Chapter 14
A Prescriptive Stock Market Investment Strategy for the Restaurant Industry using an Artificial Neural Network Methodology

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ABSTRACT

Stock price forecasting is a classic problem facing analysts. Forecasting models have been developed for predicting individual stocks and stock indices around the world and in numerous industries. According to a literature review, these models have yet to be applied to the restaurant industry. Strategies for forecasting typically include fundamental and technical variables. In this research, fundamental and technical inputs were combined into an artificial neural network (ANN) stock prediction model for the restaurant industry. Models were designed to forecast 1 week, 4 weeks, and 13 weeks into the future. The model performed better than the benchmark methods, which included, an analyst prediction, multiple linear regression, trading, and Buy and Hold trading strategies. The prediction accuracy of the ANN methodology presented reached accuracy performance measures as high as 60%. The model also shown resiliency over the housing crisis in 2008.

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INTRODUCTION

Predicting the stock market trend is a very difficult task. The volatile behavior of the stock market causes it to suddenly rise and fall without much discernable pattern to the point that many still argue that it cannot be predicted. Mandelbrot (1997) argues that the stock market moves with, "wild randomness exemplified by distributions with infinite variance" and cannot be more accurately predicted by "inventing better statistical methods." This conclusion partially illustrates the opposition to the possibility of stock price prediction. Something that varies so wildly is exceedingly difficult to analyze and predict (Chenoweth & Obradović, 1996).

The volatile behavior exhibited by the stock market make the time series of the stock prices a non-linear series. Measures have been taken to try to remove some of the volatility of the stock market, making it more stable and predictable. Stock market indices reduce some of the volatile behavior of the stock market by grouping a large number of stocks together into one number. The S&P 500 Index includes 500 of the largest companies in the United States equities market. Even an index such as the S&P 500 has non-linear behavior, as demonstrated by Figure 1, where the index for the past 10 years is plotted.

Predicting individual stocks is significantly more difficult than predicting stock indices. They tend to follow stock market indices loosely, but exhibit much more volatility. For example, Figure 2 shows the S&P 500 (blue) and the McDonalds Corporation (red) over the past 10 years. However, by indexing hundreds of stocks into an index, the volatility of the stock market is partially removed.

Approaches to Stock Market Prediction

Analysts have employed a wide variety of tools to predict the stock market behavior in terms of different indices. They are vastly different in calculation and application. There are three well-known analysis methods for predicting the price movements, namely fundamental, technical, and behavioral.

Fundamental analysis uses data to determine the fundamental value of a company. The focus is on long-term prediction with the assumption that the stock price of a company will eventually move toward its fundamental value. A company that is undervalued by the stock market is considered a buy situation,

Figure 1. A snapshot of the S&P 500 index over the last ten years (Source: Yahoo! Finance)