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1. ABSTRACT

1.1 SUMMARY

The Investors Report is a web application designed to deliver real time stock report information to help consumers with their potential investments. Much like yahoo finance, the application will generate information such as investment reports, stock quotes and highlight current stock related news based on the specified company name.

1.2 FEATURES

1.2.1 Investment reports:

- Show relevant info that an investor would find useful in a clean and concise manner.

1.2.2 Stock Quotes:

- Show information such as
    - Open, high, low and close prices,
    - Stock high/low comparison over the past trading week and
    - Stock volume over the past week.

1.2.3 Current news related to company:

- Show news about specific company and its financial state from many various sources right at the bottom of the web page.

1.2.4 Portfolio:

- Personal accounts can be created by signing up.
- When a search is done while being logged in, search will be saved in the profile.

1.2.5 Compare reports:

- Look at two reports at once with a combined graphical view of their data

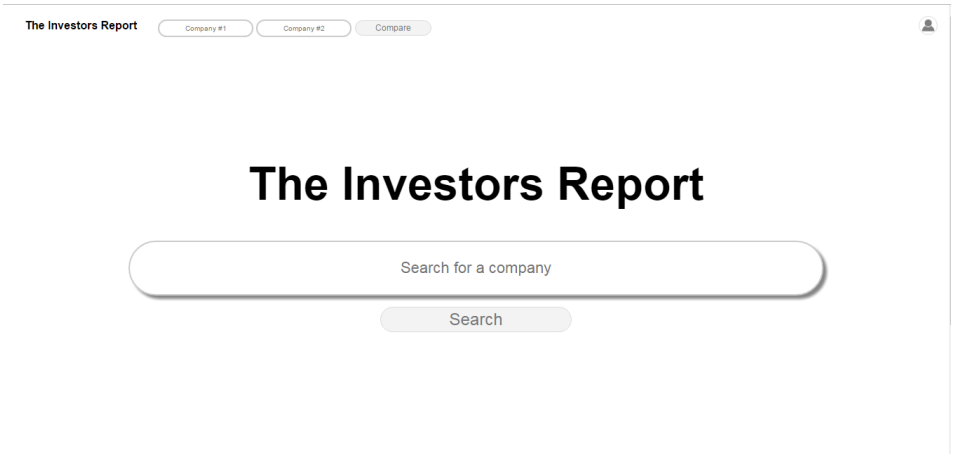
1.2.6 Stock quote predictor (slope):

- Make a prediction for what the stock price will be like next several trading days.

