

**STATUS REPORT**



| **Version:** | **1.1** |
| --- | --- |
| **Status:** | **Draft** |
| **Client:**  **Supervisor:** | **Netcompany**  **Lê Thị Nhàn** |
| **Author:** | **Quách Hoàng Minh**  **Nguyễn Bảo Nguyên**  **Ngô Gia Hân**  **Nguyễn Vũ Anh Thư** |

**Date: 24/03/2022**



# Executive Summary

This report is the mid-review report for the R&D project related to data analysis, especially stock price prediction.

The project process has been going for a while and our team could say we have kept up in the planning defined in the project beginning. We have finished all the documents that the client required in the first two Program Increments (PI). We have already fetched the stock data from the data sources and finished researching and deciding the algorithm we will use in the project. Current objective is to make the UI for the application.

In the first process, many difficulties happened in the project but the issues were quickly solved by the members and stakeholders in weekly team meetings.

# Project Description

The customer has a budget, and they want to invest in the stock market. They want to know the information of many stocks, so that they can decide which stock to invest in.

The stock market is a volatile place. The cause of that fluctuation comes from many sources: market trends, investor sentiment, company's financial statements, etc. There are two ways to analyze securities: fundamental analysis and technical analysis.

Fundamental analysis assumes that stock prices do not inevitably reflect the true intrinsic value of the underlying business. And our solution for our customers lies in the second analytical method. Technical analysis generally assumes that a stock's price reflects all available information and that prices generally move according to trends. In other words, by analyzing a stock's price history, you may be able to predict its future price behavior. If you have ever seen someone trying to identify patterns in stock charts or discussing moving averages, that's a form of technical analysis (Frankel, M. (2021, July 5). *How to Research Stocks*. Retrieved from The Motley Fool: https://www.fool.com/investing/how-to-invest/stocks/how-to-research-stocks/).

When the project is completed, a stock market web application is delivered to the client. Customers can view stock price trends on HOSE, HNX and UPCOM stock exchanges. In addition, customers can use the predict function to predict prices in the next one week.

# Scope

### 3.1 Scope

* Costs must not exceed the estimated budget.
* The final product must be released within 6 months.
* Must have a UAT version for customers to try before releasing the final version.
* The final product must satisfy the Minimum Viable Product (MVP).
* There are documents and resources that prove the predictions are reliable.

### 3.2 Outside scope

Below features are not included in this project:

* Allow users to directly buy stocks on the website
* Have a box chat between all users of the page
* Have an admin page.
* Support real-time stock information

# Plan

## 4.1 Milestones:

The project roadmap is established based on priorities of functionality from the Trading Vision Project (TVP). The roadmap is still high-level but has placed each theme of functionality into a release.

As established in Project Dependencies, the project is constrained by several dependencies, which is handled by scheduling functionality with dependencies in releases where time permits completion of the dependencies. Due to this, some functionalities are planned later than their original priority would demand, in order to accommodate for the dependency. All project and system dependencies have been marked as milestones:

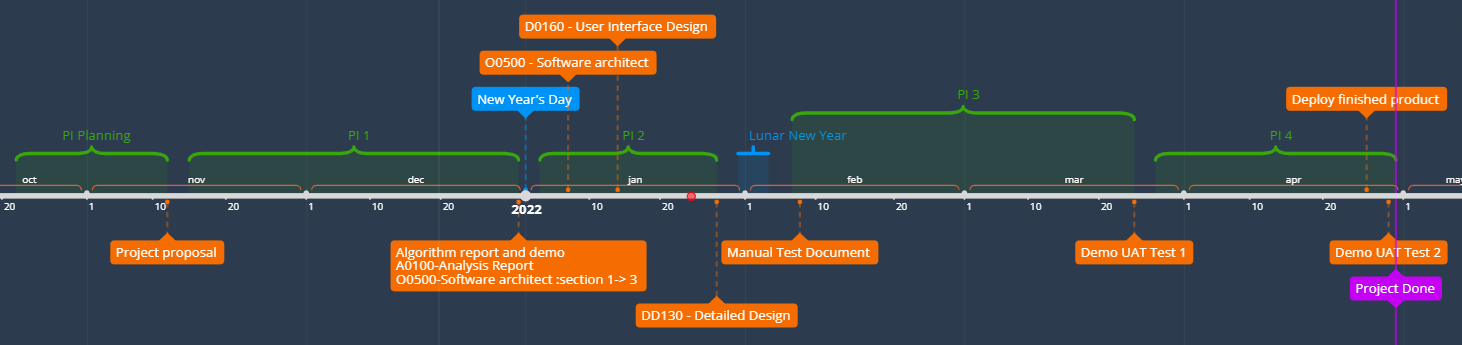


Figure: Roadmap

The result is the following releases:

* **Release 1:** Demo for UAT test 1
* **Release 2:** Demo for UAT test 2

## 4.1 Deliverables

According to each PI, there will be documents that need to be completed accompanied by some parts of the overall product.

