
GPU Optimized Machine Learning Algorithms for Low-Volatility Stock Portfolio Options

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1 INTRODUCTION

This project is a hybrid construction between economics, finance and computer science. We seek to identify characteristics of low volatility equities while attempt to forecast if the equities stay within the realm of profit for specific options strategies. While volatility and value and positively correlated, given the black scholaes formula, we seek to look only for low volatility strategies as this gives us a cheaper and more reliable approach for looking at applications to finance as a whole.

After we identify these low volatility equities in one of five time horizons (3 months, 6 months, 1

year, 2 year and 5 year) we look at numerous machine learning algorithms and see which ones are most adept at identifying the desired outcome for low volatility. We will be using a combination of algorithms then present the most compelling algorithms comparing the results to one another. This will allow us to gauge performance from a run time perspective and an accuracy perspective. Traditional metrics for machine learning such as confusion matrices will serve as a litmus test to determine how our algorithms will perform in real world scenarios.

Our goal is to see how well these algorithms perform, select the best algorithm that performs the most accurate under our testing set then to see how we can increase the performance of our algorithms by porting them to GPUs. We will use a combination of leveragable packages through R and CUDA. In the end we seek to find performance gains and accurate predictors for a equities while displaying useful real world performance. Future implications for this work can be to limit negative market exposure or to dynamically craft baskets for clients that want particular exposure to companies in a specific sector but at a quantifiable risk profile. In order to provide validity to our testing methods we divide our data into two separate categories.

2 METHODOLOGY AND APPROACH

3 LITERATURE REVIEW

4 GPU RATIONALE

5 KEYWORDS

6 ADDITIONAL