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Project Proposal

Description:

In our project, we will explore different approaches to apply machine learning principles and algorithms to the financial world. There exist technical indicators traditionally used by analysts to evaluate and predict market and equity performance, as they "can provide a unique perspective on the strength and direction of the underlying price action". Feature extraction could be used to determine relevant indicators while identifying irrelevant and redundant indicators. Different implementations of algorithms based on these indicators could be used to predict performance of individual equities, sectors, or overall markets. They could also be used to classify and identify the correlation and interdependencies between equities, sectors, and markets. Our goal is to implement these various approaches to determine their efficacy as enablers to financial analysis.

The biggest obstacle we face is finding relevant data and ways to accurately test our implementations. This being said, below are extensive datasets on stock market pricing and volume data that will serve as the basis in generating technical indicator features to implement in our machine learning algorithms. From this project we hope to deepen our understanding of the usage cases for applying specific machine learning algorithms as well as expanding upon our technical analysis of the stock market and which indicators play a role in successful market analysis.

Datasets:

Huge Stock Market Data:
A day-by-day dataset consisting of the: Open, High, Low, Close, Volume of stock market data
https://www.kaggle.com/borismarjanovic/price-volume-data-for-all-us-stocks-etfs

Quantopian/Ziplie API:
An API that offers minute-by-minute financial data of equities
https://github.com/quantopian/zipline

References:
Information on technical analysis indicators for the stock market:
http://stockcharts.com/school/doku.php?id=chart_school

Financial signal processing and **machine learning**
by Akansu, Ali N., 1958; Kulkarni, Sanjeev; Malioutov, Dmitry

Research Papers:
https://arxiv.org/archive/q-fin