Bankruptcy prediction in Colombian case, using multilayer perceptron trained with memetic algorithm

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***Abstract*—Literature about Bankruptcy prediction is still incipient, therefore this work try to fill this gap by using machine learning and metaheuristics techniques to find an optimal set of weights in a MLP model.**

***Index Terms*—Machine learning, Bankruptcy, Metaheuristics, Evolutionary Algorithms, Local Search, Memetic algorithms, Neural Networks, Multilayer Perceptron.**

I. Results

Data we retrieved the information of SuperIntendencia de Sociedades (in Spanish) for the period 2016-2019.

Classifying as bankrupt all firms that enter a process of insolvency.

We consider all firms during the period 2016-2019 that enter that one year to another in a process, and uses financial ratios of one and two year before of the occurrence of the event, for instance firms that have a normal state in 2018 and in 2019 enter in a process uses the financial ratios of 2018 and 2017 to model the event in 2019.

Were consider all satements that were presented in the december of each year, also were eliminated from data all events in 2016 of datasets to eliminated biased of financial ratios.

According to the following table the number of events per year were:

According to the following Table 1:

Using shapiro-test was evaluated the normallity distribution of variables and T-test and kruskall wallis were carried out were performed to test if there is significative difference among bankrupt and no-bankrupt firms in one and two years.

1) Exclusion criteria: Were excluded from database those firms that are in preoperative process and firms that enter in default the initial base.

II. Benchmark

The models used to benchmark were: Decision tree, logistic regression and multilayer perceptron.

III. Appendix

The financial ratios used were:

- new