EE / CprE / SE 491 – sdmay19-07

Real Estate Portfolio Optimization

Week 8 Report

Monday, October 29 – Sunday, November 4
Client: Principal
Faculty Advisor: Chinmay Hegde

Team Members

Blake Roberts - Project Manager / Backend
Colton Goode - Meeting Scribe / Backend
Kevin Johnson - Quality Control / Frontend
Leelabari Fulbel - Meeting Facilitator / Frontend
Nickolas Moeller - Report Manager / Backend

Weekly Summary

This week the frontend team made important strides with their understanding of Dash and its capabilities. We have been able to get a pie graph showing for the current optimized data. The frontend team has also determined that PowerBI could be used for the showing on graphs and data. However there will need to be more discussion on the use of PowerBI.

This week the backend team corrected the covariance matrix test input for the Markowitz portfolio optimization code. The team also corrected the expected returns calculations. The team investigated writing unit tests and investigated standard data formats for the required inputs such as: portfolio/asset data, expected returns, and covariance matrices.

Past Week Accomplishments

- Formed SQL table statements around data format for portfolios, expected returns, and covariance matrices. - Blake
    - The resultant SQL statements servers as a rough data structure outline of persistent user data. Namely, that of portfolio and portfolio asset information.
- Corrected covariance calculations - Blake and Colton
    - This was the main focus of the technical meeting held on Wednesday. Ben, our Principal point of contact and data science professional, assisted in this effort.
    - Wrapped up corrections to covariance calculation.
    - The main resultant finding was that percent returns in the calculation needed to be as percentages (e.g. multiplied by 100).
- Implemented unit tests - Nick and Colton
    - Started a layout for our unit tests after learning the unittest Python package.
    - Mostly on the backend data optimization

- Created document of compiled research into Power BI - Kevin
    - (Google Drive) Senior Design/Design/PowerBIResearch
    - (Link) https://drive.google.com/open?id=1oepKX0yoW1GyTTW-vH3IbG3OoB34t45fyrb2JZH6_ss
- Generate graphs for data visualization - Leelabari
    - create a basic platform for the web app that allows for the showing of the pie graph of the optimized data. This was separate from the flask server made.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Blake Roberts	Worked on correcting covariance matrix. Outlined data format for portfolio data, expected returns, and covariance matrix	6	42
Colton Goode	Testing of markowitz functionality and covariance matrix correctness	6	42
Kevin Johnson	Did extensive research into benefits/cost of using Power BI. Downloaded all necessary packages for python.	6	41
Leelabari Fulbel	Aided with Kevin's set up. Worked on creating a pie graph that shows what the current optimization portfolio looks like.	7	41
Nickolas Moeller	Researched Python unit testing and built simple tests	6	42

Pending Issues

- Need a confirmation with principal about the use of PowerBI and whether they want to finance its use
- Dash and flask servers currently run separately but not together. This should be a simple fix of changing routes, but needs to be looked into
- Still a little of with the weight optimizations, it is much better than before, but will refine it further this week

Plans for Coming Week

- Continue working on creating simple dashboard for data visualization using Dash - Kevin, Lee, Cole
- Create new backed routes to access information for: Efficiency frontier, Sharpe Ratio, TreeMaps, Expected vs. Actual - Kevin, Lee, Cole
- Research more into the financial and technical feasibility of PowerBI before meeting with client on Wednesday - Kevin and Lee
- Continue backend Markowitz testing - Blake, Nick
    - Implement more test cases and future-proof tests.
- Combine Flask and Dash into a single Server - Blake

RASIC

Our client desires weekly RASIC tables to be submitted every Monday detailing the tasks to be completed and to keep which team members are involved in each task. It also records which member at Principal Financial is (if they are) directly involved with a particular task or not.

R: Responsible
- The team member primarily responsible for the task's completion.

A: Approve
- The team member responsible for approving the task's completion.

S: Supporting
- The team member(s) who support the task's completion.

I: Informed
- The Principal team member(s) who are informed of decisions, progress, and completion associated with the task.

C: Consulted
- The Principal team member(s) who serve as Subject Matter Experts or key stakeholders for the task or project as a whole.

Past Week RASIC:

10/29/2018	Team Members					Principal Team		
Task	Blake	Cole	Kevin	Lee	Nick	Ben	Jonathan Ling	Jonathan Frank
Research PowerBI			R	R		C		
Combine Dash with current Backend	S		R	R				
Correct covariance matrix	S	R			S			
Backend markowitz/data unit tests	S	S			R			
Outline standard data structures (portfolio, expected returns, covariance matrix)	R				S	C		

Next Week RASIC:

11/5/2018	Team Members					
Task	Blake	Cole	Kevin	Lee	Nick	Ben
Make additional routes to show Efficiency Frontier utilizing optimization code output.		S	S	R		
Get confirmation about potential PowerBI usage			S	S		C
Get example Uses of PowerBI			S	S		C
Combine flask and dash to one server	R			S		
Backend markowitz/data unit tests	S				R	
Create tabs for the various "pages" of application based on design mockups				R	S	