Bankruptcy Predictive Analysis

1 Research Problem

How can we predict if the company is going to be bankrupt or facing any kind of financial difficulty?

2 Project Background

Bankruptcy or business failure can have a negative impact both on the enterprise itself and the global economy. Business practitioners, investors, governments, and academic researchers have long studied ways to identify the potential risk of business failure in order to reduce the economic loss caused by bankruptcy.

The prediction of bankruptcy is the practice of forecasting bankruptcy and different indicators of public firms' financial distress. It is a huge field for study in finance and accounting. The value of the field is partially due to the relevance of creditors and investors in determining the risk of a company going bankrupt. The quantity of analysis is also a feature of the availability of data: various accounting ratios that may suggest danger can be measured for public entities that went bankrupt or did not, and numerous other possible explanatory variables are also available. The field is therefore well-suited for evaluating increasingly complex, data-intensive approaches to forecasting. In short, bankruptcy prediction is a very important task for many related financial institutions.

The primary objective will be to develop a predictive model that will be robust, precise and successful in predicting corporate bankruptcy. Effective prediction of bankruptcy is crucial for making reasonable lending decisions by financial institutions. In order to determine the creditworthiness of prospective borrowers, many potential lenders use credit scoring models to help lenders select the factors that allow them to distinguish between good and bad credit risks, such as default or bankruptcy.

3 Data

For this project, we will use the data which was collected from the Taiwan Economic Journal 1 for the years 1999 – 2009. Company bankruptcy was de- fined based on the business regulations of the Taiwan Stock Exchange [2]. The dataset consists of 6819 Instances and 96 Attributes.

4 Prediction models

This project focuses on examining the discriminatory power obtained by combining different categories of financial ratios (FRs) and corporate governance indicators (CGIs) for bankruptcy prediction. To determine the best combination of FRs and CGIs, a real- world Taiwan dataset is used.[4] There are many common and well- known techniques which can be employed to develop prediction models, we have to select the precise method to accurately predict the analysis. In this project, five related techniques would be compared, namely support Naïve Bayes (NB) classifier, Logistic Regression, Decision Tree, XGBoost, Random Forest are some of the prediction models. We will be comparing these models to see the accuracy using testing methods called k-fold and f1 score.[3]

However, there might be a slight change in the selection of models with the development of the project tasks.

5 Deliverables

From financial statements of businesses, the predictor variables are gathered. In decision making, the most important financial ratios are often calculated. This may give time for administrators, creditors, and all other parties involved to take remedial action. In order to help management, refocus their resources, revalue their business strategy and reduce losses, construction models, which signify approaching financial failure, have therefore been an important part of corporate finance literature. Predicting the risk of corporate financial distress to help investors and creditors reveal any company's performance stability. This will serve valuable contribution to accurately predict bankruptcy.

References

[1] url: https://www.kaggle.com/fedesoriano/company-bankruptcy-prediction

[2] url: https://archive.ics.uci.edu/ml/datasets/Taiwanese+Bankruptcy+Prediction

[3] url: https://machinelearningmastery.com/k-fold-cross-validation/

[4] Liang, D., Lu, C.-C., Tsai, C.-F., and Shih, G.-A. (2016) *Financial Ratios and Corporate Governance Indicators in Bankruptcy Prediction: A Comprehensive Study*. European Journal of Operational Research, vol. 252, no. 2, pp. 561-572. https://www.sciencedirect.com/science/article/pii/S0377221716000412

[5] Qi Yu, Yoan Miche, Eric Séverin, Amaury Lendasse .-A. (2013) *Bankruptcy prediction using Extreme Learning Machine and financial expertise.* Neurocomputing. https://www.sciencedirect.com/science/article/pii/S0925231213010011

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