
**Step (6)** Go to Step 9 CALL finddeal(**deal**[ ])  
**Step (7)** Set i=i+1  
 End While  
**Step (8)** Set items of listbox LstAnswer to NULL.  
**Step (9)** Function finddeal(G[ ] G[i]=finpip[ ]-deal[ ]  
 Repeat steps 3 and 6 While G [i]!=NULL  
**Step (10)** Add items of G [i] to listbox reslst  
 If(G[i]> stoprot)  
 {  
 Set stprolst =reslest  
 }  
**Step (11)** Set i=i+1  
 End While  
**Step (12)** Set reslst to i  
 [reslst contain the profit on commidity ]  
 Endwhile

### VIII. RESULTS

The data is collected from various statistics to predict currency rates. The attributes are sorted according to the information gain. In this section, we report experimental results. The algorithm processes only categorical attributes. The datasets are appropriate to model for learning problem. Data from various countries are used to initialize the algorithm and to calculate the prediction. Figures below show the value for countries currency exchange rate.

The results are evaluated in two ways, one for prediction of currency exchange rates and other for prediction of trends. The first way tests the accuracy of rates and the second way tests the accuracy of trends. In this three currency pairs are used which mostly gives bigger turnover. The currency pairs are shown in the Table.

Table 1: Currencies used in Prediction

Currency Pair
EUR/USD
EUR/JPY
USD/JPY

The prediction of rates of three currencies shown in Table is tested using the Table parameters.

Table 2: Rates Parameters

Rates	From date	To date
1	06/06/2012	08/06/2012
2	12/09/2013	14/09/2013
3	21/12/2014	23/12/2014

There after the system is evaluated for the testing the Prediction of currency exchange rate.

#### Currency Exchange Rates Result Analysis

The difference between the actual value and the predicted value in percentage is shown in table.

Table 3: Percentage Difference between Actual and Predicted rate

Result	%
1	0.72
2	0.46
3	-0.15
4	1.98
5	-1.18
6	0.25
7	0.15
8	1.29
9	0.29
10	1.94



11	0.016
12	0.14
13	1.40
14	0.21
15	0.23
16	1.11
17	-1.01
18	1.24

## XI. CONCLUSION

The foreign exchange companies do not directly make interactions with its consumers, they depend on previous years data. There is no direct method to forecast future values in the Foreign exchange market. Each method has to be discovered. This project provides an approach to discover exchange rates and trends using data mining techniques. A linear regression algorithm is used to predict future values of a currency pair. The prediction tool predicts the exchange rate to obtain the higher rate. The more predictor variables used, more will be the accuracy. In this thesis future prediction of Foreign Currency Exchange Rate is done for the years 2012 to 2014 on the basis of data of previous year data using linear regression algorithm.

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