Research Questionnaire

Note:
- **Fill up *Table 2* for each paper. (COPY TABLE 2 AND PASTE AT THE END OF THIS FILE FOR NEXT PAPER)**
- *Green* **– Write few or more lines of required in your own words.**
- *Red* **– write down the list of what is required and description about each in the list**

1.

TABLE 1	
Reg. No. & Name	19BCE2245 - Gokul R Nair
Team No.	**7**
Paper Title	***1. Prediction of stock values changes using sentiment analysis of stock news headlines*** **2. A Method of Using News Sentiment for Stock Investment Strategy** **3. Augmented Textual Features-Based Stock Market Prediction**
Citation *(APA style)*	1. Nemes, L., & Kiss, A. (2021). Prediction of stock values changes using sentiment analysis of stock news headlines. *Journal of Information and Telecommunication*, 1-20. 2. Katayama, D., & Tsuda, K. (2020). A Method of Using News Sentiment for Stock Investment Strategy. *Procedia Computer Science*, *176*, 1971-1980. 3. Bouktif, S., Fiaz, A., & Awad, M. (2020). Augmented textual features-based stock market prediction. *IEEE Access*, *8*, 40269-40282.

<div align="center">

TABLE 2

</div>

Problem answered in this paper. (1-2 lines)	How to analyse stock value changes and predictions of the stock values using fresh scraped economic news about the companies
Detailed description about the problem (5-8 lines)	Stock market prediction is highly dynamic, in-order to predict its change and analyse it we need some high computation technology. The following work focuses on analysing the stock market using news headlines.
Why that problem is chosen in this paper? Scope of the problem and solution (*Refer Introduction*) (5-8 lines)	The stock market is one of the most important economic participants. Many people try to interpret and define the different stock market movements in many ways. In this article, we use different tools to the sentiment analysis, especially focussing on the economic news, but in terms of economic news, focussing only on the headlines of economic news.
History of the problem. (*Refer Introduction*) (8-10 lines)	The traditional method which we use are analysing the graphs and making a prediction on it. The graphs analytics are still acceptable, but with the dynamics of Stock market changing every second we need to find some new methods.

List of the related/similar problems (*Refer Related work*) – Describe each with proposed solutions

Related problem 1 – Describe (3-4 lines)	**Stock market prediction using an improved training algorithm of neural network**
Paper in APA style	Billah, M., Waheed, S., & Hanifa, A. (2016, December). Stock market prediction using an improved training algorithm of neural network. In 2016 2nd International Conference on Electrical, Computer & Telecommunication Engineering (ICECTE) (pp. 1-4). IEEE.
Related problem 2 – Describe (3-4 lines)	**Real-Time Sentiment Analysis of Twitter Streaming data for Stock Prediction**
Paper in APA style	Das, S., Behera, R. K., & Rath, S. K. (2018). Real-time sentiment analysis of twitter streaming data for stock prediction. *Procedia computer science*, *132*, 956-964.
Related problem 3 – Describe (3-4 lines)	**BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding**

