Business Intelligence Algorithmic Trading Analysis Tool Project

Date: November 21, 2023
School: University of the Fraser Valley
Department: CIS
Course: Comp 371 - Object Oriented Modeling and Design
Project: BI Tool Milestone 2
Project Team: Team Super Group
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Product Owner: Dr. Youry Khmelevsky

1 Introduction – Where we are at

In our agile development process, we currently find ourselves at the heart of second construction phase, a critical juncture within our algorithmic trading analysis project. This stage signifies the transition from our project's initial concept to more detailed planning. Our team collaboratively refines project objectives, identifying key technical needs: Historical, Real-Time & News data. Using agile practices and GRASP patterns, we aim for continuous improvement & refinement. This will ensure our project's success. It's important to highlight our commitment to using the principles of High Cohesion and Low Coupling in our algorithmic trading analysis project. These two GRASP patterns are the cornerstones of our architectural strategy, contributing to the system's long-term viability. High Cohesion ensures that every component's responsibilities are tightly aligned and collaborative, promoting clarity, maintainability, and flexibility. Meanwhile, Low Coupling minimizes inter-component dependencies, safeguarding against the ripple effects of changes and simplifying scalability. Our focus on these principles underscores our aim to build a flexible and maintainable system with a view to evolving trading data in financial markets. [1]

2 Business Use Case

The business case outlines the reasons for the project, its benefits, and costs, providing financial and strategic justification:

- Increase returns/accuracy on the trading algorithm
- Justify algorithmic choice
- The trading Algo is at 5% accuracy, identify the 95% failures of the trading algorithm and determine which errors cost the most. [2]

Focusing on low coupling, at a high conceptual level, we want to avoid locking into any specific company or software solution that could necessitate increased future costs.

3 Vision

The vision statement clearly describes the desired future state, focusing on outcomes and a common goal throughout the project. A solution to Business Case looks like fast, accurate, contextualized information to assess the data and decisions of the algorithm:

- The final version will be a BI Tool that reduces the complexity of contextualizing analytic data (News/Real-Time/Historical) to allow the analyst to focus on key deficiencies in the algorithm.
- We are in the final stages of our vision having mostly scraped, aggregated, stored, parsed, presented in a succinct manner the information an analyst would need. [1]

Focusing on high cohesion, at a high conceptual level, we want a powerful tool that limits its scope to useful and necessary information and presents only relevant information to the analyst.

4 Architecture

This document discusses the application of Low Coupling and High Cohesion architectural patterns in different layers of a software system, including the Presentation Layer (Metabase), Application Layer (PHP), and Data Layer (MySQL and Docker). These patterns enhance flexibility, maintainability, and efficiency within each layer by reducing dependencies and ensuring related functions are well-organized. [3]

5 Software Requirements and Pattern Application

The progress of the Algorithmic Trading Business Intelligence Tool's development faces impediments rooted in sophisticated data integration, real-time data latency, complexities associated with news data analysis. Addressing these issues requires a strategic application of design principles that prioritize high cohesion and low coupling. By incorporating these principles into the development framework, we aim to create a solution where the various components of the tool are intricately related (high cohesion) and yet exhibit minimal interdependence (low coupling). Embracing a pattern-based solution, rooted in high cohesion and low coupling, holds the key to unlocking a more resilient, adaptable, and efficient Algorithmic Trading Business Intelligence Tool. [1]

6 Software Licensing

Debian GNU License, Apache2 Apache2 License, Mariadb GNU Lesser General Public License, PHP Creative Commons Attribution 3.0 License, Python The Python Software Foundation License 2.0, Metabase GNU Affero General Public License. (Unmodified open-source system software operates without legal constraints). Project DNS Hosting provided by "FreeDNS - Free DNS - Dynamic DNS - Static DNS Subdomain and Domain Hosting," n.d. https://freedns.afraid.org/ [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19]

7 Conclusion

We're approaching the end of the construction process. Code completion, testing, performance optimization, and regulatory compliance are all in the works. A security audit is continuing, user training materials are being developed, and we're developing a deployment strategy with an emphasis on resolving any issues in the early phases. [1]

