Comparison of Sector Performance in Differently Weighted Portfolios

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Our Initial Approach

- Choose a single stock from each of the 11 stock sectors to represent its corresponding sector in an evenly weighted portfolio of all 11 stocks(Control Portfolio)
- Create 11 new portfolios comprised of the same stocks, but with a single stock weighted higher, while the other 10 stocks remain equal to each other. The new portfolios would then be named after the sector represented by the heavily weighted stock(for organization purposes)

Stocks we chose and the sector they represent

Technology Sector : Apple Inc

Financials Sector : JP Morgan Chase & Co

Consumer Services Sector : Meta Platforms Inc

Industrial Sector : Union Pacific Corp

Energy Sector : Exxon Mobil Corp

Utilities Sector : NextEra Energy Inc

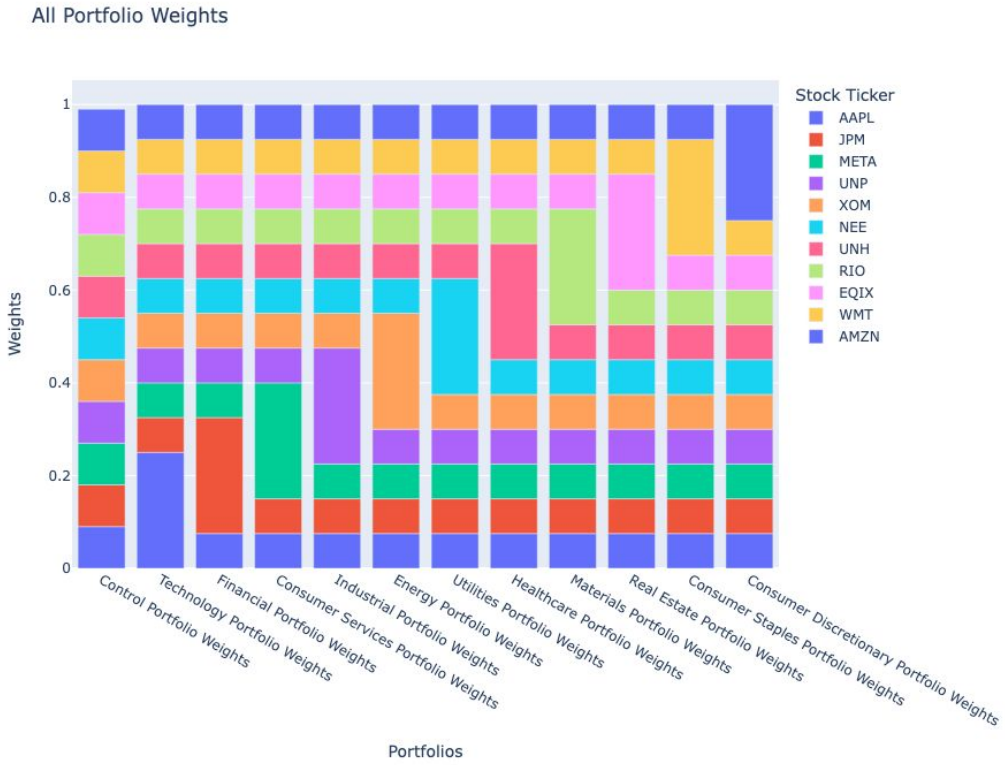
Healthcare Sector : UnitedHealth Group Inc

Materials Sector : Rio Tinto Ltd

Real Estate Sector : Equinix Inc

Consumer Staples Sector : Walmart Inc

Consumer Discretionary Sector : Amazon.com Inc



Visualization of Portfolio Weights

Our Hypothesis:
We hypothesized that the Tech portfolio would perform the best among all of the other prospective portfolios.

