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Big Data in Finance

Assignment C

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Stock Price Prediction by Tweets

To put the idea in the simplest way, I load the data into Apache Spark and then transform them from the .json format to .txt format. The reason for making this choice is simply that text files are easier to work with. The Python scripts contain multiple functions, whose purpose includes counting the instances of company names from the Dow Jones Index and computing the ratio of good-sentiment words and bad-sentiment words. To predict the stock returns, I filter those tweets that contain the target companies and study them. There are many ways to analyze the tweets, but the simplest way is to search the tweets for words with positive or negative sentiments. Paying attention to the negation words, I specifically check if there are negation words such as “not,” “never,” and “rarely,” and count these as the opposite. Next, I define a variable call good/bad ratio as an indicator for whether the stock prices will move up or down. I have written a merge function to combine tweets at a certain time with its related stock returns at the same time or within several hours. This function enables me to consider tweets in a more accurate fashion. It is a concern that most of the tweets were posted outside of the 390 minutes of trading time per trading day and many more were posted during the weekend. Therefore, I count tweets after 4:30 pm as affecting the next trading day.

After I sort out these details, the core step of predicting stock price movements is constructing a regression relationship between the good/bad ratio and the stock returns. The simple regression function will serve as my model for predicting stock prices in the future. For example, the tweets and the Google stock returns in March 2013 gave me the regression formula y=0.5x-0.5. If the good/bad ratio for April 2013 was 1, I expect the stock price to stay at the original level.