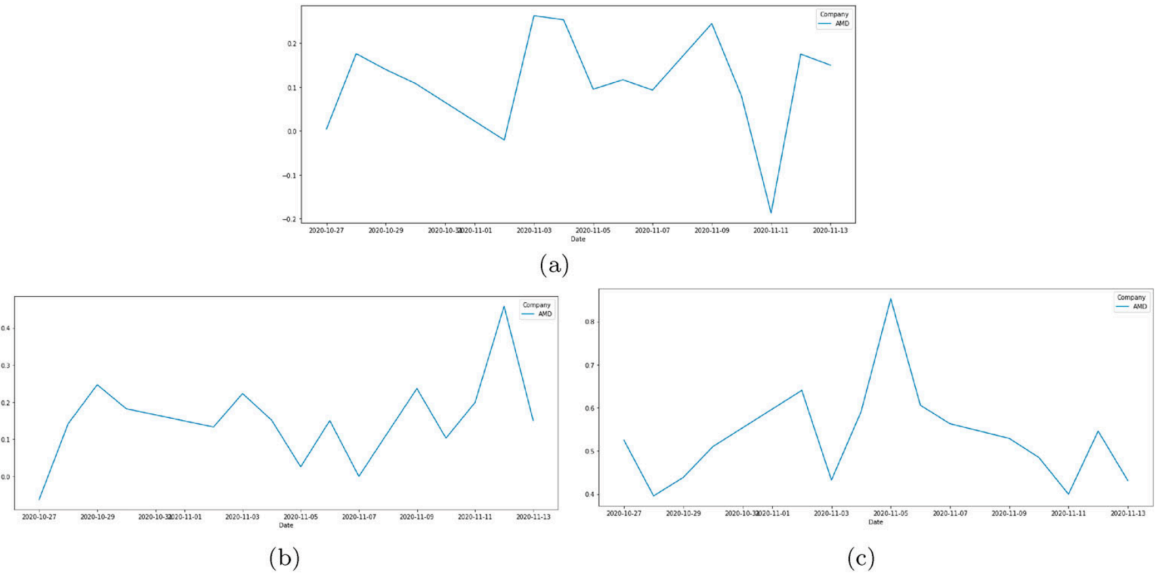|	
Paper in APA style	Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2018). Bert: Pre-training of deep bidirectional transformers for language understanding. *arXiv preprint arXiv:1810.04805*.
Related problem 4 – Describe **(3-4 lines)**	Predicting Stock Market Behavior using Data Mining Technique and News Sentiment Analysis
Paper in APA style	Khedr, A. E., & Yaseen, N. (2017). Predicting stock market behavior using data mining technique and news sentiment analysis. *International Journal of Intelligent Systems and Applications*, *9*(7), 22.
Related problem 5 – Describe **(3-4 lines)**	**A survey on opinion mining and sentiment analysis: Tasks, approaches and applications**
Paper in APA style	Billah, M., Waheed, S., & Hanifa, A. (2016, December). Stock market prediction using an improved training algorithm of neural network. In 2016 2nd International Conference on Electrical, Computer & Telecommunication Engineering (ICECTE) (pp. 1-4). IEEE.
What is the proposed solution in this paper for the problem chosen? (*Refer Proposed work*) **(5-8 lines)**	Sentiment analysis with BERT is one of the most powerful tool that we can use, but we can also create a Recurrent Neural Network (RNN) as well or use the NLTK tool with VADER Lexicon with SentimentIntensity Analyzer.
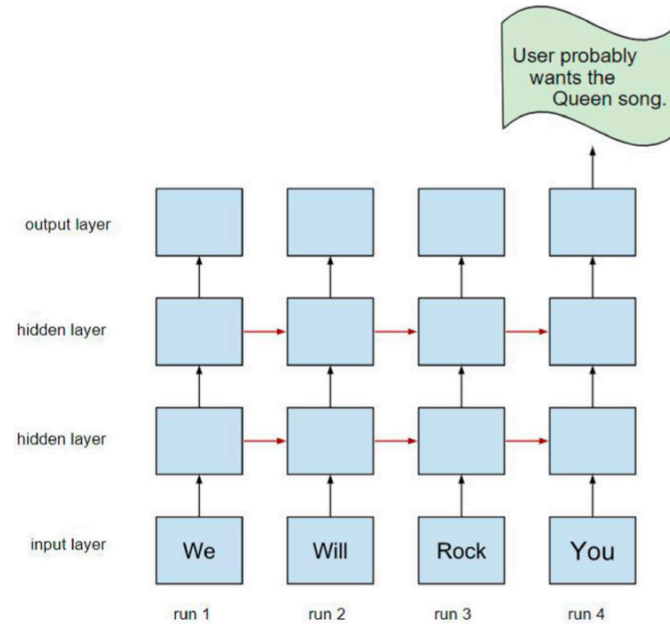
Architecture of the proposed solution. (*Refer proposed work*) **Diagram**	
Name of the approach as stated by the authors (if not, you try to give a name based on the concepts used)	**Bidirectional encoder representations from transformers (BERT)**

List of existing algorithms used by the authors to complete the proposed work. **(1-2 lines for each algorithm)**	Recurrent neural network (RNN) Recurrent Neural Network is a neural network that is intentionally run multiple times, where parts of each run feed into the next run. Specifically, hidden layers from the previous run provide part of the input to the same hidden layer in the next run. **NLTK -- VADER lexicon** NLTK stands for Natural Language Toolkit. This toolkit is one of the most powerful NLP libraries which contains packages to make machines understand human language and reply to it with an appropriate response. **TextBlob** TextBlob is a powerful NLP library for Python, which is built upon NLTK and provides an easy to use interface to the NLTK library. This tool can be used to perform a variety of NLP tasks ranging from parts-of-speech tagging to sentiment analysis, and language translation to text classification, but we focus on the sentiment analysis.
List of datasets used. (*Refer experimental evaluation/result discussion*) **(3-4 lines)**	**IMDB review dataset** A dataset compromising of 50k plus movie reviews with 250000 highly polar reviews.
References/links to each of the dataset used in this paper (in APA style)	1. https://www.kaggle.com/lakshmi25npathi/imdb-dataset-of-50k-movie-reviews 2. https://www.imdb.com/interfaces/