2 . MAIN

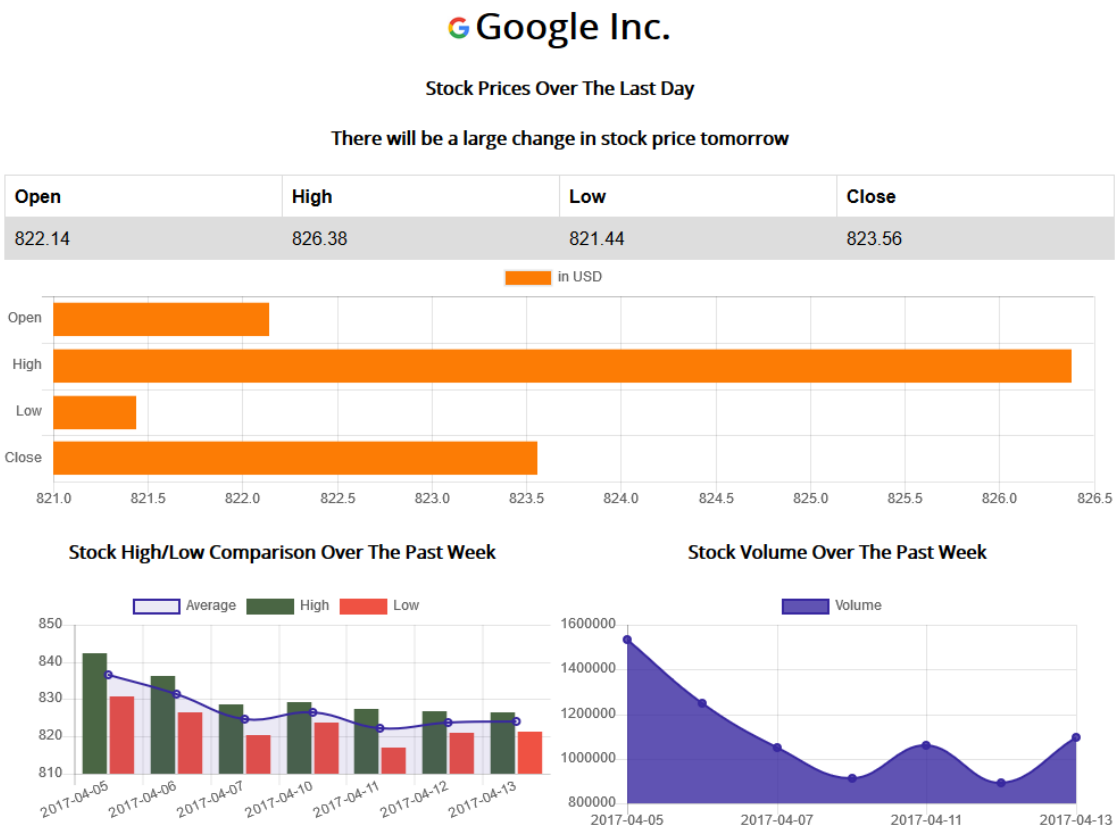
2.1 OVERVIEW

The goal of this web application is to provide the users with quality financial information to guide them in their investments. The user would enter a company name in the search engine provided, which leads to financial information on that company. This information can be investment reports, stock quotes, and current news in relation to that specified organization. Unlike other similar applications, we want to provide the user with a very simplistic yet effective UI. There is also a portfolio feature which users can select information to save into their accounts.

