PRELIMINARY PRESENTATION

Group #4
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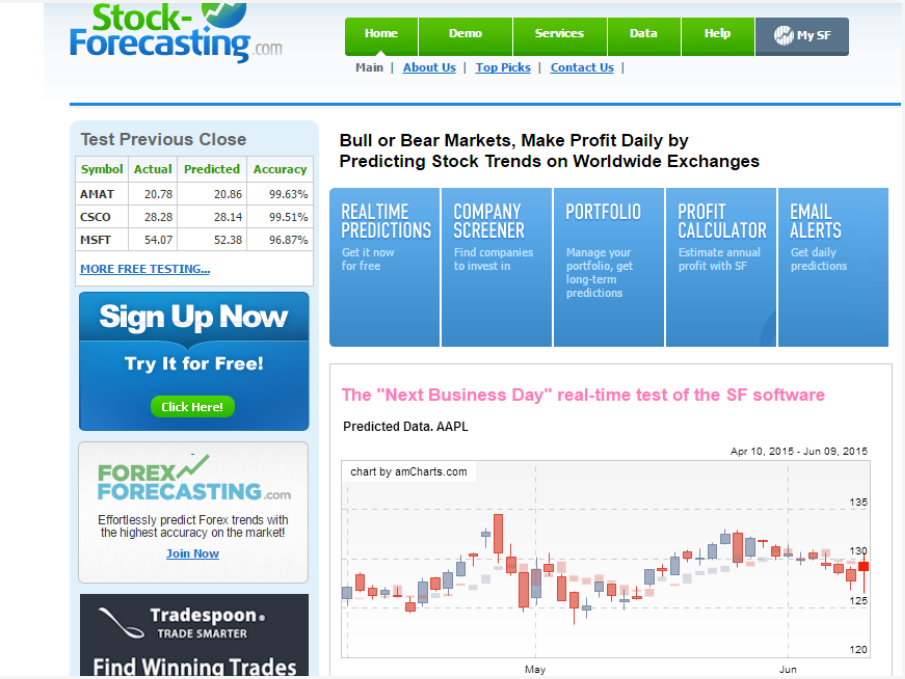
General Background

- In finance, **technical analysis** is a security **analysis** methodology for forecasting the direction of prices through the study of past market data, primarily price and volume.

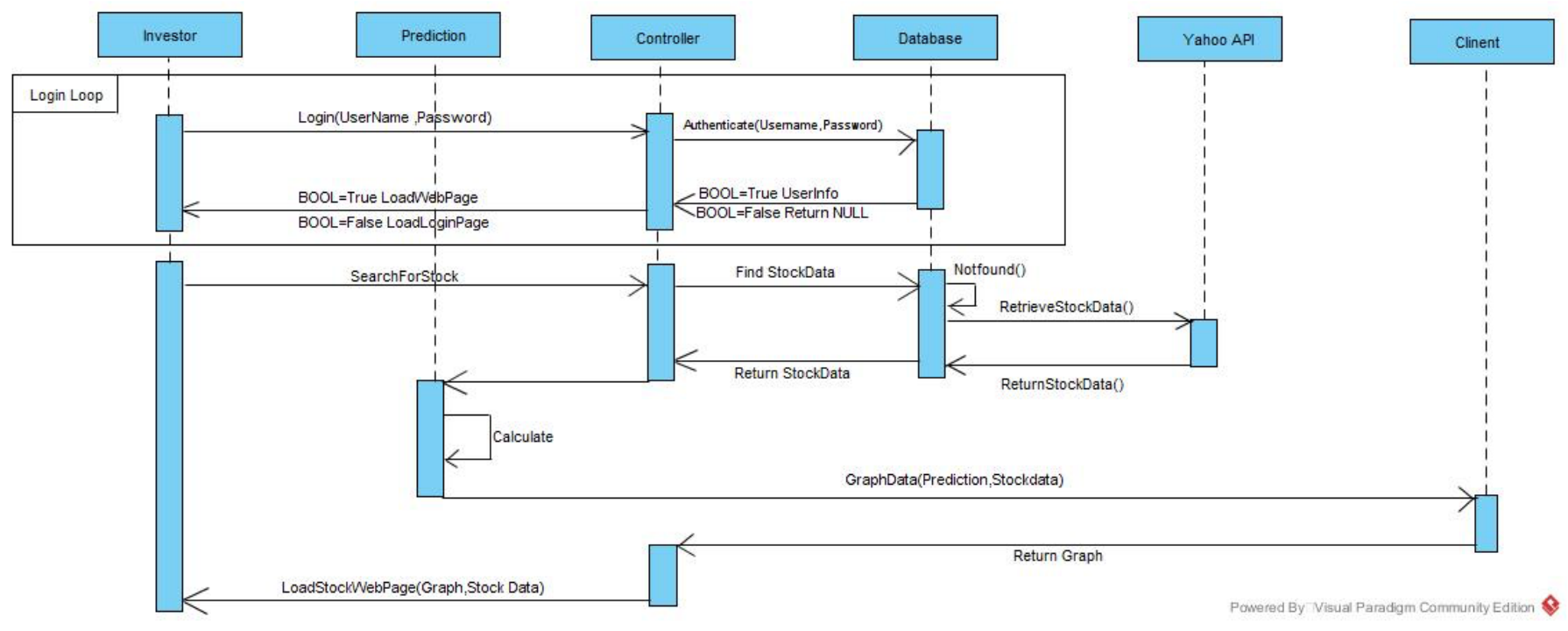
- Our website contains stock information collection, user stock management and stock price prediction.