Our Questions

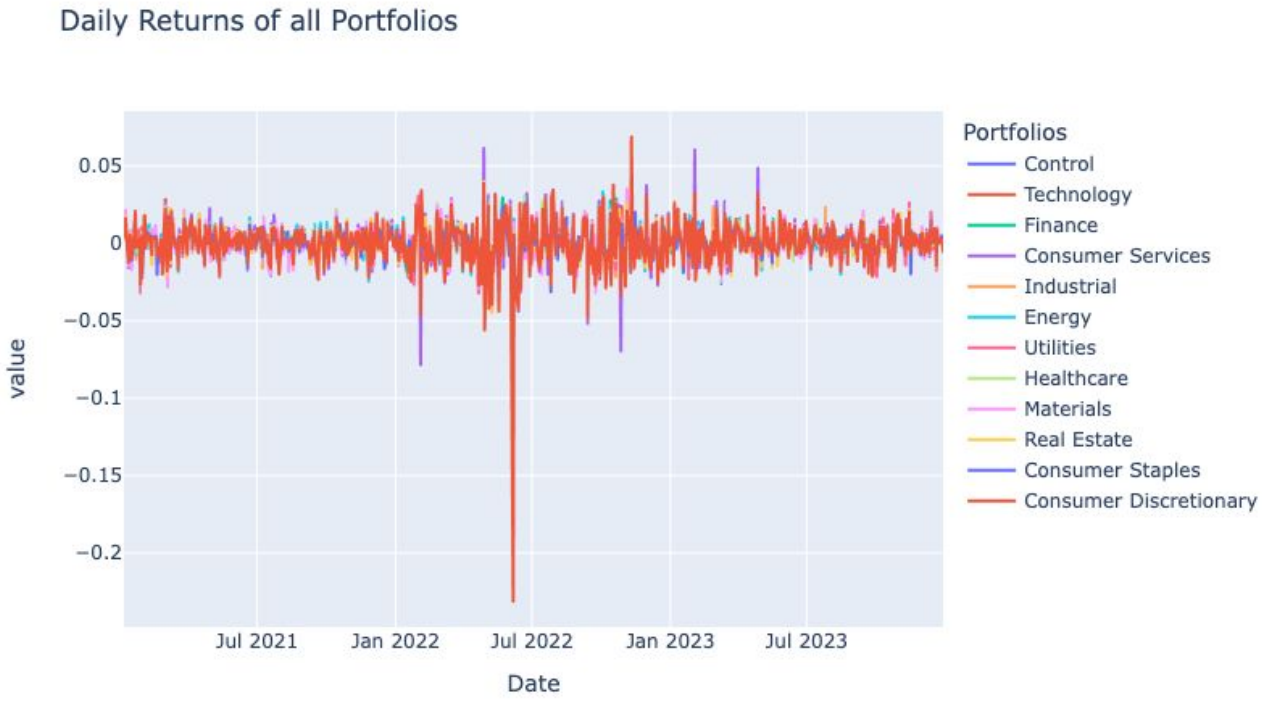
- Which Portfolio will have the highest potential gain?
- Which Portfolios will contend for the highest potential gains?
- After consulting our data, which stock/portfolio was the most volatile?
- Is there an evident outlier in the data, if so what caused this outlier?
- What difficulties could be/were encountered during the data analysis process?

Libraries Used

- pandas
- numpy
- dotenv
- alpaca_trade_api
- hvPlot/HoloViews
- **New Library:** Plotly - A Python graphing library that makes interactive, publication-quality graphs.

