CS514

Applied Artificial Intelligence

Fuzzy JESS Project

Submitted By

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Due Date: 15th February 2019

Can I Give a Loan to this Company?

A Fuzzy JESS Project

Description of Domain:

Determining credit worthiness of a loan applicant is an important decision making process for banks. Interests from the credits are one of the primary source of revenue for bank. However this involves high risk wherein if the loan is given out to a wrong customer, it could end up in a bad loan. Banks are always looking to minimize the percentage of bank loans.

When the loan applicant is an individual the parameters to decide creditworthiness is fairly simple. However, when the banks have to handout loans to corporates and companies, the deciding factors are lot more complex. Macroeconomic parameters become relevant, and subtle features have to be taken into account. This is why this project tries to identify few such features, determine the creditworthiness of a company in simple terms.

Features and Rules Used:

Total of 31 rules have been constructed using the below features.

Current Ratio (Name: f_curRatio Type: Float): This is the ratio between current assets and current liabilities of the company. Current assets and liabilities are usually payable within one year. Some examples of assets are buildings, cash on deposit, Inventory, Guaranteed Investment Accounts, Stocks and Bonds and etc. Some examples of liabilities are loans payable, account overdrafts, income taxes payable, production cost payable, employee salaries payable etc.

Quick Ratio (Name: f_qckRatio Type: Float): Even though inventory of a company is a value of current asset, it can get difficult to turn quickly, particularly when the business of the company is bad. So it is wise to take inventory out of the asset equation and consider only cash, marketable securities and accounts receivable. Such a modified asset equation with current liabilities is quick ratio.

Debt-to-Equity Ratio Growth Percentage (Name: f_deRatio Type: Integer): This is the ratio between how much of the company is financed with debt to the amount financed with equity.

Receivables Turnover(Name: n_rtTime Type: Integer): The total amount of receivables divided by the total amount of collections for specific time is the receivables turn. We have considered 1 month as the time period.

Interest Coverage Ratio (Name: f_icRatio Type: Float): Divide the total operating cash flow, which is earnings before taxes and interest, by the total amount of interest paid on business loans.

Product Base (Name: n_prodBase Type: Integer): Number of different products produced by the company

Number of Years in Business (Name: n_years Type: Integer): The number of operating years of the bank

Creditworthiness of the Stakeholders (Name: av_credWorth Type: Low Medium High): Credit Score of the founders/board members of the company

Overall Demand of the Industry (Name: av_demand Type: Low Medium High): Overall revenue the sector/industry is producing, and the trend of demand for the products from the industry

Number of Competitors (Name: n_comp Type: Integer): Number of competitors in the industry for the competing product

(Fuzzy) Number of Legal Proceedings (Name: n_legal Type: Integer): Number of legal proceedings that are currently underway in the court of law

(Fuzzy) Total Industry Turnover (Name: n_indTurnOver Type: Integer): Check if the industry turnover is high, medium or low

(Fuzzy) Stock Health of the Company (Name: n_stHealth Type: Integer): Determine the performance of the stocks of the company

(Fuzzy) Employee Happiness in the Company (Name: n_empHappiness Type: Integer): Determine the overall employee satisfaction in the company

(Fuzzy) Number of Banks willing to offer Loans (Name: n_empHappiness Type: Integer): The total number of banks willing to give loans determines the financial image of the company.

Test Case 1:

```
;Get User Input
(assert (Company_Credit_Applicant (company_name "abc_company")
                (n_years 1) (n_rtTime 20) (n_comp 20) (n_prodBase 1) (n_legal 1) (n_indTurnOver 900000)
               (n_stHealth 8) (n_empHappiness 10) (n_banks 9) (av_credWorth Low) (av_demand Medium)
        (f_curRatio 1) (f_qckRatio 1)  (f_deRatio 1)  (f_icRatio 1)))
(run)
```

Test Case 2:

```
;Get User Input
(assert (Company_Credit_Applicant (company_name "abc_company")
                (n_years 3) (n_rtTime 30) (n_comp 6) (n_prodBase 5) (n_legal 1) (n_indTurnOver 900000)
        (n_stHealth 8) (n_empHappiness 10) (n_banks 9)
        (av_credWorth Medium)  (av_demand High)
        (f_curRatio 2.7) (f_qckRatio 2.1)  (f_deRatio 15)  (f_icRatio 3.3)))
(run)
```