



Evaluation of Neural Network and Logit models for classification of Default in a Honduran Bank



Walter Jeremías López Flores

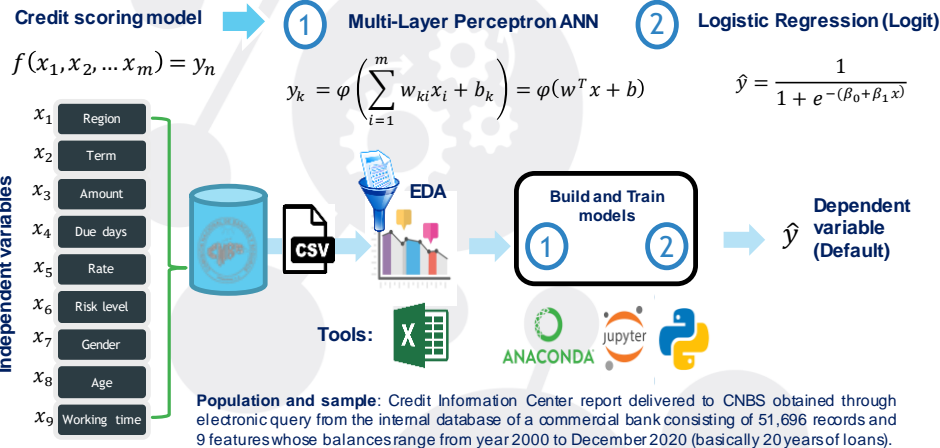
Facultad de Postgrado, Universidad Tecnológica Centroamericana, UNITEC, San Pedro Sula, Honduras

E-147 Original

Banks have a wealth of data about their borrowers that can be used to predict the likelihood that borrowers will default on their loans. The evaluation of this type of risk is based on the probability that the borrower fails to comply with its obligations, a situation that in financial jargon is called default. The purpose was to evaluate the performance of Artificial Neural Networks (ANN) as modern techniques to classify the risk of default against the traditional Logit statistical method using a Honduran bank as a case study.

INTRODUCTION

METHODS



CONCLUSIONS

The ANN outperformed the Logit method when the data is unbalanced. However, it was observed that when SMOTE oversampling was applied it slightly improves the performance of the MLP networks, but the Logit method indeed performed substantially better, but didn't reach the MLP's metrics: accuracy of 99.16%, precision of 99.47%, sensitivity of 99.59%, specificity of 95.48 %, F1-score of 99.53% and ROC and PR curves with AUC of 98.68% and 97.69% respectively.

RESULTS

Table 1. Summary of results from Logit models

Resulting model params	1: base model	2: base + risk level	3: base + due days
Pseudo-R ²	-0.031	0.230	0.888
AIC	18,331.11	13,692.05	2,010.18
BIC	18,388.46	13,757.59	2,075.72
Log-Likelihood	-9,158.6	-6,838.0	-997.09
Coefficients (p-value)			
Term	-1.0197 (0.0000)	-0.7542 (0.0000)	-3.3273 (0.0000)
Amount	3.2866 (0.0000)	-1.3564 (0.2587)	2.3767 (0.4810)
Rate	-3.9312 (0.0000)	-4.9894 (0.0000)	-13.4547 (0.0000)
Working time	-2.2249 (0.0000)	-2.2045 (0.0000)	-3.4216 (0.0000)
Age	-0.7501 (0.0000)	-1.3624 (0.0000)	-1.1699 (0.0015)
Region	0.4539 (0.0000)	-0.3652 (0.0000)	-0.7861 (0.0000)
Gender	-0.3038 (0.0000)	0.3206 (0.0000)	-0.3458 (0.0058)
Risk level		5.2807 (0.0000)	
Due days			360.4526 (0.0000)

Contact: walter.lopez@unitec.edu.hn

Conflict of interest: none

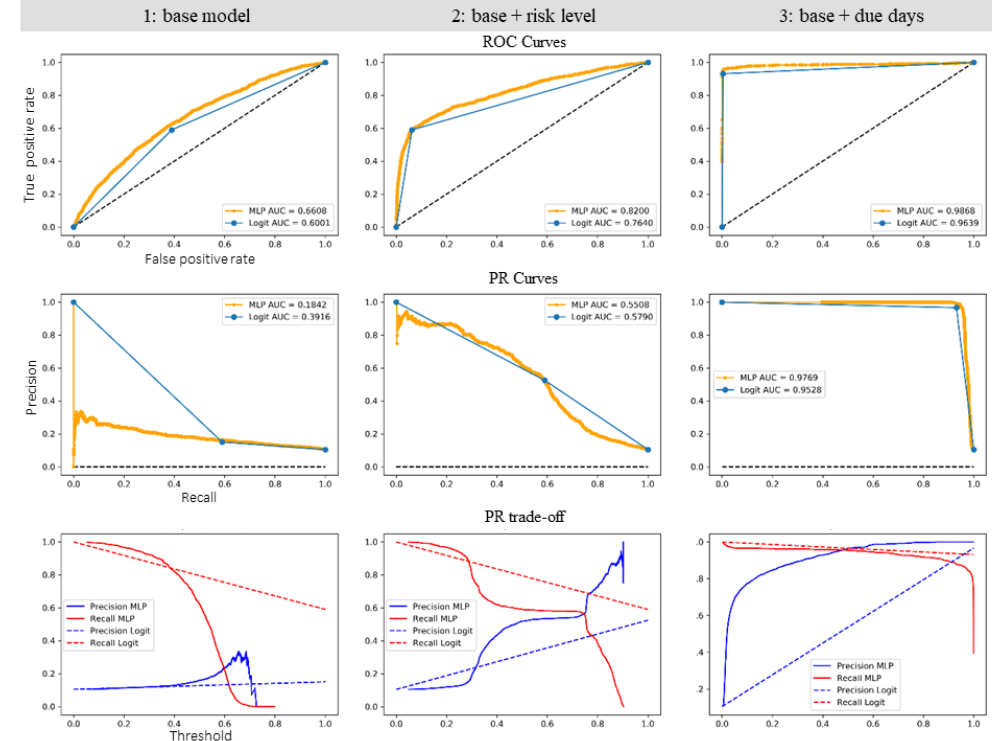


Figure 1. ROC and PR curves of both models after SMOTE oversampling