Project Proposal: Stock Trading Analysis APP

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Abstract

Taking advantage of state-of-the-art machine learning models and data mining techniques, our team plans to build a web application that provides meaningful stock price prediction and monitors the drift of market opinions with a user-friendly interface.

1 Team Member

Key Stakeholders	Member Names	Roles	Skills
Project Sponsor			
Team Leader	Linle Jiang	PM & Front-end	Vue
Team Member	Jiaxin Liang	Back-end	Django
Team Member	Bo Yang	Back-end & Front-end	Django, Vue

2 Business Case

We are Oracle, a technical consulting group, we help our clients develop effective solutions through combining data analysis techniques and machine learning algorithms. In other words, we are able to design and develop products tailed to customers' needs. For this project, based on our stakeholder's needs, we will develop a stock price prediction model or a price analyzing tool to help them increase revenue in the stock trading cycle. Therefore, we plan to take advantage of historical stock market data to train a model, like the past stock prices, market news, and other financial indexes, to predict stock market price in the future. Also, we would implement an informative and user-friendly user interface to facilitate our client's decision-making process in terms of stock trading.

3 Project Statement

3.1 Problem Statement

- The client wishes to know the future price trend of their selected stock, especially, the closing price and whether the stock price will go up or down in the next trade window.

- They are also interested in knowing the whole market's attitude towards the specific stock or the industry in which the company operates.

- They want an analyzing tool that offers them insights about when the best timing is to purchase or sell the stock they selected.

3.2 Goal Statement

- By applying deep learning techniques on historical stock price data, our model would be able to predict closing price of selected stocks.

- In addition, our application would provide our stakeholders with strategic insights about the industry and the stock market through sentiment analysis.

- Based on the historical and predicted stock price, our application will also visualize the recommending buying and selling signals on the selected stock, in order to increase our client's profit or warn them about potential risks.

4 Project Scope

Our deliverable in this project would be a single-page website demonstrating the achievements in the project.

- First, we will apply and compare various cutting-edge deep learning algorithms and identify the stock prediction model with the optimal predictive accuracy. And we will visualize the actual and predictive price for each stock on our webpage.

- Second, we will visualize sentiment analysis results for each stock over time.

- Third, we will visualize the predicted buying and selling signals for each stock.

Since most of our training datasets we used are publicly available and that no investments are required in terms of computing resources, the projected cost is based solely on human labors at around $6,300 (i.e., three workers * fifteen dollars/worker/hour * ten hours/week * fourteen weeks).

Notably, collecting textual data by web-scraping for the sentiment analysis or extending the stock prediction model to other stocks is out-of-scope in this project.

5 Project Timeline

Our Project started on 1st Feb 2021. And it will be divided into five phases, including define, measure, analyze, improve and control.

- Based on the customer's needs, we came up with some ideas and features about our project, such as price prediction, sentimental analysis, and buying and selling signals.

- Next, except for the measurement standards adopted in previous work, we will also create a new measurement to assess our project performance by 14th Feb 2021.

- And in the next month period, we will analyze what the reasons might be that were causing the underwhelming model performance.

- After we identified the main problems in the previous project, we would spend two weeks to address them and improve the model performance in order to meet our customer's requirements.

- The project will be controlled by weekly team meetings throughout the semester and bi-weekly meetings with the teaching assistant as well. As for day-to-day progression, it will be controlled by live communication among teammates, including task status updates and/or difficulties encountered.

Key Milestone	Target Date	Revised Date	Comment
Start Date	01-Feb-21	01-Feb-21	
D Phase Tollgate	05-Feb-21	05-Feb-21	
M Phase Tollgate	14-Feb-21	14-Feb-21	
A Phase Tollgate	14-Mar-21	14-Mar-21	
I Phase Tollgate	01-Apr-21	01-Apr-21	
C Phase Tollgate	15-Apr-21	01-Apr-21	

6 Resource, Constraints and Risks

According to the previous research and online discussions, our team has found an existing GitHub repository[1] that we can take advantage of and some useful datasets[2] and demonstrated the feasibility of features we are going to implement in our application. But we also realized that there are some constraints or risks we might encounter as we work on this project.

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[1]Stock-Prediction-Models https://github.com/huseinzol05/Stock-Prediction-Models
[2]Historical financial news archive, accessible from https://www.kaggle.com/gennadiyr/us-equities-news-data

- Based on the client's needs, we plan to conduct sentimental analysis on existing finance news. However, we are still searching for more relevant datasets. The limited data might affect the accuracy of price prediction.

- Next, team member collaboration issue. Since one of our team member is located in a different timezone, scheduling for real-time communications might be challenging.