EE / CprE / SE 491 – sdmay19-07

Real Estate Portfolio Optimization

Week 9 Report

Monday, November 5 – Sunday, November 11
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 discussed alternative data visualization tools to use. Currently we use dash for data visualization, and have reworked the dash and flask servers to run together in one server instance now. However after speaking with the client we may make a switch to a different technology from Microsoft, PowerBI, which is more familiar to them. This is to be determined when we meet with them this upcoming week. We have also made progress on the dashboard and generating an efficiency frontier graph.

This week the backend team reworked the markowitz algorithm to return efficiency frontier data coordinated with the frontend team. Additionally, there was a push to restructure the test data to mimic user input data. Built tests for our Markowitz functions.

Past Week Accomplishments

- Combined the dash and flask backends into one server instance - Colton and Lee
    - Flask and Dash both can run seperately as a backend server to serve a webapp to the user, originally we had these two running separately for testing purposes.
    - We found out that Dash actually uses flask under the hood, so we found a way to integrate them to run together in one flask app instance
    - This simplifies the app greatly as you only have one instance of the server running now
- Cole and Lee created an interactive efficiency frontier graph using dash to display optimal portfolios based on risk and expected return. The graph was a plot line with a line curve through. It will be used by portfolio managers to show the relationship between risk and reward.
    -

- Markowitz function testing - Nick
    - Built a few unit tests for our backend helper functions and reiterated over them to make them modular.
- Restructure test data to mimic user input data - Blake
    - Using the NCREIF test data, a sample was taken to represent a phoney portfolio manager's portfolio
    - This test data was then stored in the data tables created last week (Asset and Portfolio tables)
- Additional Power BI research - Kevin
    - Watched some videos and read some documents about using Power BI Embedded resource to generate embedded visuals to use in our Dash App.
    - Still waiting on Principal to send the account information so we can test embedding Power BI visuals in our application.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Blake Roberts	Aggregate example/test data to mimic structure of user data.	6	48
Colton Goode	Combined the flask and dash servers to operate in a single server (Dash embedded in an existing flask server), debugged efficiency frontier in dash	8	50
Kevin Johnson	Researched additional data visualization software (still leaning towards Power BI) Fixed errors with installing cvxpy package	6	47
Leelabari Fulbel	Combined the flask and dash servers to operate in a single server (Dash embedded in an existing flask server), debugged efficiency frontier in dash	7	48
Nickolas Moeller	Learned Python unit testing and built tests unit for our Markowitz functions	6	48

Pending Issues

- Client is considering a switch to PowerBI to generate interactive graphs instead dash, which is what we are currently using. They offer very similar functionality, however PowerBI is more familiar to the client, so that will help with future development beyond this class. This would mean that we would have scrap some of the previous work done and rework the server side a bit. The concern is how the plotly Dash tool holds the data. To be discussed with client this week.
- Not sure if PM's or application users be able to upload portfolio asset historical returns.

Plans for Coming Week

- Working on the frontend design by introducing tabs to represent pages
- Add CRUD operations and endpoints for the database
- Start working on the Design Document V2, and improve sections of it based on the feedback received from the first version
- Finalize choice for data visualization by testing PowerBI
- Creation of Editable table for expected returns
- Finish transitioning test data to mimic user input data (historical data and covariance matrix calculation)

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:

11/5/2018	Team Members					Principal Team		
Task	Blake	Cole	Kevin	Lee	Nick	Ben	Jonathan Ling	Jonathan Frank
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	S	R		S				
Backend markowitz/data unit tests	R				S			
Create tabs for the various "pages" of application based on design mockups				R	S			

Next Week RASIC:

11/12/2018	Team Members					Principal Team			Action	Notes
Task	Blake	Cole	Kevin	Lee	Nick	Ben	Jonathan Ling	Jonathan Frank		
Design Document V2	R	R	R	R	R					This is an ISU class requirement due Friday, Nov. 16.
Add portfolio CRUD server endpoints		R								
Finalize decision on software we will use for data visualization			R	S		I				
Update markowitz to use new data format	R									
Create Tab Format for the showing of "pages"			S	R						
Create Table for expected returns changes			R	S						