Deep Momentum Stock Price Predictions

# Background and Objectives

Machine Learning with non-linear methods can prove to be very effective in explaining asset price behavior. Gu et. al show that regression trees and neural network approaches have promising results when an empirical study was done on US Equities [1]. Most empirical asset pricing studies tend to focus on the US market as that offers the longest history of stock prices but Olson and Mossman attempted a similar study on Canadian Equities comparing Neural Networks and Ordinary Least Squares and Logit [2]. This study compares neural network forecasts of one-year-ahead Canadian stock returns with the forecasts obtained using ordinary least squares (OLS) and logistic regression (logit) techniques. The input data are 61 accounting ratios for 2352 Canadian companies over the period 1976–1993. Therefore, an analysis using the alternative techniques mentioned in [1] which would include regression trees, dimensionality reduction techniques as well as neural networks with a variation in the hyperparameters such as the number of hidden layers would be valuable to replicate on the Canadian Equities market. Furthermore, as [2] was conducted in 2003 and was done using different accounting ratios, it would be interesting to explore some of the characteristics used in [1] on updated and more recent market data.

# Methodology

This project/paper will focus on the Canadian Equities Market initially focusing on the S&P TSX composite and build 20-30 years of history. Out of the possible 94 characteristics used in [1], 15-20 of the characteristics will be chosen varying between price data and accounting ratios applying all the methods mentioned in the paper (a mixture of linear modeling, dimensionality reduction, trees and neural network approaches).

# Timeline

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| Date | Milestone |
| Feb -> March | Build characteristics and complete data preparation |
| March -> April | Build testing framework and determine which off the shelf implementations can be used for regression tree and DNN |
| April->June | Continue Analysis, and if successful attempt to expand to all Canadian equities |
| June->August | Write report for MRP |

# References

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| [1] | S. a. K. B. T. a. X. D. Gu, "Empirical Asset Pricing via Machine Learning," Chicago Booth Research Paper , vol. 18, no. 04, 2018. |
| [2] | D. Olson and C. Mossman, "Neural network forecasts of Canadian stock returns using accounting ratios," International Journal of Forecasting, vol. 19, no. 3, pp. 453-465, 2003. |