Imports & API Data Extraction

Historical Analysis

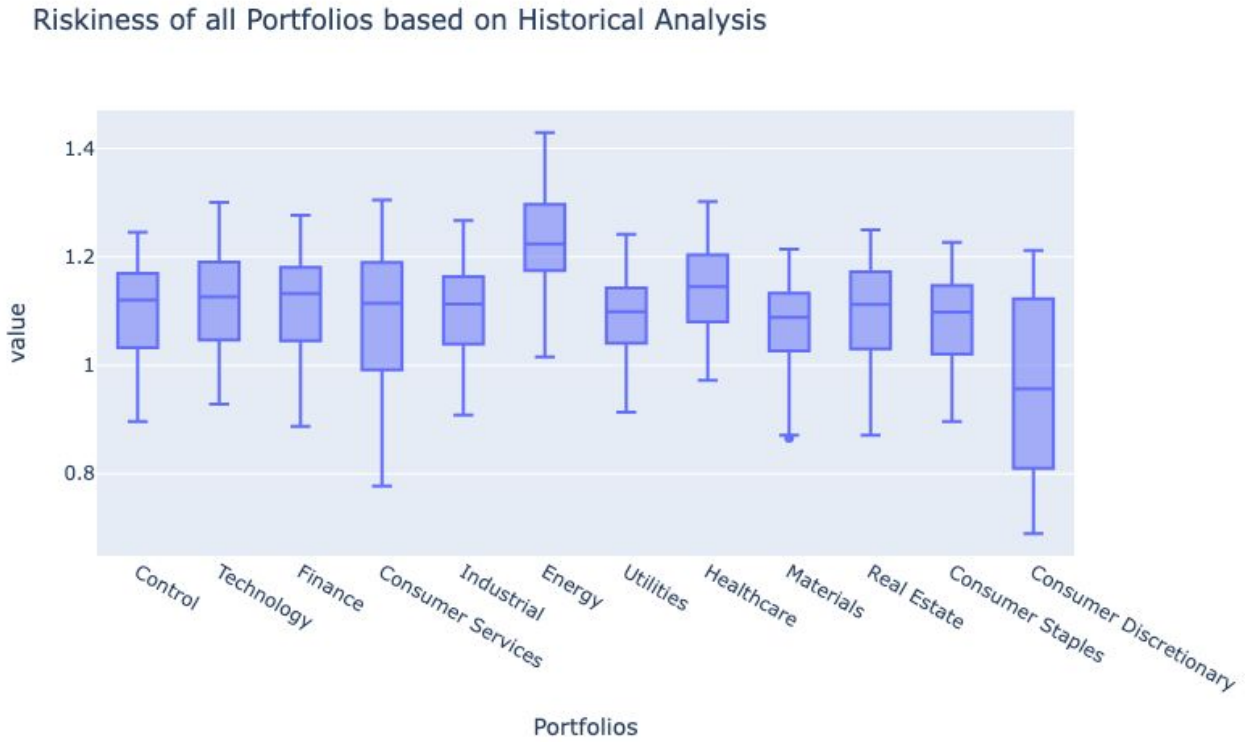


3 Year Historical Daily Returns of Each Portfolio Figure

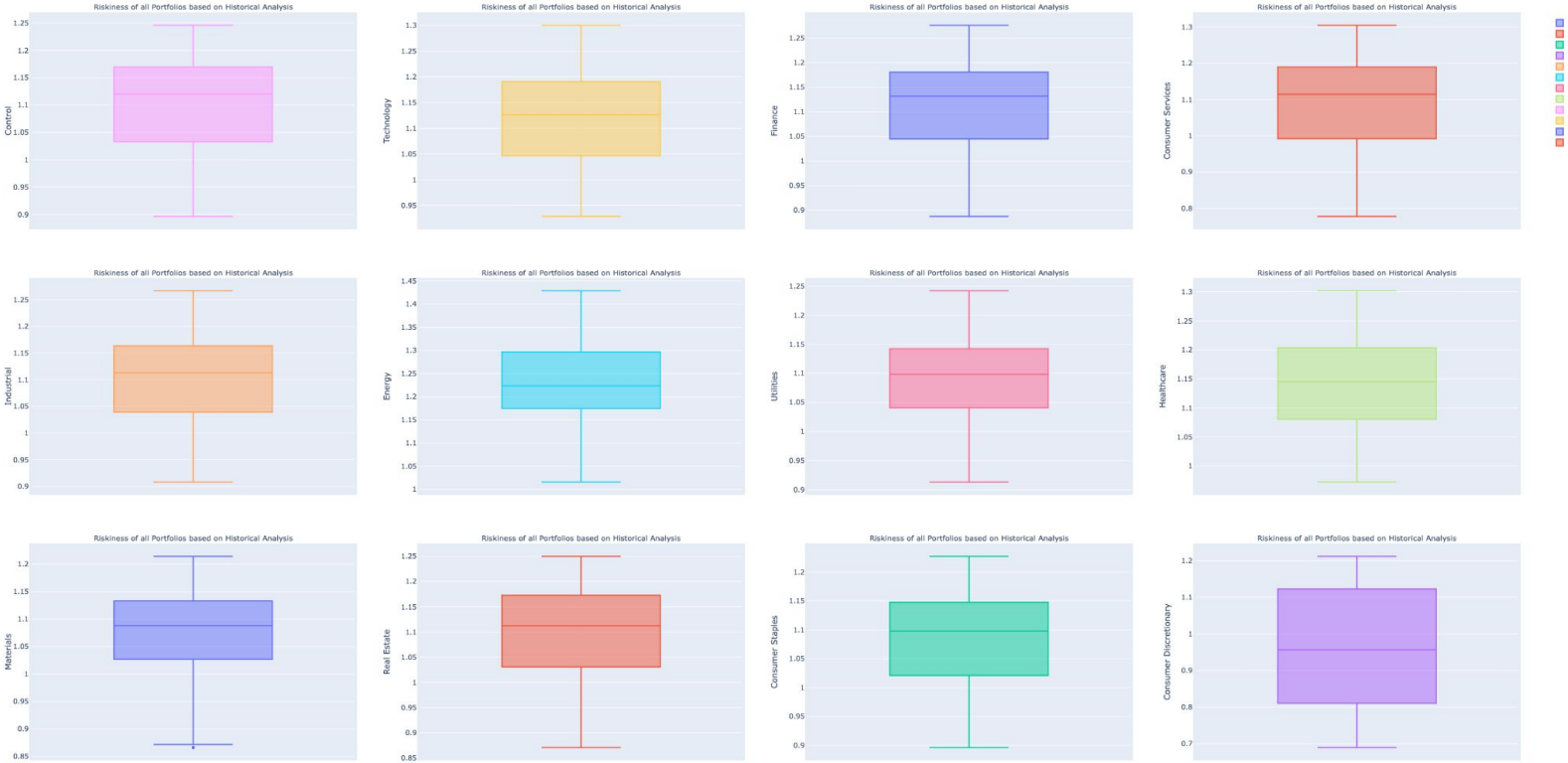
3 Year Historical Cumulative Returns of Each Portfolio Figure