8 Current Super Group Phase: Implementation and Testing

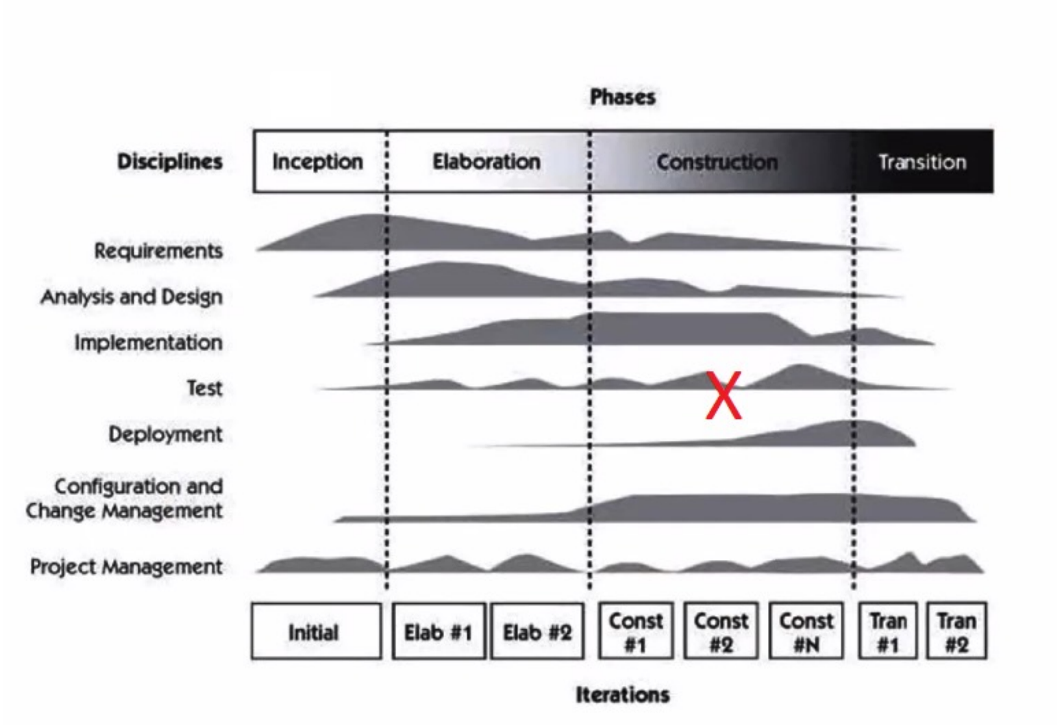

Figure 1: Phases
[1]

9 BI Tool Analyst Use Case Diagram

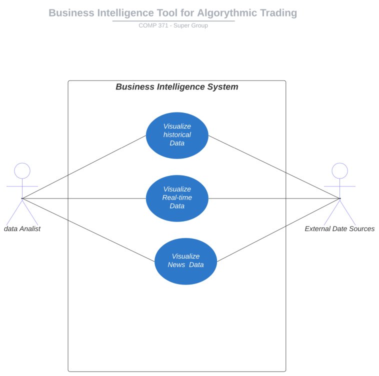
Business Intelligence Tool for Algorythmic Trading
COMP 371 - Super Group
Business Intelligence System
Visualize historical Data
Visualize Real-time Data
Visualize News Data
data Analist
External Date Sources

Figure 2: Use Case Diagram
[4]

10 Visualizing Intelligence: BI Tool Activity Diagram

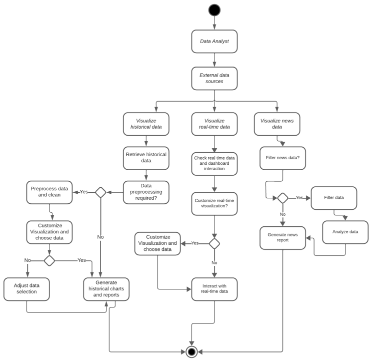
Data Analyst
External data sources
Visualize historical data
Visualize real-time data
Visualize news data
Retrieve historical data
Data preprocessing required?
Yes
No
Preprocess data and clean
Customize Visualization and choose data
No
Yes
Adjust data selection
Generate historical charts and reports
Check real time data and dashboard interaction
Customize real-time visualization?
Yes
No
Customize Visualization and choose data
Interact with real-time data
Filter news data?
Yes
No
Filter data
Analyze data
Generate news report

Figure 3: Activity Diagram
[4]

11 Structuring Insight: BI Tool Class Diagram

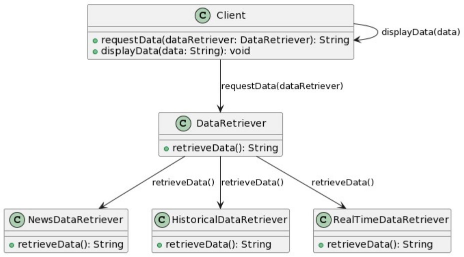

Figure 4: Class Diagram
[5]

12 Sequencing Intelligence: BI Tool Sequence Diagram

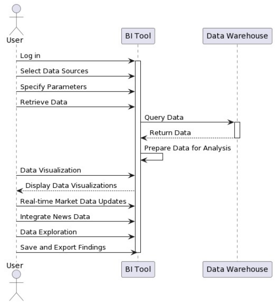

Figure 5: Sequence Diagram
[5]

13 Agile Insights: BI Tool State Chart Diagram

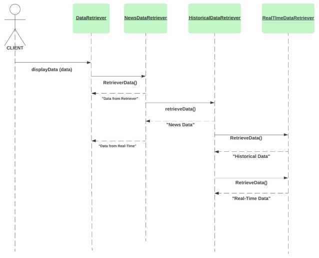

Figure 6: State Chart Diagram
[1]

14 Decoding MVC: Model, Controller, View

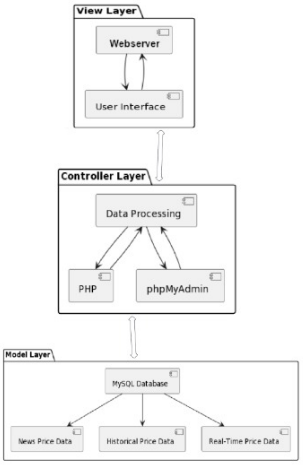

Figure 7: Model Controller View
[1]

15 Crafting Solutions: Tools and Architecture

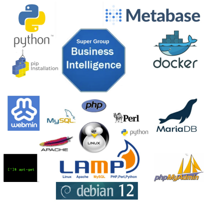

Figure 8: Tools and Architecture
[8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19]

16 References

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