* **First PI:** 
  + A0100 - Analysis Report
  + O0500 - Software Architecture - Clarification Phase
  + Demo and Compare Algorithms: Demo the learned algorithms and write a report comparing the efficiency between those algorithms.
* **Second PI:**
  + D0160 - User Interface Design
  + O0500 - Software Architecture
  + Mockup: Mockup of the website's user interface prototype
  + Algorithm Report: Describe in detail the algorithm that will be applied to the data prediction
* **Third PI:**
  + DD130 - Detailed Design
  + Manual Test Document: Product a list of specific test cases for all the websites with the status fail or pass for the test and give for the developer to fix and update the status on time.
  + Demo Product: Product demo with interface as well as some main functions
* **Fourth PI:**
  + Final Product: Release the final product with all required functionalities.

# Project Status

We have completed all the analysis steps, as well as the UI design prototype for the website. All the required documents are completed except for DD130, which could be moved to PI 3. This change was agreed by the clients. Besides, the most important part of the project is our data and algorithm and some high priority pages, which we also finished. We will describe all completed tasks in detail as follows.

5.1. Fetch Data

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Fetch stock prices from Cafef and import to mongoBD. The retrieved columns are ‘Time’, ‘StockExchange’, ‘Ticker’, ‘PreviousClose’, ‘Ceiling’, ‘Floor’, ‘Highest’, ‘Lowest’, ‘Volume’, and ‘Match’ respectively by using beautifulsoup | * Research and learn how to scrape data with BeautifulSoup * Learn how to connect to Mongodb cloud * Learn how to push data fetching from the website to the MongoDB | * Done * Can get data with the top 100 stocks with the most trading volume. |
| Minh Quach Hoang | Rewrite script to get data with 300 specific stocks from 3 stocks exchanges (hose, hnx, upcom)  Fetch company information from vcbs (https://www.vcbs.com.vn/) | * Know how to fetch data from the web. Get to know what web scraping and web crawling are. * Learn how to connect MongoDB to store all data. * Study how to create scheduled tasks on the Windows operating system (before server provision) and then cron on EC2 server. | * Done * The script runs normally but is still not optimized because the running time is up to nearly 1 minute and makes the CPU stuck when run continuously every one minute. But it is fixed afterwards by optimizing code. * Fetch company info’s script can run normally |
| Nguyen Nguyen Bao | * Rewrite to optimize script fetching stock price by just using list and dictionary instead of pandas dataframe. Connect mongoDB using localhost instead of connection string via network. * Create cronjob to run script automatically for fetching data: stock prices, stock company information and query close price for prediction. | * Researched about web scraping with beautiful soup, and selenium. * Learned how to connect and import data to mongoDB * Did research on how to create scheduled tasks on the Windows operating system (before server provision) and then create cron jobs on EC2 server. | * Done * The script was able to run normally on the server and reduced the execution time to only about 6 - 9 seconds for each run |

5.2. Define Use Cases and User Stories

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Draw use case diagram and write user story login/ logout, overview page | Learn how to define all the use cases and user stories necessary in the project | Done |
| Thu Nguyen Vu Anh | Draw use case diagram and write user story search index, index chart | Learn how to get requirement from the client and have the product meet the requirement of client | Done |
| Nguyen Nguyen Bao | Draw use case diagram and write user story prediction index,setting reminder | Recognize the important role of defining use cases and user stories in a project. | Done |
| Minh Quach Hoang | Draw use case diagram and write user stories for manager user , favorite list | Apply knowledge from Software Engineering course and deeply know the differences between use case and user stories. | Done |

5.3. Query Data for Prediction

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Minh Quach Hoang | Write script to query close price of each stocks for prediction, and import to mongoDB | Study how to query data from MongoDB with PyMongo. | Done |
| Nguyen Nguyen Bao | Learned how to get and query data from MongoDB with PyMongo. | Done |

5.4. Check Fetch Data

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Minh Quach Hoang | Check retrieved data and try to fix bugs | Learned how to optimize code, preprocess data and change data type to suit the project. | Do until the end of the project |
| Nguyen Nguyen Bao | Check retrieved data and try to fix bugs | Do until the end of the project |