3 Year Historical Value of Each Portfolio with an Initial Investment of $20,000 Figure

Risk Analysis

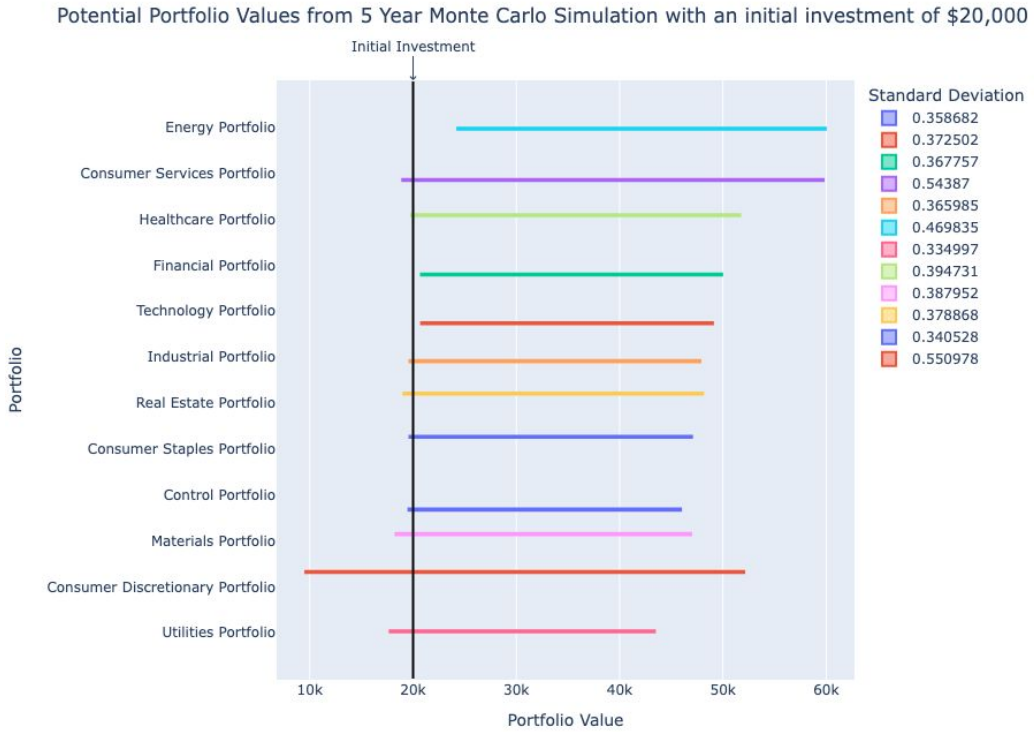


Box Plot displaying riskiness of portfolios based on cumulative returns



All Portfolios Separate

Monte Carlo Simulation



Potential Portfolio Value Ranges From 5 year MC Sim

Our Findings

- Energy maintained superior performance when compared to historical analysis.
- Preceding the Monte Carlo simulations we took the provided data and compared the data.,The consumer services portfolio competed fiercely with the eventual "winner" of the analysis, Energy.
- Although consumer discretionary was the most volatile, it did not yield a healthy risk ratio.
- Whilst running our quantitative analysis we noticed an outlier around the summer months of 2022. As we delved further into our findings, we found that after educating ourselves on the economic conditions at the specific time (Summer of 2002) that the outlier was skewed due to the fact that Amazon issued a 20:1 stock split, which affected each portfolio negatively.
- During our data analysis, we found trouble when attempting to create a single box plot visualization with hvPlot that expressed similar risk values.