Why the above dataset(s) used? (*Refer experimental evaluation/ result discussion*) **(3-4 lines)**	IMDB dataset having 50K movie reviews for natural language processing or Text analytics. This is a dataset for binary sentiment classification containing substantially more data than previous benchmark datasets. We provide a set of 25,000 highly polar movie reviews for training and 25,000 for testing. So, predict the number of positive and negative reviews using either classification or deep learning algorithms.
List of equations that are very well applied in this problem domain	Equation 1: RNN Algo Description: T**he state of the art algorithm for sequential data** and are used by Apple's Siri and and Google's voice search.
List of method(s)/metrics used to evaluate the proposed approach. (*Refer experimental evaluation/ result discussion*) **(5-8 lines)**	**RNN, Text Blob, NLTK** Figure 12. Sentiment analysis of different models by daily separation. (a) TextBlob. (b) NLTK -Vader Lexicon and (c) RNN.

List of supporting tools/concepts (3-4 lines)	**NLTK -- VADER lexicon** **TextBlob**
What are the similar approaches with which the proposed approach is compared? (Refer experimental evaluation/ result discussion) **Explain each of these approach (3-4 lines)**	Approach 1: **Graph Analysation** The traditional method of graph analysation is compared with sentiment analysis based graphs to find the similarity. Approach 2: **Statistical Analysation** Past Stock prices of AMD was compared with the sentiment based statistics to match the precision.
How the results of proposed approach are compared with other similar approaches? (*Refer experimental evaluation/result discussion*)	**Time based fluctuations of stock price.** A normal for loop based code which compares data added in both the arrays(array 1 with historical data and array 2 with sentimental analysis data) to find acceptance rate.
Advantages/merits of proposed solution in your view. (*Refer conclusion / result discussion / experimental evaluation*)	The advantage of this method is we can predict the future prices without the help of any statistics of previous price chart. This will help us to free billions of data storage which comprises of time based stock prices.
Disadvantages/limitations of proposed solution in your view. (*Refer conclusion / result discussion / experimental evaluation*)	Disadvantage is the whole system depends on news headlines and user response. Due to this we need user response in-order to habitat with this method. If time arise when we have no news headline based on stock prises which might cause failure of this service. But the above mentioned problem have 10^-9%* chances of happening.

Future work as stated by authors (*Refer conclusion / result discussion / experimental evaluation*)	Future work could include further expansion of the analyses, possible additions of a new features. In addition, the inclusion of other tools to compare stock market predictions with different sentiment analysis tools. That can be built into an easy-to-use format by developing a platform incorporating various future changes of tensorflow into the current model.

Your one page write-up about this paper

Predictions and speculations regarding stock market values, particularly the valuations of global firms, are a fascinating and appealing topic. In this post, we look at how stock value varies and how to anticipate stock value changes using freshly scraped economic news about companies. We're concentrating on economic news headlines.To analyse the sentiment of the headlines, we use a variety of technologies. We use BERT as a baseline and compare the sentiment results to stock fluctuations over the same time period using three other tools: VADER, TextBlob, and a Recurrent Neural Network.In contrast to the other two instruments, the BERT and RNN were far more accurate; these tools were able to assess emotional values without neutral parts. We can determine the moment of the change in stock values by comparing these results to the movement of stock market values over the same time periods using sentiment analysis of economic news headlines.In contrast to the other two instruments, the BERT and RNN were far more accurate; these tools were able to assess emotional values without neutral parts. We can determine the moment of the change in stock values by comparing these results to the movement of stock market values over the same time periods using sentiment analysis of economic news headlines.

Your findings: (possible alternate for the solution proposed)

- One of the alternate is using LSTM rather than RNN, because the specificity of LSTM would helps us to target the core problem
- Using pre built ML model synthesiser(eg: CoreML) which will help to create ML model based on the data provided and precision

2.

