Company Bankruptcy Prediction and Analysis

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Introduction and Motivation:

Predicting and projecting financial issues in both public and private enterprises is known as bankruptcy prediction. In assessing a company's financial position and future prospects, predicting bankruptcy is crucial. Financial distress is a global phenomena that affects a wide range of industries.

Suppliers and retailers of a company always conduct credit transactions with it, and in order to make credit decisions, they must be entirely informed of the company's financial status. The capacity to effectively predict a company's financial troubles is critical for the company's many stakeholders. Due to the prevalence of bankruptcy, research has been conducted to identify various business pressures in order to aid investors in making prudent investment decisions.

Scope of the Project:

The ability to accurately estimate a company's financial performance is critical for many stakeholders when making key and consequential decisions about their relationship and engagement with the company.

Investors, as well as suppliers and retailers to the business, need to know if the company will go bankrupt.

To avoid major losses for banks and other credit lenders, credit lenders and investors must assess a company's financial insolvency risk before making an investment or extending credit.

Dataset Description:

The dataset contains a total of 6819 observations, including 6819 observations for each of our 96 features. The features are all numerical (int64 or float64). The data has no missing values (Nan). It is severely unbalanced because the total no of companies bankrupted are only 220 which is very less compared to 6599.

Methodology:

On the dataset, we evaluated and compared a number of outliers removal approaches and discovered that isolation forest provided the best results.

Then we used the method of stacking for forming a hybrid model using the K neighbours and Gaussian Naïve Bayes Model named **RMN algorithm**.

Stacking is a general procedure where a learner is trained to combine the individual learners. Here, the individual learners are called the first-level learners, while the combiner is called the second-level learner, or meta-learner.

Results:

Comparative Analysis of all models:

MODEL	ACCURACY
KNN	50%
Gaussian NB	52%
Random Forest	88%
Gradient Boost	92%
RMN Algorithm	99%
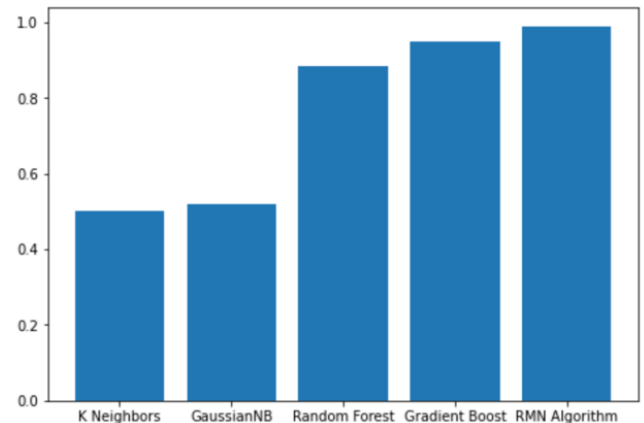

```
In [36]: accuracy_score

Out[36]: [0.5,
          0.5207564575645757,
          0.8842250922509225,
          0.9511070110701108,
          0.9910242968041134]
```

From the above table and graph, it is clear that the RMN algorithm gives the highest accuracy. Alone the K Neighbours model and Gaussian NB give accuracy of 50% but after stacking they form a hybrid model giving accuracy of 99% which is even more than the random forest and Gradient Boost models.

Github link:

https://github.com/mac25-git/Company-Bankruptcy-Prediction-and-Analysis.git

Conclusion:

We have developed a model which is used to predict the financial condition of a company using different economic variables of interest like operating gross margin, profit rate, sales, etc. This model is compared with other models and gives an accuracy more than them.

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