Doug Dellolio

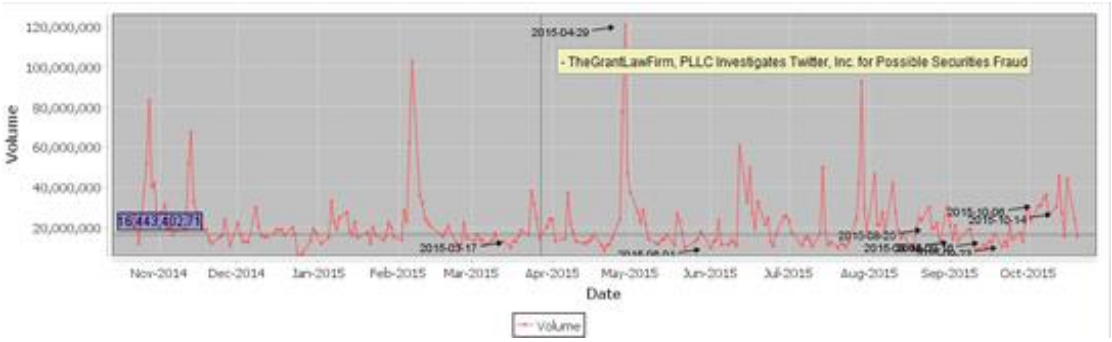
Senior Design - Stock Market Program

Writing Assignment 2

One of the main reasons why one invests in the stock market is to achieve a positive return on their initial investment. One of the main drivers of a stock price is media and in particular social media. Media has a great impact on whether the price of a stock moves up or down. Companies listed on any exchange will publish press releases regularly to inform the public about events or products. After a press release is published, the price of the stock can move in any direction as a reaction by shareholders and traders. Traders and shareholders usually have reactions to these releases which causes them to buy more of their position or sell out completely. One of the main goals of this program is to analyze the press releases and tweets of these companies giving the user an overview of the most significant terms and phrases used by the company. Another main goal of this program is to use the analysis of the press releases and tweets to predict the movement of a stock based on certain phrases and words. Applications that claim to have similar goals such as predicting movement use different techniques such as volume history to predict where the price of a stock may go. They will use things such as mathematical equations for weighted averages and volume history assuming that it can give clues about the future. The volume of a stock is defined as the amount of shares traded in a specific time period. This application will take new and unique ways to help the user predict the movement of stock price after a press release is published.

The first component of this application is a modern graph with the latest volume data. As stated previously, volume history is one of the biggest factors that traders might look at to predict price movement. In this applications case, we will be focused on using this volume data in a

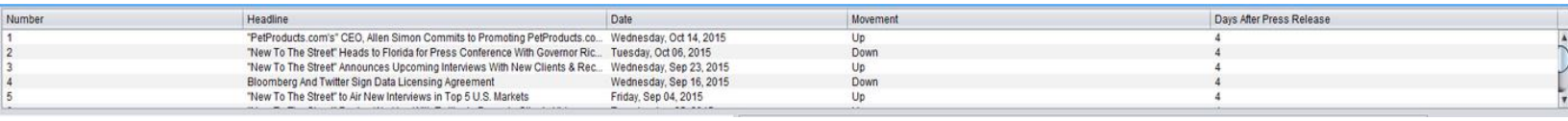
different way. Only daily volume, or the amount of shares traded in a day, will be used to determine movement of stock price in a certain time period. A line graph will be the main visual component which will include the press releases that were published on specific dates. The Y-axis will include the volume in millions, and the X-axis will include the dates of the past year. On hover, you will be able to see press releases for that date and read the titles of those press releases. This is important for the user to see because it will illustrate visually the movement of the stock after the press release was published. It is clear to see after a release what exactly happened to price because the release is pointed out for each date. Below is an example of the chart for Twitter (TWTR) stock. You will notice at the highest point of the graph, a press release titled "TheGrantLawFirm, PLLC Investigates Twitter, Inc. for Possible Securities Fraud" is shown on hover. This release was published on April 29, 2015 stating that the company may have published misleading statements concerning advertising revenues and revenue growth. As one can imagine, the consequences of this release corresponded with the words "fraud" and "investigates". The downward movement of the stock is clearly seen in the following days.



The main goal of this application is to look at that release and point out what is it about the content that caused this negative movement. The user will also be able to use their cursor to easily view the volumes for each date. A crosshair is created and will move along with the mouse to show volume differences as well. The volume for the days in the center of the crosshair will

show up on the left hand side in a purple dialog box. The changes in volume that can be viewed visually will also be used in another component of this application and will be explained more at a later point.

