

Cloud Based Stock Price Prediction using News Sentiment Analysis- A Review of Literature

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ABSTRACT

Stock price prediction is a difficult task, since it very depending on the demand of the stock, and there is no certain variable that can precisely predict the demand of one stock each day. However, Efficient Market Hypothesis (EMH) said that stock price also depends on new information significantly. One of many information sources is people's opinion in social media. People's opinion about products from certain companies may determine the company's reputation and thus affecting people's decision to buy the stock of the company. When using opinion as primary data, it is necessary to make a suitable analysis of it. A famous example using opinion as data is sentiment analysis. Sentiment analysis is a process to determine emotion/feeling within people opinion about something, in this case products of some companies. There are some researchers about sentiment analysis used to predict the stock prices. Bollen on his research concludes that people opinion on social media such as Twitter can predict DJIA value with 87.6 percent accuracy. This shows that there is a relation between sentiment analysis and stock prices. Our purpose on this research is to predict the Indonesian stock market using simple sentiment analysis. Naïve Bayes and Random Forest algorithm are used to classify tweet to calculate sentiment regarding a company. The results of sentiment analysis are used to predict the company stock price. We use linear regression method to build the prediction model. Our experiment shows that prediction models using previous stock price and hybrid feature as predictor gives the best prediction with 0.9989 and 0.9983 coefficient of determination.

Keywords— linear regression, sentiment analysis, stock price, supervised learning, Twitter

I. INTRODUCTION

Stock price prediction is a difficult task. It is because there is no certain variable that can precisely predict the stock price every day. Based on Efficient Market Hypothesis (EMH), new information is a significant factor that effects changes of stock price [1]. This information, such as news about company can influence people decision whether they will buy the company's stock. More people buy the company's stock, the price is getting higher. People tend to buy a company with good reputation. One way to know company's reputation is by seeing relationship between the company and customer [2]. The explosion of social media usage forces many companies to create their official account in social media to keep in touch with their customer. This makes customer can express their opinion about products easily. One of the social media that commonly used by company is Twitter.

There are several researchers about how the information from social media can affects the stock price. Based on research conducted by Johan Bollen, et.al[3], it concluded that certain mood states of Twitter data can predict the Dow Jones Industrial Average (DJIA) value with 87.6% accuracy. Another research conducted by Anshul Mittal and Arpit Goel[4], shows that with the DJIA value, calmness, and happiness mood states of twitter data on previous days can predict the DJIA value on the current day with 75.56% accuracy. This shows that information from Twitter can really be used to predict stock data. The contribution of this research lies in the use of existing classification and prediction algorithm to the dataset. The dataset consists of twitter dataset and stock price dataset. Twitter dataset used was in Bahasa and stock price dataset retrieved from several companies in Indonesia.

II. PROBLEM STATEMENT

Stock price prediction is a difficult task, since it very depending on the demand of the stock, and there is no certain variable that can precisely predict the demand of one stock each day. However, Efficient Market Hypothesis (EMH) said that stock price also depends on new information significantly. So, the purpose of this work is to develop an application to accurately predict stock price.

III. LITERATURE SURVEY

No.	Paper	Authors	Year
1.	Biologically inspired speech emotion recognition	Reza Lotfidereshgi;Philippe Gournay	2017
2.	Analysis of Concealed Anger Emotion in a Neutral Speech Signal	Vamsi Vijay Mohan Dattada;M Jeevan	2019
3.	Construction of a database of emotional speech using emotion sounds from movies and dramas	Youjung Ko;Insuk Hong;Hyunsoon Shin;Yoonjoong Kim	2017
4.	Short-term prediction for opening price of stock market based on self-adapting variant PSO-Elman neural network	Ze Zhang;Yongjun Shen;Guidong Zhang;Yongqiang Song;Yan Zhu	2017
5.	Influence of audio bandwidth on speech emotion recognition by human subjects	Olivier Lahaie;Roch Lefebvre;Philippe Gournay	2017
6.	An Affective Service based on Multi-Modal Emotion Recognition, using EEG enabled Emotion Tracking and Speech Emotion Recognition	Danai Styliani Moschona	2020
7.	Improving Speech Emotion Recognition with Unsupervised Representation Learning on Unlabeled Speech	Michael Neumann;Ngoc Thang Vu	2019
8.	Time Series with Sentiment Analysis for Stock Price Prediction	Vrishabh Sharma;Rajgauri Khemnar;Renu Kumari;Biju R Mohan	2019
9.	Stock Price Prediction Using News Sentiment Analysis	Saloni Mohan;Sahitya Mullapudi;Sudheer Sammeta;Parag Vijayvergia;David C. Anastasiu	2019

10.	Stock Price Prediction Through the Sentimental Analysis of News Articles	Jaeyoon Kim;Jangwon Seo;Minhyeok Lee;Junhee Seok	2019
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IV. PROPOSED ARCHITECTURE

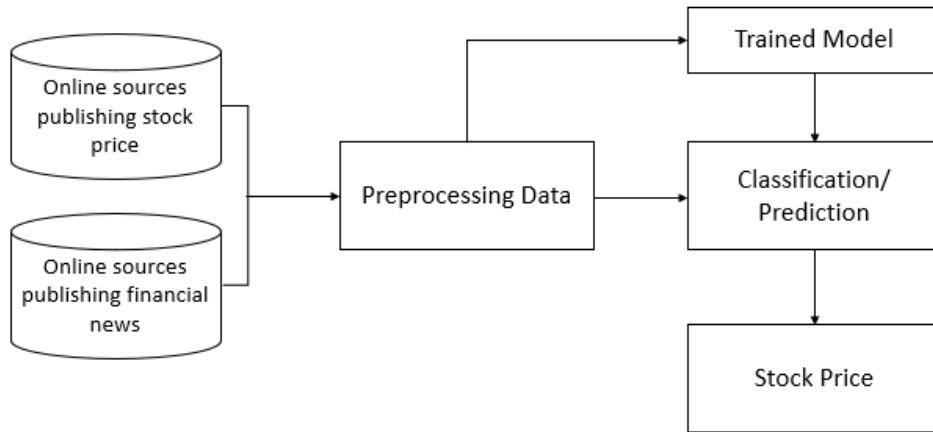


Figure 1 System Architecture

Our system automatically analyzes and classifies news articles and generates recommendations for investors. Success ratio of our system can be increased by using more proper news articles. Because some articles in the dataset may have not been directly related to the selected stock. Online sources that we used to get articles publish some articles originally related to stocks of other companies in the same sector under our stock’s category. If articles that are not directly related to the selected stock are eliminated, success of the system would increase.

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IV. CONCLUSION

We accomplished the stock prediction system using financial news articles. Our system automatically analyzes and classifies news articles and generates recommendations for investors. Success ratio of our system can be increased by using more proper news articles. Because some articles in the dataset may have not been directly related to the selected stock. Online sources that we used to get articles publish some articles originally related to stocks of other companies in the same sector under our stock’s category. If articles that are not directly related to the selected stock are eliminated, success of the system would increase.

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