5.5. Algorithms Research

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Research paper for LSTM, ARIMA, write research in A0100 | Research LSTM and ARIMA algorithms in stock prediction field | * Done * Write algorithm research in A0100 done (section 2.10) |
| Thu Nguyen Vu Anh | Research paper SVM, polynomial regression, write research in A0100 | Read the research of other people about in stock prediction SVM and polynomial regression in all the paper, how to find the best paper that could be trusted | * Done * Write algorithm research in A0100 done (section 2.10) |
| Minh Quach Hoang | Help do research and discuss all the algorithms | Research into which algorithms can be used for stock prediction | Done |
| Nguyen Nguyen Bao | Help do research and discuss all the algorithms | Researched about definition of three algorithms | Done |

5.6. Code selected algorithm

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Thu Nguyen Vu Anh | Code SVM, Polynomial Regression in our real data | Learn how to code SVM, Polynomial Regression algorithms in Python ,how to dealing with the data to get the best result, the way algorithms working in real life situations | * Done * Draw graph, Calculate the MAPE result of each for comparison |
| Han Ngo Gia | Code LSTM in our real data | * Learn how to transform and implement it for the data of our project * Learn to draw the graph and count the MAPE for algorithm analysis * Learn how to export models for saving time and retraining them when there are new data | * Done * Draw graph,Calculate the MAPE result of each for comparison -> choose LSTM in final |
| Nguyen Nguyen Bao | * Code script to retrain model with Hân. * Run model to predict stock price on server | * Learn how to save and retrain models. | * In progress * We are changing some lines of code to suit with our real data |

5.7. A0100- Analysis Report

LInk: [[TVP] A0100 -ANALYSIS REPORT-v1.2.docx](https://docs.google.com/document/d/12vn6fVwaDmzSuq_lkRU1_gbPwqUb0sNA/edit?usp=sharing&ouid=103080287603430099155&rtpof=true&sd=true)

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Write part 1, 2.6,2.8 | Improve analysis and research skill, and how to write a practical analysis report | Done |
| Thu Nguyen Vu Anh | Write part 2.1,2.2, 2.6,2.8 | How to write the analysis report follow the Software Development cycle, which part is important and must define clear before the project begin | Done |
| Quách Hoàng Minh | Write part 2.3,2.4, 2.6,2.8 | Improve analytical ability, as well as write a realistic analysis report | Done |
| Nguyen Bao Nguyen | Write part 2.5,2.6, 2.7,2.9, 2.10, 2.11 | Improve analytical ability, as well as write a realistic analysis report | Done |

5.8. O0500- Software Architecture

Link: [O0500 - Software Architecture - v1.0.docx](https://docs.google.com/document/d/1d-gEXlVek7IqQ-Bpp3lhOSztiCnZ27A2/edit?usp=sharing&ouid=103080287603430099155&rtpof=true&sd=true)

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Write part 1.1,3.2.2 | Learn how to divide the project architectures into smaller parts | Done |
| Thu Nguyen Vu Anh | Write part 1.2,3.2.2 | Learn how to divide the project architectures ,how specific the document must be and define the software architect by document. | Done |
| Minh Quach Hoang | Write part 1.3, all part 3 | Learn how to document all the diagrams into different parts of a document for clients. | Done |
| Nguyen Nguyen Bao | Write part 1.4, 2, all part 3 | Learn how to break down the structure into smaller parts and define each necessary components | Done |

5.9. Logical Data Model

Link: [Logical Data Model](https://drive.google.com/file/d/1tIkukjsrPcz-1kDu-PcJXm8QxE_sDBpw/view)

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Minh Quach Hoang | * Define needed entities and attributes should be stored in database * Draw logical data model | Learned how to draw a practical logical data model and recognize the importance of defining all entities and needed attributes | Done |
| Nguyen Nguyen Bao | Done |

5.10. Control Flow Diagram

Link: [Control Flow Diagram](https://drive.google.com/file/d/1Snq7PZSFuv4Jm6_wusqD_WVkZTam0UJW/view?usp=sharing)

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Draw login, logout, delete account, view prediction chart function | Learn how to draw control flow diagram for the project | Done |
| Minh Quach Hoang | Draw view chart, add/delete stock in favorite list, search index function | Know what is control flow diagram | Done |
| Nguyen Nguyen Bao | Draw fetch data, set/edit/delete reminder, compare two stocks function | Research about how to draw control flow dìagram | Done |

5.11. UI/UX Wireframe

Link: [Wireframe Design – Figma](https://www.figma.com/file/Lf12KB7JMVBkOKafDtTNTc/Wireframe-Design?node-id=3%3A14)