The next component that will be used will be a textual representation of the graph above. This will include a summary of all of the points in the graph as well as other important information. It will also include the movement of the stock based off of 1-5 days after the press release was published. This will also help the analyzer to conclude which press releases could be positive or negative. Below contains the press release list for Twitter. This table corresponds with the visual graph above.



Number	Headline	Date	Movement	Days After Press Release
1	"PetProducts.com's" CEO, Allen Simon Commits to Promoting PetProducts.co...	Wednesday, Oct 14, 2015	Up	4
2	"New To The Street" Heads to Florida for Press Conference With Governor Ric...	Tuesday, Oct 06, 2015	Down	4
3	"New To The Street" Announces Upcoming Interviews With New Clients & Rec...	Wednesday, Sep 23, 2015	Up	4
4	Bloomberg And Twitter Sign Data Licensing Agreement	Wednesday, Sep 16, 2015	Down	4
5	"New To The Street" to Air New Interviews in Top 5 U.S. Markets	Friday, Sep 04, 2015	Up	4

There is a column titled “Movement” which describes the movement of the stock price after a determined number of days. The number of days taken is located on the right most column titled “Days after Press Release”. The program takes the volume of the day of the press release and compares it to the next few days to calculate the movement after release. In Twitter’s case, the program decided to take the next 4 days after release to show the movement. The less days the program can use, the more accurate reading it will be able to show. This is the exact data the analyzer is using to learn the data and create a prediction. It is important to show this data to the user so they know what exactly is going into the calculation of the probability that a future press release will move the price up or down.

The two most important components, the actual text analysis, will be in the front center of the application. Using a library called Lingpipe, there will be three methods of text analysis.

These three methods include topic classification, significant phrases, and sentiment analysis. For the topic classification, the main idea is to determine whether or not a specific press release is "on topic" with the goals of the company. It is important to see whether or not the content is on topic because if it is not, it may cause a downward trend in the movement of price or have no affect at all. This works in various ways. First, the application is trained on the different sectors and industries that the stock market is made up of. This will include consumer goods, technology, healthcare, services, and more. In the background, the application is fed multiple press releases each pertaining to a sector so that it can learn what each sector is about. After it is trained, it will be able to take in a press release and rank each based on the sector of best fit. It can be assumed that if the best category it receives is not corresponding with its sector, it is not on topic. It can also be further concluded that it may have had a negative or neutral effect on the stock price for that particular day. Next, it will go through a significant phrase calculation. The user will be given a list of significant phrases and words based on previous press release history. This will also include new words and phrases and phrases that are most frequently seen. It is important to know these significant phrases because it will correspond to the movement of the stock. This will allow a prediction of stock price to be created for future releases because the application will know if a press release caused an upward movement, and the most frequent words and phrases will correspond to that release. The last part of the analysis will create a sentiment analysis. Not only is it important to understand the topic at hand and significant phrases, but it is important to actually rank these terms into categories of positive, negative, and neutral. The user should be able to see what caused the stock price to move up (positive), move down (negative), or had no effect (neutral). These categories will be shown in neat graphs created by Java's chart class. In seeing these visually, the user will not only be provided with the

applications opinions, but they can make up their own ideas as to how they would like to proceed, whether to buy or sell a stock. This is unique in that all of the data being analyzed will be shown to the user, and will not be hidden in the background like other programs may do.

The main goal of this application is to help create an analysis for users and provide an educated prediction as to the movement of stock price. Most programs today will take into account other factors at an attempt to try and predict future price movement of a stock. It is shown that this actually has no effect on the movement of a stock, rather it is social media that will have the most impact on price movement. This application will take this social media aspect into account because of its importance to a company's reputation. After every release on Twitter's chart, there was a movement in price that can be easily viewed from the pictures posted above. Furthermore, these programs on the market today are extremely complicated and only those with much knowledge of the market can handle using the programs effectively. The components for this application that are mentioned above are all presented together in such a way that even a user with little knowledge of the market can handle. Data is also cached to ensure a fast and smooth retrieval of press release data. Lastly, allowing the user to see the data instead of it being hidden will create a more transparent atmosphere as they are being shown exactly how the data is being analyzed and how the numbers are being calculated. Although this program does a lot of the thinking work for you, it will never tell you exactly what to do. However, it will provide you an educated guess based on facts to help guide you to make better investment decisions and become a better investor.