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| **Explorations on predicting movements of securities** |

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**1 Project Overview**

Financial Mathematics is a very well researched domain lying on the intersection of applied Math, Finance, Data Science and Software Engineering. We will compare a large variety of models and architectures for neural networks and compare them against other machine learning and non-machine learning techniques, in order to identify a superior algorithm in a variety of asset prediction methods.

Some asset movements predictions techniques are: Using popular sentiment, trading a fund based on information and predictions of its composing assets, and rapidly trading derivatives leveraging changings on the underlying asset(s). If time and resources permit, we can explore the use of fundamental indictors to predict long term movements, among other things of interest, such as predicting the price-to-earnings ratio of a stock.

Work will be divided up such that each person will explore and evaluate one of the above ideas. Depending on personal interests and time, other ideas can be explored. Our goal is to purpose two methods to beat the performance of the S&P 500 index, one on an weekly time scale, and one on a multi-monthly time scale. Our self-imposed hard deadline for projects presentation and report are April 6th, and April 17th respectably. This means we have six weeks to do our individual parts, and one week to have them come together under our unifying theme of predicting the price of tradable (security) assets.

**Potential references**

[Text-based crude oil price forecasting](https://arxiv.org/abs/2002.02010),

[Detecting Changes in Asset Co-Movement Using the Autoencoder Reconstruction Ratio](https://arxiv.org/abs/2002.02008)

[A Bayesian regularized artificial neural network for stock market forecasting](https://www.sciencedirect.com/science/article/pii/S0957417413002509)

[Recession forecasting using Bayesian classification](https://www.sciencedirect.com/science/article/abs/pii/S0169207018301560)

[Support Tensor Machine for Financial Forecasting](https://ieeexplore.ieee.org/abstract/document/8683383)