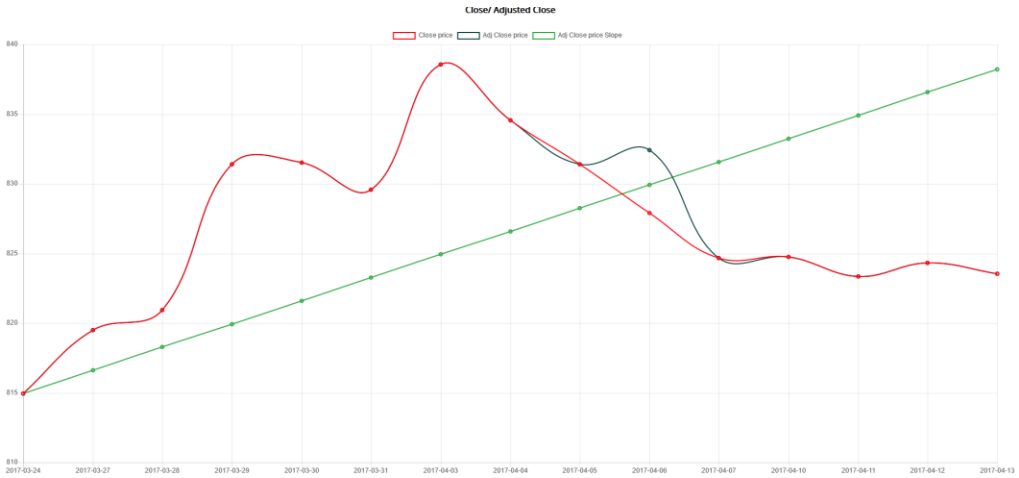


2.2 IMPLEMENTED FEATURES:

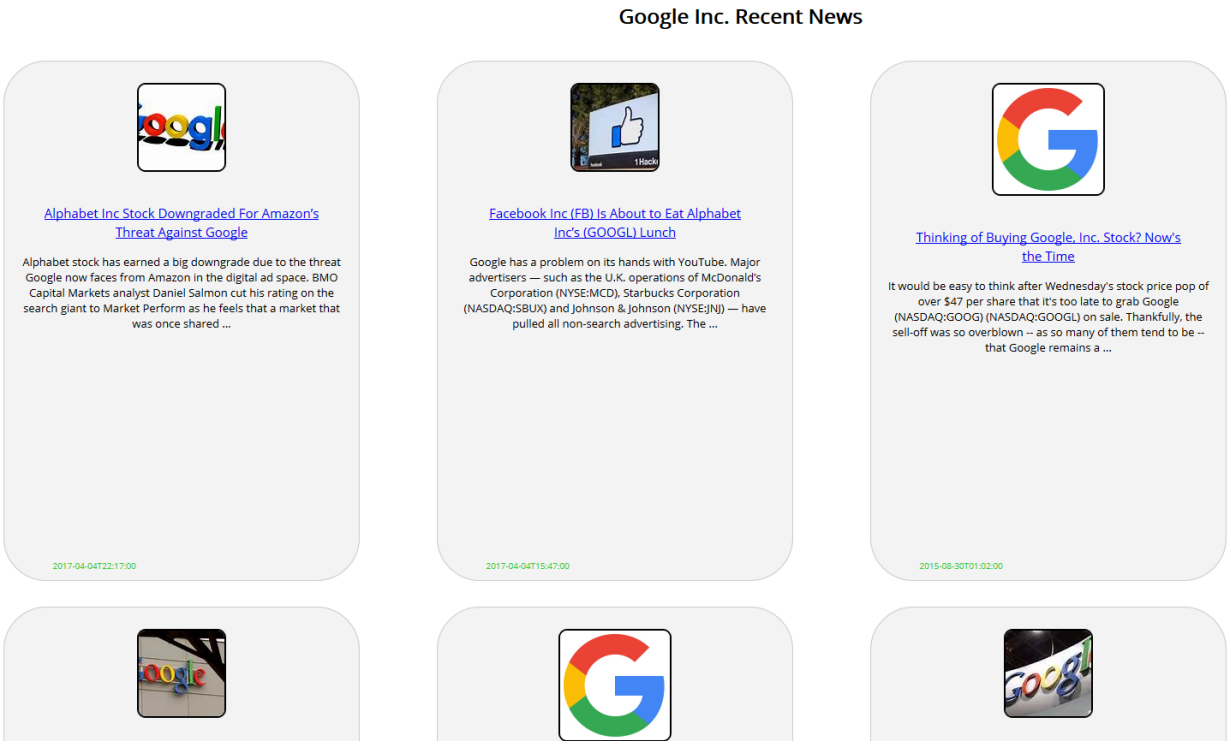
2.2.1 Investment reports:



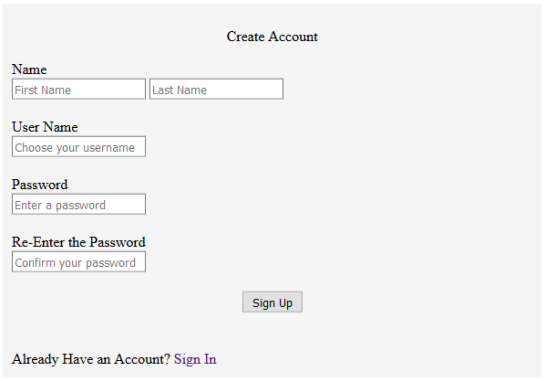
2.2.2 Stock Quotes:



