General Motors FinTech

Development Plan

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Document Version History

Version	Date	Author	Reviewer	Approved by	Description
0.1	9/15/2019	Abdul Ahmad	N/A	N/A	Created the new document, formatted.
0.2	9/16/2019	Abdul Ahmad	Aalem Singh	Abdul Ahmad	Reviewed, proofread, edited.
1.0	9/17/2019	Abdul Ahmad	Aalem Singh; Mohamad Saab; John Gettel;	Abdul Ahmad; Aalem Singh; Mohamad Saab; John Gettel;	Completed final draft of version 1 and submitted to team for review. Team edited the plan in detail.
1.0	12/1/2019	Abdul Ahmad	N/A	John Gettel; Aalem Singh; Mohamad Saab;	Edited sections, added logo, changes in lead responsibilities in Team Organization section, proofread

Project Overview

The General Motors FinTech (financial technology) team is responsible for improving an existing application that makes predictions about the future behavior of various financial instruments. The application indicates when to buy, sell, or hold a group of assets under management.

General Motors has been working with Wayne State University for 10 semesters on various applications designed by students that utilize machine learning techniques in order to predict movements in various financial markets. Continuing with this past work, the team aims to enhance the application so it can conduct a thorough analysis of past financial data and make better decisions about managing a hypothetical portfolio of assets with increased accuracy and more robust and modular code.

Purpose, Score, and Objectives

At this point in the project, both the existing code and algorithms require reevaluation. Additionally, new and more effective algorithms should be added to enhance the platform. The financial markets are impacted by many different external factors, and this can cause rapid fluctuations in stock prices. This application will give users the ability to see the impact of these factors and make financial decisions prior to them occurring. The system will try to understand previous market trends that will allow it to predict the market situation.

The focus for this term will be on improvements to code, algorithms, and database design.
Emphasis will be on improving the basic application function of collecting and storing data locally. Current algorithms will be enhanced, and new trading strategies will be explored and added when appropriate. If time allows, changes to the database design will also be implemented

The objective of this project is to develop a robust machine learning business intelligence application that makes financial decisions for the user based on predictions that are as accurate as possible. This semester we will be enhancing previously-developed code. The emphasis of our work will be to increase the accuracy of trend forecasting and to reengineer the code so that it is more understandable and can be easily modified for future improvements.

Team organization

The entire team is responsible for collectively contributing to all phases and development of the project in addition to maintaining sections that they are individually responsible for. The goal of these responsibilities is to make sure that each aspect of the project is well maintained and meets the requirements of the client.

Abdul Ahmad [Team Lead, Database Lead, Front-End Lead, Documentation Lead, Presentation Lead, Algorithm Development, Data Analyses]

- The team lead will oversee all aspects of the development of the application and help members in any way needed - technical or otherwise
- The database lead will be responsible for enhancing the database's normalization quality
- The front-end lead will oversee UI design and development
- Write, oversee and finalize all documentation
- The presentation lead is responsible for making sure all presentations are well formatted and include appropriate material
- Work on algorithm development and all data analyses
- Team Lead will be the main point of contact to the GTA, client and the instructor

John Gettel [Full Stack, Algorithm Development, Middle-Layer]

- The full-stack integration lead will ensure all aspects of the code function properly together before implemented in the full application
- Also responsible for reviewing new algorithms and any changes made to existing algorithms
- Make sure all Python code is optimized and works according to the requirements
- Assist with any other task as requested by the Team Lead

Aalem Singh [Documentation, Algorithm Development]

- Assist with documentation in all phases of the project
- Work on the algorithm development, review and documenting the usage

Mohamad Saab [Documentation, Middle-Layer]

- Assist with documentation in all phases of the project
- Work on the middle-layer in Python and algorithm development

Problem Resolution Policy

In order to resolve project related issues among team members, a team member should alert the team lead about the concern. The team lead will approach the team member to address the issue and will include other team members in the discussion if necessary. In the event of repeat offenses or if the issue is unable to be resolved the TA will be alerted to the problem. If the issue is still unable to be resolved the professor will then be informed about the problem.

All meetings with the client, TA, and between members are mandatory. Missing one of these meetings without notice is a cause for concern. Additionally, missing a class-imposed deadline or a deadline set by the team will also constitute a violation of this policy.

Project Plan

Weekly meetings with the client will occur at an agreed upon time each week on Friday evenings for the time being. The TA has indicated a desire to attend this meeting each week with additional meeting time with the team before or after the client meeting if necessary.

The team will also meet weekly on Thursday afternoons at 4:00 P.M. and at additional times during the week as necessary. Additional communication between team members can occur through A WhatsApp chat group.

Tentative schedule:

- Development Plan (9/18/19) : Present the development plan and upload it before midnight
- Prototype 1 (9/30/19) : Initial display of back-end, middle-layer and front-end
- Software Requirement Specifications (10/2/19): Describe project in greater detail including necessary software.
- Design Specification (10/23/19): Most detailed document describing product design specs
- Prototype 2 (10/30/19) : Improvement on previous algorithms
- Prototype 3 (11/20/19) : Integration of new algorithm to increase profit
- Test Plan (11/25/19) : Present any testing plan if applicable
- Final(12/9/19) : Present a fully functional applications according to client's requirements

Task Management Plan

Tasks for the team will be distributed at weekly meetings by the team lead. When completed, work will be reviewed by the team lead and the appropriate area lead before final submission. The team will utilize a shared Google Drive folder to ensure coordination of tasks between team members and to easily track progress.

Major deliverables and milestones will be reviewed by all team members before final submission. The team will operate with using agile management methodology. There will be short sprints of 3-4 days after which the goals will be reevaluated by the team and the client.
GitLab will be used as source control tool for this project. The work from previous semesters will be added to a new repository to keep new code separate from the previous version. Any changes made by the team this semester will be merged once all members review the code and confirm that it is working as intended. All team members are expected to contribute to the code and appropriately comment their additions and changes.

Technologies

The technologies used for the project have been predetermined as this is an existing project.

- Front End :
  - Tableau: This is client's preferred tool for data visualization.
- Back End :
  - Python: Previous code for the application's algorithms has been written using python.
  - IEX (Investors Exchange): This data source delivers market data from the exchange into the SQL Server database
  - SQL Server: The server holds raw data and calculations from the application's algorithms.