Similar Systems

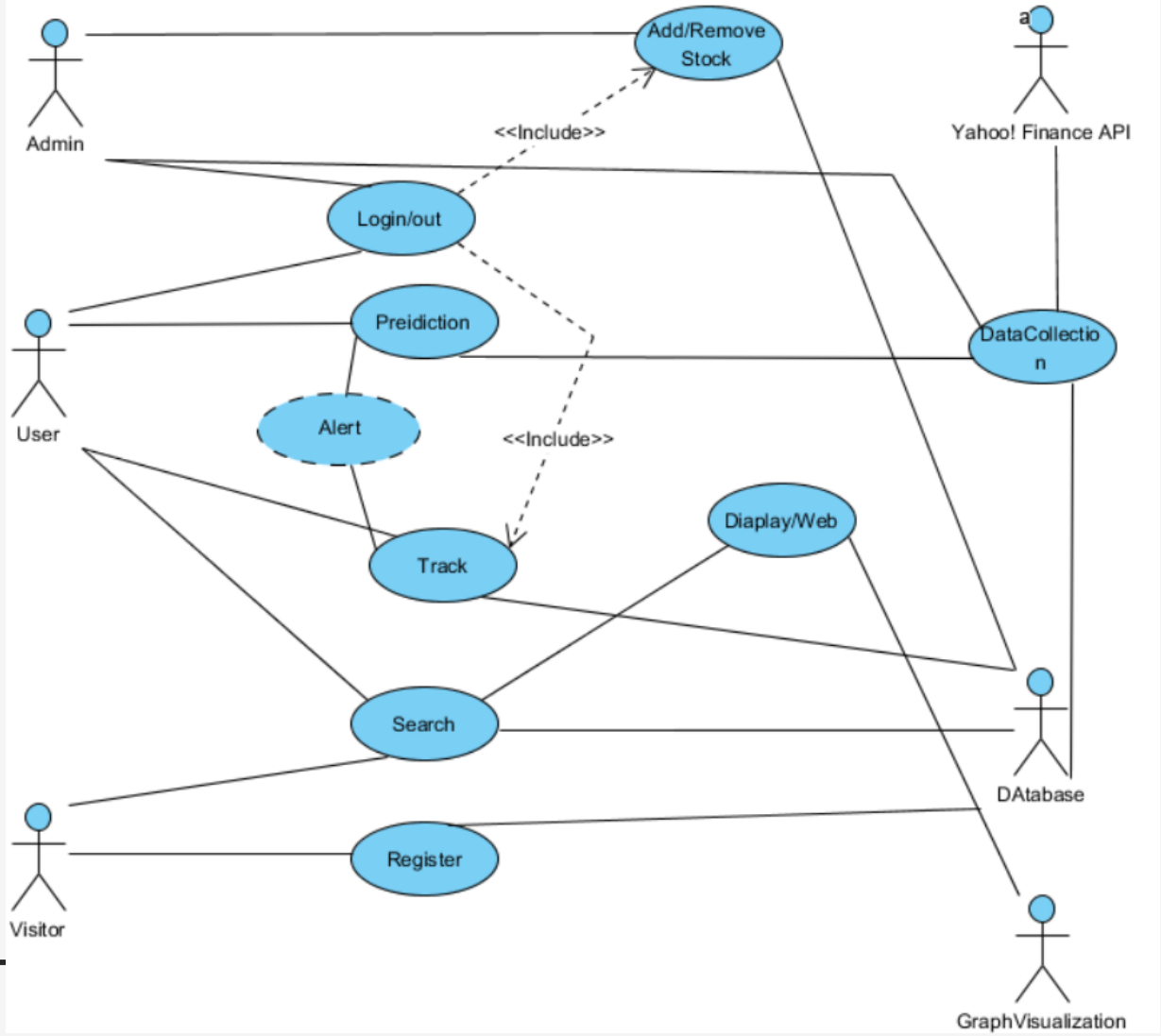
- Stock-forecasting.com
  - Charts presentation
  - Discover which securities have generated a buy or sell signal



High-Level Architecture



Use Case


Admin
Add/Remove Stock
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a
Yahoo! Finance API
Login/out
Preidiction
DataCollectio n
User
Alert
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Diaplay/Web
Track
Search
DAtabase
Visitor
Register
GraphVisualization