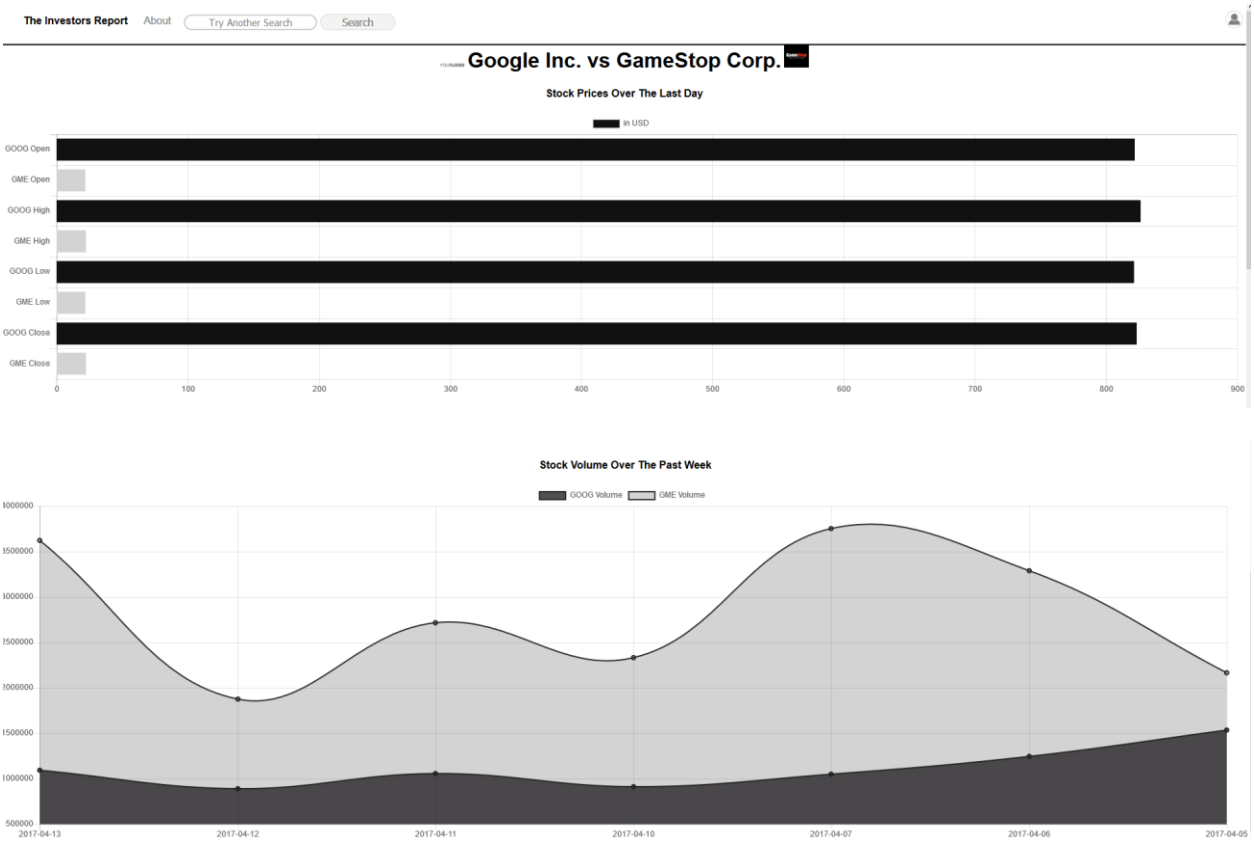
2.2.3 Current news related to company:



2.2.4 Portfolio:



2.2.5 Compare reports:



2.2.6 Stock quote predictor:

We knew from the beginning that line of best fit would be useless for the predictor since stock can rise and fall at a moment's notice. So, rather than giving the user useless info that can be naturally inferred, we chose to try and go with something more useful that would analyze and find patterns that could predict more accurately.

The current trend predictor uses a Perceptron algorithm to separate clusters of data. It is limited to outputting either a 0 for slight change or 1 large change when predicting what the next iteration will be. In this case, the data for stock price over last day is put into a dataset.

The gist of the algorithm is that there are weights that are set to zero which are used to help classify the data. The algorithm keeps running until all instances in the training data are classified correctly. For each instance in the training data, if it's classified as being in the same cluster as the first, add it to the weight. If not, subtract it from the weight. At the end, all the weights' dot products are taken and if it's positive, it will output a 0. A negative will output a 1. The 0 meaning that the prediction for the next instance will be in the same cluster as the previous. If it is a 1, then the next instance is not in the same cluster.

The main disadvantages of this algorithm alone for the predictor feature is that the output can only tell if the future will hold a small or large difference from the current and there is no way to know for sure if it is a positive or negative change. Using an additional algorithm would benefit the accuracy of the predictor.

