|  |  |
| --- | --- |
| [Demo Day] Project Outline | 08/28/2019 |
| Created On: 08/11/2019 | **Last Modified: 08/12/2019** |

1. **Background Info**
   1. It is highly unlikely that the average, retail investor will outperform low-cost passive investing strategies such as purchasing ETFs that simply mimick a benchmark (SPY, QQQ). It is important to note here that simply making money in the market or beating an index in absolute terms do not, in themselves, satisfy the premise set forth at the beginning. In order to qualify an investor must achieve superior returns with a portfolio that has a risk profile lower than or equal to the benchmark it is being comapred to. Ourperformance of a diversified index is difficult due to the imposed trading fees and commissions which, like vegas poker, constitute a negative sum game. Additionally, in order to achieve “optimal” performance an investor must not only select good stocks for the portfolio, but weight them in such a way in which the expected return is the highest and volatility is at the lowest. The difficulty of this problem grows exponentially as more and more assets are added to the portfolio. What this means is given a portfolio with a sufficient number of stocks, the duration of time required to test every combination of weights for this portfolio may exceed that of the persons life. Even with the fastest available super computers.

1. **Project Overview**
   1. Target Audience:
      1. Amateur/Beginner/Novice Focused on Building Efficient, Long-Term Investment Portfolios
      2. Finance/Business Students Looking for an Introduction into the Basics of Modern Portfolio Theory and Portfolio Management.
   2. Goals & Objective:
      1. Promote financial education and literacy by attempting to flatten the learning curve
      2. Increase awareness and bring focus to investment management practices which look to improve an investor’s performance by improving inefficiencies and better managing risk.
      3. Design and build an interactive, web-based, portfolio analytics platform which provide our target audience with the tools and resources to further their understanding and improve their practice of portfolio management.
   3. Ideals, Principles, and Strategy:
      1. Less is more
      2. Simple is Beautiful
      3. Intreague not inform
      4. Show dont’t tell
      5. Intersting Facts
      6. Relate to Target Audience
         1. ELI5 (Explain Like I’m 5)
         2. TLDR (Too Long Didn’t Read)
      7. Effective Communication/Debate Strategies & Techniques
         1. Relatable Examples and Interactive Demos
         2. Parallel Reasoning
   4. Project Resource Requirements
      1. Financial Database – Stock Price API
      2. Web Hosting
         1. Github Pages
         2. Heroku
         3. Register Domain Name:
            1. www.UciDemoDay2019.com/PortfolioOptimizer
   5. Project Overview - Components:

* Primary: Web-Based Interactive Portfolio Analytics Dashboard
  + The purpose of this dashboard is to provide novice investors with tools, and actionable insights with which can be easily implement to better manage their personal portfolios. It achieves this by providing a risk/return breakdown of the user’s optimized portfolio and compares it’s historic risk-adjusted performance to that of the overall market.
* Secondary: Interactive Educational Learning Resource
  + Simplified, interactive, web visualizations designed to demonstrate, relate and gamefy the core financial concepts which underly the tools used in the portfolio analytics dashboard.

1. **Primary: Web-Based Interactive Portfolio Analytics Dashboard**
   1. Required Technologies:
      1. Python – Pandas
      2. Python – Numpy
      3. HTML, Bootstrap
      4. CSS
      5. JavaScript – Plotly.js
      6. JavaScript – Chart.js
      7. JavaScript – D3
   2. Step-by-Step Breakdown
      1. Data Quality,Collection,Aggregation:
         1. Closing price data for each stock within the user’s portfolio
      2. Data Concerns: Validations, Cleaning, Adujustments
         1. Stock Splits/ Reverse Splits – Legal stock price manipulation (without changing the company’s market capitalization) by increasing/reducing the number of outstanding shares on the market.
         2. Stocks w/ Limited Historical Data – Newer Stocks (ie: SnapChat)
      3. Data Calculations:
         1. [Portfolio] Score/Strength
         2. [Portfolio] Expected Return
         3. [Portfolio] Expected Volatility
         4. [Portfolio] Holding Period Return
         5. [Portfolio] Sharpe Ratio
         6. [Portfolio] Beta
         7. [Portfolio] Back-Tested Performance
         8. [Benchmark] Back-Tested Performance
         9. [Benchmark] Historic Volatility
         10. [Benchmark] Historic Return
      4. Data Visualizations:
         1. [Portfolio] Backtested Performance
            1. Type: Line Graph
            2. Interactive Features:

Overlay w/ Benchmark

Hover Over (Date, Closing, %Change)

* + - 1. [Portfolio] Volatility of Historic Returns
         1. Type: Line Graph
         2. Interactive Features: None
      2. [Portfolio] Asset Correlation
         1. Type: Heat Map (-1: Green >> 0: Blue >> 1: Red)
         2. Interactive Features:
      3. [Portfolio] Risk/Return Attribution
         1. Type: Bar Graph
         2. Interactive Features;

Toggle: Return & Risk

Hover Over: Show Associated Values

Conditional Formattting ( LT 0 : Red, GT 0: Green)

* + - 1. [Portfolio] Profile Overview (Attributes)
         1. Type: Radar Chart (Pentagon)
         2. Interactive Features:

Overlay: Market Profile (Attributes)

* + 1. Web Development (HTML, Bootstrap, CSS, JavaScript)
       1. Web Hosting
       2. HTML, Bootstrap, CSS
          1. Design
          2. Layout
          3. Styling
       3. JavaScript
          1. Functionality
          2. Interactivity

1. **Secondary: Interactive Educational Learning Resource**
   1. Required Technologies
      1. Python – Pandas
      2. Python – Numpy
      3. Python – SQLite
      4. Python – SQLAlchemy
      5. HTML, Bootstrap
      6. CSS
      7. JavaScript – Plotly
      8. JavaScript – D3
   2. Interactive Learning Modules
      1. Beginner
         1. Top Down Approach
            1. Start by Introducing a problem/scenario
            2. Conceptually identify and explain, in a non-technical way, what statistial concept is needed in order to address this problem.
            3. Associate non-technical concept to statistical concept.
            4. Introduce simple definition and interactive module
         2. Conceptually Easy / Non-Technical Probability Puzzles
         3. Gambling & Sports
         4. Curriculum
            1. Measures of Central Tendency
            2. Measures of Disbursion
            3. Correlation
      2. Intermediate
         1. Expected Returns
            1. Generalized as average historic performance
            2. Visualization:
            3. Interactive Features:
         2. Expected Volatility
            1. Generalized as average historic fluctuation of performance
            2. Visualization:
            3. Interactive Features
         3. Correlation
            1. Standardized to between 0 and 1, it is the degree to which the perfomance of two assets are related over time.
            2. Visualization
            3. Interactive Features
         4. Efficient Portfolios
   3. Step-by-Step Breakdown
      1. Basic
      2. Intermediate
2. Web Development
   1. Technologies
      1. HTML, Bootstrap
      2. CSS
      3. JavaScript
      4. Flask
3. Project – Demo Day Presentation
   1. Table Setup Diagram
   2. Handout Materials
      1. Resumes
      2. Business Cards
      3. Brochure, Pamphlet, Comb-bound Booklets
   3. Code Demonstration