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Draw Homepage, Specific stock,login page | Learn to design wireframe for the website of the project | Done |
| Nguyễn Vũ Anh Thư | Draw Market, Specific stock, user info page | Learn to draw the wireframe for customer before make the real UI design | Done |
| Minh Quach Hoang | Draw Reminder, Specific stock, Add Reminder page | Know how to use the Figma tool and get used to designing a wireframe for a website. | Done |
| Nguyen Nguyen Bao | Draw Favorite, Specific stock, Comparison of two stocks page | Know more about Figma’s features and some tips when using Figma to design | Done |

5.12. UI/UX Design Prototype

Link: [Design Prototype – Figma](https://www.figma.com/file/gITr7wjHQp3BNRUXRoInrK/Design-Prototype?node-id=3%3A14)

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Draw Homepage, Specific stock,login page | Learn to design UI prototype from the wireframe | Done |
| Thu Nguyen Vu Anh | Draw Market, Specific stock, user info page | Learn to draw the prototype in Figma | Done |
| Minh Quach Hoang | Draw Reminder, Specific stock, 404 fail page | Know how to use the Figma tool and get used to designing a prototype from a wireframe for a website. | Done |
| Nguyen Nguyen Bao | Draw Favorite, Specific stock,comparison page | Know more about Figma’s features and some tips when using Figma to design | Done |

5.13. Server

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Nguyen Nguyen Bao | Play as an administrator: copy scripts to EC2 server, create cronjob to run those scripts automatically.  Check server status if there are any problems such as server down, notify to mentor to restart and find out the reason | * Learned a lot more about the server, learned how to track the server status, the tasks the server is doing, create/pause/change cronjobs * Know how to transfer files and folders from our laptop to the server. | Do until the end of the project |
| Minh Quach Hoang | Copy scripts to server | * Get used to working with a real server, how to transfer files from a local machine to an online server. | Do until the end of the project |

5.14. Study about stock market:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Minh Quach Hoang | Study all basic and necessary knowledge about stock market | Know what stock is, how the stock market basically operates in Vietnam, differentiate fundamental analysis and technical analysis.  Can retrieve fundamental information from a candlestick chart. | Get more acquainted with the stock market and share understanding with other team members. |

5.15. Study about Nodej:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Minh Quach Hoang | Study all basic and necessary knowledge about Nodej to do project | Knowhow to create the back end website with nodej | Get more acquainted with the back end website with node j and share understanding |
| Thu Nguyen Vu Anh | Study all basic and necessary knowledge about Nodej to do project | Knowhow to create the back end website with nodej | Get more acquainted with the back end website with node j and share understanding |

5.16. Study about React:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Study all basic and necessary knowledge about react to do project | Knowhow to create the font end website with reactj | Get more acquainted with the back end website with react and share understanding |
| Nguyen Nguyen Bao | Study all basic and necessary knowledge about reactj to do project | Knowhow to create the font end website with react | Get more acquainted with the back end website with reactj and share understanding |

5.17. DD160 - User Interface Design:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Part 1, 2.1,2.2 | Learn how to document all the ui design | Done |
| Nguyen Nguyen Bao | Part 2.8, 2.9,2.10 | Learn how to document all the ui design | Done |
| Thu Nguyen Vu Anh | Part 2.5, 2.6,2.7 | Learn how to document all the ui design | Done |
| Minh Quach Hoang | Part 1, 2.3,2.4 | Learn how to document all the ui design | Done |

5.18. DD130 - Detailed Design:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Thu Nguyen Vu Anh | Part 1, 2.2 | Learn how to document all the backend design | Review |
| Minh Quach Hoang | Part 1, 2.1,2.2 | Learn how to document all the backend design | Review |

5.19. Develop Front End:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Han Ngo Gia | Doing Market page, view stock page, search, login/ logout, reminder list, favorite list | Learn how to develop the font end of the website | On going |
| Nguyen Nguyen Bao | Doing Market page, view stock page, search, login/ logout, reminder list, favorite list, user profile page | Learn how to develop the font end of the website, connect frontend and backend | On going |

5.20. Develop Band End:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Quach Hoang Minh | Doing API for return the info, authentic with Facebook | Learn how to develop the back end of the website | On going |
| Thu Nguyen Vu Anh | Restructure project to MVC, doing google authenticator,market page and view specific stock API, reminder list | Learn how to develop the back end of the website | On going |

5.21. Benchmarking report:

| **Assignee** | **Description** | **Research and Upskilling** | **Results** |
| --- | --- | --- | --- |
| Nguyen Nguyen Bao | Evaluating and tracking the CPU performance as well as the length of time when executing the predicted scripts. From there, compare the results between experiments (run one stock at a time, Sequential two stocks, Sequential two stocks with interval and release resources  ). Based on the results of previous attempts, I can made decision to create cronjobs to predict price automatically | Learn how to benchmark performance of the server. | When executing the script to predict the price of 300 shares sequentially on the server, it stuck the CPU, leading to the server crash.  After that I tried many ways to find the best solution to create a cron job. Until now it work effectively  Done |

Here is our github link, which contains all of the documents, weekly reports, weekly meetings and source code: [Github](https://github.com/rdteam1510/Trading-Vision). Nguyen is responsible for uploading documents and creating and managing tasks on the jira dashboard.