2.3 USE CASES:

- Choose Report
    - Type company names into various search bars
    - Pick from a list of companies that fit name criteria
    - Compare report by typing in another company in the corresponding bar
- View Report
    - Hover over key points on graphs to view specific numerical info
- View news
    - Transfer to site of news article when clicking on it
- Signup for user account
    - Input personal info to have register search history

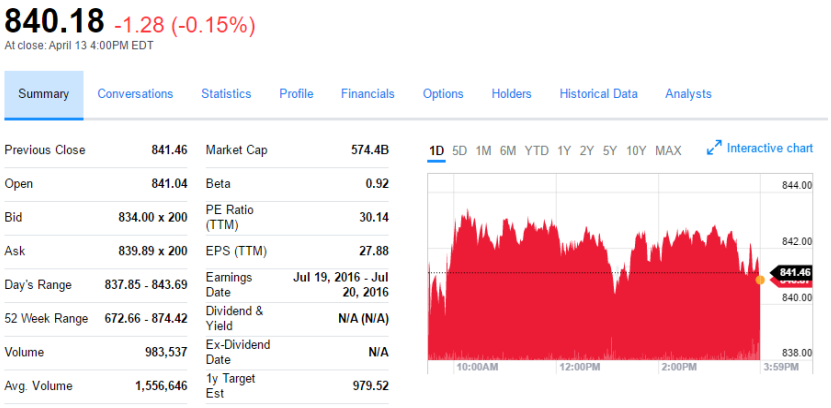
- Login to user account
    - Input account credentials

2.4 SIMILAR WORKS:

2.4.1 Yahoo finance

It contains a lot of information that can be relevant to an experienced investor, however, it is extremely cluttered and confusing to a novice. The main graph is unlabeled and most of the time some sections have a value of NA. In comparison to Yahoo Finance, our web app shows only what a novice would want to view to make an initial decision. One difference that Yahoo Finance has over our web app is the graph on earnings and the earnings. If we could find an api that contained info on earnings with the time limit we had, we would have implemented a graph on that too. The recommendation trends graph is also something that Yahoo Finance has that we do not. However, it is not very useful because most of the bar seems to indicate a buy rather than a sell for most companies most of the time. The numbers on that graph are also not explained and do not seem to be relevant to anything or reference anything that a

novice would understand. We planned on implementing something a little different as described in the future works section.



2.5 TECHNOLOGIES CHOICES:

2.5.1 HTML5

2.5.2 CSS3

2.5.3 JavaScript

2.5.4 JSON

2.5.5 MySQL

2.5.6 Node.js

3. CHALLENGES:

Finding a good API for the job was a little tricky. Because Google Finance recently halted their API, we needed to use a lesser known alternative. Ibrahim found a great API that had a stock info on companies in North America, called Quandl. It had a multitude of info on companies, but we had to pick and choose to use only four of the given categories for the graphs. Some of the data was not relevant to a novice investor such as the dividends category. When someone starts out at investing they do not usually think of the dividends yet, and even if they were they would be miniscule unless they were investing in larger companies. At that point, they might as well skip to the big leagues.

Another problem arose when we wanted to implement the search function for the web application. The API only provided company names as codes. Another separate API had to be used to be able to match them. Unfortunately, the two APIs were not congruent and the second API did not have all the name conversions for all the companies in Quandl. We had to make do with it for now.

Server side served as one of the largest challenges in this entire project. We used a member's existing server as a host for the application. Due to the existing site, we needed to find a way to have two co-existing applications running off one server and using one port for easy navigation. To do this we had to point the server using NGINX which allowed the use of URL's without port numbers.

Also server side, encryption and the gathering of data from MySQL using NodeJS was a challenge. We decided not to use a NodeJS framework for the encryption to see how it is done. Finding the perfect hash algorithm and a completely random salt was easy, however sending the data to the server from the client securely was a challenge.

4. CONCLUSION:

The Investors Report web application is designed for the novice investor to have up to date information to help them plan on which companies to invest in. Having the simple layout of graphs with the hover-over option for numbers is a streamlined way of seeing the trends rather than a bland spreadsheet. While the app in its current state might not be as others of its kind, it is not meant for the experienced investor. People new to the stock market can be overwhelmed by the sheer amount of data that is presented in other platforms, so the Investors Report web application is the easy way to get a summary while at the same time have an accurate representation of what the market looks like. We hope the application can find a balance between form and function and be useable by the average novice.

5. FUTURE WORKS:

5.1 BETTER STOCK QUOTE PREDICTOR:

If we were to continue to improve on the current web app, the predictor would use additional data mining algorithms. Classifier algorithms such as j48(aka c4.5), naive bays, and linear regression could be used. Nearest neighbor and j48 were attempted to be implemented for the assignment but nearest neighbor is hugely inaccurate due to the huge amount of variation in stock price and there was not enough time to completely make a j48 algorithm work. With these a numerical attribute value could be classified and there could be a more definitive prediction than just a big or small change sentence. If there were even more time, an ensemble approach could be put to use and compare multiple different algorithms for a best result.

