Financial Distress Prediction of a Company using Data Mining

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Abstract - *Data mining tools become important in finance and accounting. This paper analyses the classification and prediction is used for bankruptcy prediction, financial distress prediction, management fraud detection, credit risk estimation, and corporate performance prediction. The existing financial analysis model does not address the issue of Bankruptcy. Thus, an efficient financial analysis model should be generated to know about the financial distress of a company.*

Key Words: **Financial data, Bankruptcy, Data Mining, Z-score ,F-score etc.**

1. INTRODUCTION

Data mining tools become important in finance and accounting. The Classification and prediction is used for bankruptcy prediction, financial distress prediction, management fraud detection, credit risk estimation, and corporate performance prediction. Data mining is the practice of automatically searching large stores of data to discover patterns and trends that go beyond simple analysis. Data mining uses sophisticated mathematical algorithms to segment the data and evaluate the probability of future events. Data mining is also known as Knowledge Discovery in Data (KDD).

The key properties of data mining are:

- Automatic discovery of patterns

- Prediction of likely outcomes

- Creation of actionable information

- Focus on large data sets and data bases

1.1 The Data Mining Process

The process flow shows that a data mining project does not stop when a particular solution is deployed. The results of data mining trigger new business questions, which in turn can be used to develop more focused models.

1.2 Data mining applications for Finance

A huge amount of data is generated in online transactions, so the ability to identify the right information at the right time can mean the difference between gaining or losing millions of dollars:

- Increase customer loyalty by collecting and analysing customer behaviour data.
- Help banks predict customer behaviour and launch relevant services and products
- Discover hidden correlations between various financial indicators to detect suspicious activities with a high potential risk.
- Improve due diligence to speed alerts and support real-time decision-making
- Identify fraudulent or non-fraudulent actions by collecting historical data and turning it into valid and useful information.

2. Bankruptcy Prediction

Predicting bankruptcy is of great benefit to those who have some relations to a firm concerned, for bankruptcy is a final state of corporate failure. In the 21st Century, corporate bankruptcy in the world has reached an unprecedented level. It results in huge economic losses to companies, stockholders, employees, and customers, together with tremendous social and economic cost to the nation. Therefore, accurate prediction of bankruptcy has become an important issue in finance. Companies are strongly demanding explanations for the logic of prediction.
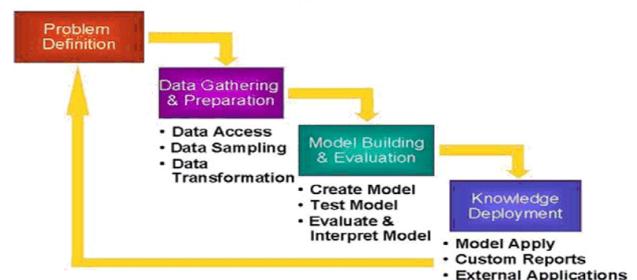

Fig -1: KDD process

The breakthrough bankruptcy prediction model was the Z - score model developed by Altman. The five - variable Z - score model using multiple discriminant analysis showed very strong predictive power. Since then, the discriminant analysis has been approved to be the most widely accepted and successful method in bankruptcy prediction literature.

In addition, numerous studies have tried to develop different bankruptcy prediction models by applying other data mining techniques including logistic regression analysis, genetic algorithms, decision trees, classification and regression trees (CART), and other statistical methods. Those

techniques can generally provide good interpretability of the prediction models.

In the past two decades, a number of studies have also applied neural network approach to bankruptcy prediction, most centring on the comparison of predictive performance of neural networks and other methodologies such as discriminant analysis and logic analysis. Some have reported that the performance of neural networks is slightly better than that of other techniques, but results are contradictory or inconclusive.

The existing financial analysis model does not address the issue of Bankruptcy. Thus, an efficient financial analysis model should be generated to know about the financial distress of a company.

The dramatic growth of the information available online and stored in enterprise databases has made data mining a critical task for enhancing knowledge management and, generally, for gaining insight to drive decision making. A significant source of this insight derives from the capability to identify hidden patterns and relationships in data.

Data mining drills the static data deeper and examines the historic business activities. Ad hoc reporting spotlights analysis of both. Thereby, the pattern and trends are tracked. Mining software spotlights the algorithms thereafter.

This way, unknown business strategies are identified. The deduction of current liabilities from current assets gives out working capital. Capital fuels a business to run. Extract the idea of how working capital is being utilized. If the current liabilities exceed current assets, the business can encounter bankruptcy.

Therefore, this working capital gives ideas of how the company's efficacies are performing and how much it gains in short interval. Operational efficiency can be achieved with the forecast that mined data provides. The way of achieving goals can be identified this way.

The proposed system for prediction of financial distress is F-Score system and if f score > -0.05 the company is considered to be healthy case and if not   f   score<=-0.05 Distressed.

The methodology's assumption is the willingness to make the process of data mining reliable and usable by people with few skills in the field but with a high degree of knowledge of the business.
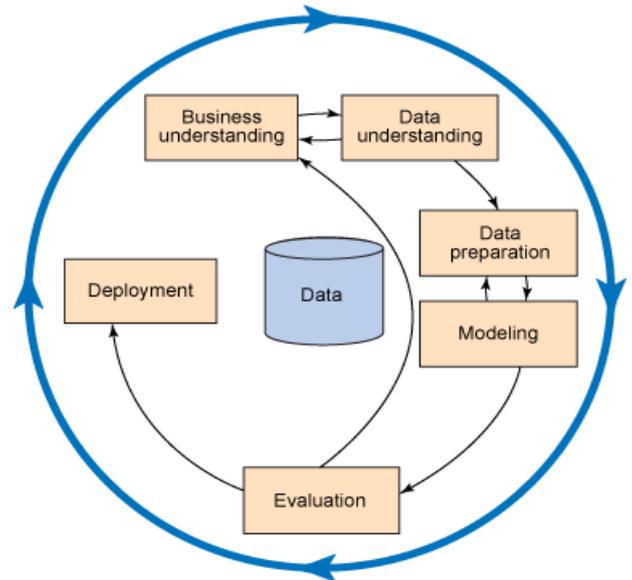

Fig -2: Methodology

The methodology provides a framework that includes six stages, which can be repeated as in a loop with the aim to review and refine the forecasting model:

- Business Understanding
- Data Understanding
- Data Preparation
- Modelling
- Evaluation
- Deployment

3. CONCLUSIONS

In this study we use financial data as inputs to the failure corporate prediction model using structured and heterogeneous information grouped by the company's financial statuses. Thus, using F – Score in Data mining financial distress of the companies is displayed.

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