

Application of Deep Neural Networks to Assess Corporate Credit Rating

Authors : Parisa Golbayani, Dan Wang, Ionut, Florescu

Abstract : In this work we implement machine learning techniques to financial statement reports in order to assess company's credit rating. Specifically, the work analyzes the performance of four neural network architectures (MLP, CNN, CNN2D, LSTM) in predicting corporate credit rating as issued by Standard and Poor's. The paper focuses on companies from the energy, financial, and healthcare sectors in the US. The goal of this analysis is to improve application of machine learning algorithms to credit assessment. To accomplish this, the study investigates three questions. First, we investigate if the algorithms perform better when using a selected subset of important features or whether better performance is obtained by allowing the algorithms to select features themselves. Second, we address the temporal aspect inherent in financial data and study whether it is important for the results obtained by a machine learning algorithm. Third, we aim to answer if one of the four particular neural network architectures considered consistently outperforms the others, and if so under which conditions. This work frames the problem as several case studies to answer these questions and analyze the results using ANOVA and multiple comparison testing procedures.

Keywords : convolutional neural network, long short term memory, multilayer perceptron, credit rating

Conference Title : ICCRMA 2021 : International Conference on Credit Risk Modeling and Analysis

Conference Location : Tokyo, Japan

Conference Dates : July 22-23, 2021