5.2 ADDED REGIONS FOR COMPANIES:

Finding another API to accommodate regions other than North America would greatly expand our user-base as well as being able to make more accurate predictions by comparing trends of a larger dataset of companies. Being able to add more companies from different regions would also give way to having to convert currencies which might also need an API to keep track of the exchange rate.

5.3 ADVANCED COMPARISONS

Being able to add more companies to the comparison screen would help investors quickly and efficiently glance at the info they need. Comparing multiple different trends and graphs can help an investor visualize if they should or should not. Streamlining the comparison process would also give way to the emergence of clutter. Therefore, a modular comparison page where the user can choose what and where things are on the screen would be very useful and a nice addition to add.

5.4 DOWNLOADING REPORTS

If a user was on-the-go, needed to print something, or just wanted to save info for later, the ability to download the reports would be a great help. There could be a graphical option or a text based option.

5.5 STOCK SIMULATOR

Very handy as a stock simulator is an application which helps reproduce and/or duplicate features of a livestock market on the website. Consequently, this means that the investor may practice trading stocks and taking away the financial risk.

5.6 PREMIUM API

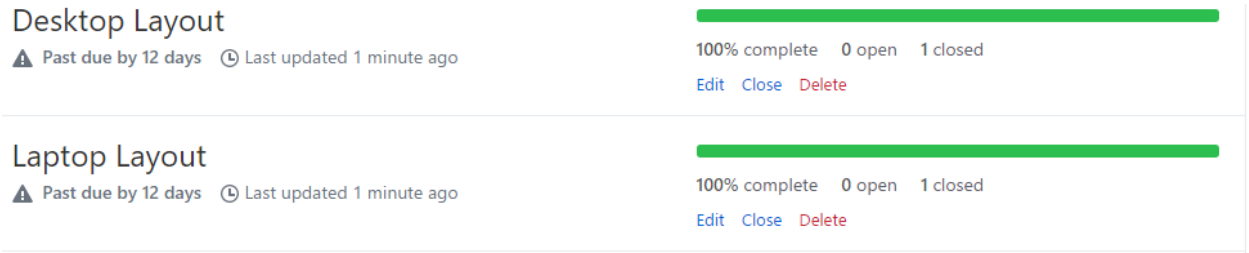
The initial API we used was very limiting because of the sole use of company code names as well as the lack of data given. The problem with many of the free API's is it's very limited to the information we can retrieve. As in, ones that are paid will grant you much more information to retrieve regarding your search. Furthermore, lots of API's have delays (15-20 minutes) till they get updated to real time feeds.

5.7 FUTURE PLANNING

This feature would be beneficial as it allows the website to predict and plan ahead for the future of the companies' stocks and where it is heading by analyzing older data and trends. Consequently, a strategic software which would guide investors.

6. GROUP DYNAMICS

6.1 SPRINTS:



6.2 EXPERIENCES:

Sprint PROS	Sprint CONS
● Frequent meetings ● Mini goals of deadlines ● Set tasks that each person can do ● Smaller tasks make final goal easier to achieve ● Meeting often helps keep us on track	● If someone is not in a meeting, it is difficult to appraise the time limit on a sprint cycle ● Too many time limits can lead to confusion ● Losing sight of final goal because of focus on tasks sooner in the deadline ● Too many meetings change the goals too often sometimes because of desired changes later in development

We did not fully follow sprint for every step of development, but when we did there was an orderly aspect to it. Some of us did not adhere to the time limit that we set for each task, though which is one of the reasons why the predictor was not present during the presentation.

Sprint did help when we did meetup because of the small iterations that we could show each other. However, we did not meetup every day like the sprint model says to. Sometimes we would go if not meeting for a week, usually due to other obligations. The set times for tasks helped with managing the goals, but more frequent meetings probably would have maximized time efficiency on our web application project.

In future projects, the frequent meetups aspect of the sprint model is very appealing and would probably keep most of us on track.

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News api:

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