User Interface

- Stock Information
  - History
  - Real-time
  - Prediction
- Track Stock
  - Buy/Sell Alert
  - Portfolio Statics
- Suggestion
  - Most likely to grow up
  - Most popular
- High-Frequency / Ultra Short Term*
  - Automatically Buy/Sell

Web Service Interface - Database

- Add/Remove to/from Stock Database (History, Real-time, Prediction)
- Query Stock Database (History, Real-time, Prediction)

- Add/Remove to/from User Database
- Query User Database

- Add/Remove to/from User Stock Database
- Query User Stock Database

Web Service Interface

- Search Stock Information
- Register/Log in
- Add/Remove Personal Stock
- Calculate Prediction
- Track Stock Process
- Visualization
- Admin add/remove stock in database

Algorithm 1 - EMA

- An exponential moving average (EMA), also known as an exponentially weighted moving average (EWMA), is a type of infinite impulse response filter that applies weighting factors which decrease exponentially. The weighting for each older datum decreases exponentially, never reaching zero.

Algorithm 1 - EMA

$$EMA = (P * \alpha) + [Previous\ EMA * (1 - \alpha)]$$

Algorithm 1 - EMA

- Data Input
  - In this project we used the Exponential Moving Average and used the period as 200 days.
  - This number was chosen from the research the group did which lead us to believe that 200 days will provide a good balance between placing emphasis on past prices as well as more recent prices.
- Data Output
  - Price prediction for the next 1 day

Algorithm 1 - EMA

- Granville's Strategy
- (1)If the 200 day average line flattens out following a previous decline, or is advancing, and the price of the stock penetrates that average line on the upside, this comprises a major buying signal.
- (2) If the price of the stock falls below the 200 day moving average price line while the average line is still rising, this also is considered to be a buying opportunity.
- (3)If the stock price is above the advancing 200-day line and is declining toward that line, fails to go through and starts to turn up again, this is a buying signal.
- (4) If the stock price falls too fast under the declining 200-day average line, it is entitled to an advance back toward the average line and the stock can be bought for this short-term technical rise.
- (5) If the 200-day average line flattens out following a previous rise, or is declining, and the price of the stock penetrates that line on the downside, this comprises a major selling signal.
- (6) If the price of the stock rises above the 200 day moving average price line while the average line is still falling, this also is considered to be a selling opportunity.
- (7) If the stock price is below the falling 200-day line, and is advancing toward that line, fails to go through and starts to turn down again, this is a selling signal.
- (8) If the stock price advances too fast above the advancing 200 day average line, it is entitled to a reaction back toward the average line and the stock can be sold for this short-term technical reaction.

Algorithm 1 - EMA

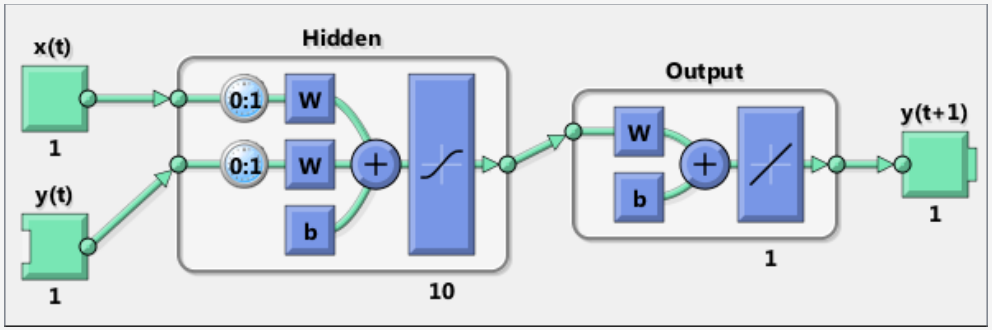
Algorithm 2 - ANN

- REASONS:
  - excellent for designing the behavior of more complicated structures because of their ability to learn
  - easy to implement
  - good compatibility

- Implement:
  - Matlab neural network toolbox

- Features:
  - Weighted average prediction
  - Confidence value
  - Trading decision

Algorithm 2 - ANN



Algorithm 2 - ANN

- DATA:
  - The price of stock in past one year from database
  - Predict 5 days close price in future

Web Sources

- The original link of stock from Yahoo is http://finance.yahoo.com/q?s=YHOO, however we use the following API as http://finance.yahoo.com/d/quotes.csv?s=$stock&f=$format, where parameters **$stock** and **$format** simply reflects stock symbol and fetched symbol. Moreover, we can realize various data collection by different parameters such as
- http://finance.yahoo.com/d/quotes.csv?s=GOOG+AAPL+MSFT&f=snl1d1t1cv
- where s=symbol, n=name, l1=last trade, d1=last trade due, t1=last trade time, c=change and percent change, v=volume. The above URL will fetch stock data of Google, Apple, Microsoft and Yahoo.

Achieved tasks & Future Plan

- Achieved
  - Database Construction
  - Data Collection
  - Algorithms Design

- Future
  - Algorithms Implementation
  - Web UI Design & Implementation
  - Stock Track & Alert Implementation
  - Tests Design & Operation
  - Documents