# Overall evaluation

This part will evaluate all the work we have done upto the mid-review of the project and what needs to be done in the following time.

## 6.1 Completed works

**Documents**:

About the documentation that the client required for us. We have finished all these documents with the acceptance from the client. The documentation part we have achieved 100% of the plan before.

* A0100 - Analysis Report (this contains algorithm report)
* O0500 - Software Architecture
* D0160 - User Interface Design
* Benchmarking report

**Data**

And about the data up to now we have done these tasks

* Completely set up MongoDB to save the data of stock we got from the real source
* Successfully created cron jobs for fetching data: stock prices, stock company information, query for prediction, predict stock price.\

**Algorithm:**

We have finished an important task of the project, which is finding and choosing the algorithm for the prediction. Our team had to demo all the algorithms running on the real data that we will use for the website and examine the MAPE score to choose the suitable algorithm we need to use in the project. More than that, we have successfully implemented a selected algorithm and export model to use in the application.

* **Prototype**

We have finished designing all necessary pages in the web application.

* **Website**

We have done pages by priority in the web application and finished market, view stock, reminder.

## 6.2 Remaining works

From now on, we will need to do and finish all these tasks during the next two month. The task will be include:

* **Documents**:

We need to complete DD130 which is agreed to be moved to PI 3 by clients.

* **Implementation:**We need to build and implement all User Interfaces for the project and implement required functions for the application.
* **Website**We need to build other pages with lower priority in the web application and deploy the project.
* **Testing**We need to do and document the testing for the application.

Taking everything into consideration, with all completed achievements, we are confident to accomplish them on the deadline.

# Summary of individual contributions

| **Member Name** | **Group Meetings** | **Logbook** | **Total Hours** |
| --- | --- | --- | --- |
| Han Ngo Gia | Attend all meetings with client and supervisor  Discuss the selected algorithm with client | [Han's Timelog](https://docs.google.com/document/d/1UknmOaBz1ZKWuOVbZa9RhExokG9gTDx4mHNqJUoviQk/edit?usp=sharing) | 332 hours 27 minutes |
| Minh Quach Hoang | Attend all meetings with client and supervisor  Take note during meeting  Answer clients’ questions | [Minh's Timelog](https://docs.google.com/spreadsheets/d/1NF0tWlCwXOXoxYPn73-TNevdu8VhvB7vRN4KKH9grss/edit?usp=sharing) | 358 hours 21 minutes |
| Nguyen Nguyen Bao | Attend all meetings with client and supervisor  Bring up confusion aspects with clients to clarify them  Take note during meeting | [Nguyen's Timelog.xlsx](https://docs.google.com/spreadsheets/d/1jOUx1llLUkEr1qHbC85JdoBaEx5MchgL/edit#gid=2037360331) | 375 hours 54 minutes |
| Thu Nguyen Vu Anh | Attend all meetings with client and supervisor  Discuss the selected algorithm with client | [Thư logwork](https://docs.google.com/document/d/1rHC48gp1uwSA5uRhqhIhrdy0-8lw7k2fyYbqCq4Alcw/edit?usp=sharing) | 259 hours 35 minutes |

# Reference:

* Document Project Proposal
* Document A0100 - Analysis Report
* Document O0500 - Software Architecture
* Document D0160 - User Interface Design
* Document Benchmarking Report
* Logical Data Model: [Logical Data Model](https://drive.google.com/file/d/1tIkukjsrPcz-1kDu-PcJXm8QxE_sDBpw/view)
* Control Flow Diagram: [Control Flow Diagram](https://drive.google.com/file/d/1Snq7PZSFuv4Jm6_wusqD_WVkZTam0UJW/view?usp=sharing)
* Github of the team : <https://github.com/rdteam1510/Trading-Vision>
* Wireframe Design : [Wireframe Design – Figma](https://www.figma.com/file/Lf12KB7JMVBkOKafDtTNTc/Wireframe-Design?node-id=3%3A14)
* Prototype Design: [Design Prototype – Figma](https://www.figma.com/file/gITr7wjHQp3BNRUXRoInrK/Design-Prototype?node-id=3%3A14)