TABLE 2	
Problem answered in this paper. **(1-2 lines)**	This study evaluates the sentiment of Japanese news and attempts to apply it to investment strategies in individual stocks.
Detailed description about the problem **(5-8 lines)**	When the effectiveness of investment was lost in weekly and monthly frequencies Japanese news made an attempt to make individual stocks stable. This reveals that the validity period of sentiment in individual the investment was made at daily, weekly, and monthly frequencies, the effectiveness of the investment was found in daily, but stocks is as short as daily. its effectiveness was lost in weekly and monthly frequencies. This reveals that the validity period of sentiment in individual stocks is as short as daily.
Why that problem is chosen in this paper? Scope of the problem and solution (*Refer Introduction*) **(5-8 lines)**	The reason was people were loosing interest and faith in Japanese Stocks. To make the flow of money constant in the market they made this attempt of boosting stock market.
History of the problem. (*Refer Introduction*) **(8-10 lines)**	The problem started with deduction in flow of money in stock market. Not only this Tokyo Stock Exchange was observing a huge descent in share price.
List of the related/similar problems (*Refer Related work*) – Describe each with proposed solutions	
Related problem 1 – Describe **(3-4 lines)**	**3D Data management**: **Controlling data volume**, **velocity and variety**. **Meta Group**

Paper in APA style	Laney, D. (2001). 3D Data management: Controlling data volume, velocity and variety. Meta Group. *Lakshen, Guma Abdulkhader*, 1-4.
Related problem 2 – Describe **(3-4 lines)**	**Data Revolution and Equity Investment**
Paper in APA style	Suwabe, T. (2015). Data Revolution and Equity Investment. *Securities Analysts Journal*, *53*(4), 6-17.
Related problem 3 – Describe **(3-4 lines)**	**Nowcasting with payments system data**
Paper in APA style	Galbraith, J. W., & Tkacz, G. (2018). Nowcasting with payments system data. *International Journal of Forecasting*, *34*(2), 366-376.
Related problem 4 – Describe **(3-4 lines)**	**The Power of Voice: Managerial Affective States and Future Firm Performance**
Paper in APA style	Mayew, W. J., & Venkatachalam, M. (2012). The power of voice: Managerial affective states and future firm performance. *The Journal of Finance*, *67*(1), 1-43.
Related problem 5 – Describe **(3-4 lines)**	**A Method of Using News Sentiment for Stock Investment Strategy**
Paper in APA style	Katayama, D., & Tsuda, K. (2020). A Method of Using News Sentiment for Stock Investment Strategy. *Procedia Computer Science*, *176*, 1971-1980.

What is the proposed solution in this paper for the problem chosen? (*Refer Proposed work*) **(5-8 lines)**	The term "big data" has been attracting attention as a new keyword since 2010. According to Laney ,data with three V's as its characteristics is often defined as a set of data so huge and complex that its difficult to handled by general data management and processing software. In the asset management industry as well, the use of big data is progressing, and there is a study of Nowcasting GDP with electronic payment data, an analysis of the voice of a company's representative at an earnings conference to use it for forecasting, and a study of the relationship between policy change and the expression of the central bank governor. In fact, a large amount of information arrives at the fund managers who manage the assets entrusted to them. In addition to
Architecture of the proposed solution. (*Refer proposed work*) **Diagram**	Table 2. Summary statistics of sentiment score. |	Sentiment model
Total	367,215
Mean	0.566
Standard deviation	0.180
Minimum	0.000
25%	0.451
Median	0.579
75%	0.691
Maximum	1.000	
Name of the approach as stated by the authors (if not, you try to give a name based on the concepts used)	**Sentimental Analyser Model**

List of existing algorithms used by the authors to complete the proposed work. **(1-2 lines for each algorithm)**	**LSTM** Long short-term memory (LSTM) is an artificial recurrent neural network (RNN) architecture used in the field of deep learning. Relative insensitivity to gap length is an advantage of LSTM over RNNs, hidden Markov models and other sequence learning methods in numerous applications.
List of datasets used. (*Refer experimental evaluation/result discussion*) **(3-4 lines)**	**TOPIX500 Stock Prices** Consists of data from January 1983 to the end of December 2016.
References/links to each of the dataset used in this paper (in APA style)	1. https://in.investing.com/indices/topix-500
Why the above dataset(s) used? (*Refer experimental evaluation/ result discussion*) **(3-4 lines)**	The top 20 stocks in TOPIX are approximately 25% of the total weighting, and the top 70 stocks make up half the market cap of TOPIX. This makes the reason of selecting TOPIX since they form a huge share of Japanese Stock Market. Thus a fluctuation in them can be considered as a fluctuation in whole market.
List of equations that are very well applied in this problem domain	Description: $NAV_{i,T}$ is the market capitalisation of the stock i at time T. $$W_{eq,i,T} = \frac{1}{n}$$ $$W_{cap,i,T} = \frac{NAV_{i,T}}{\sum_{i=1}^{n} NAV_{i,T}}$$

List of method(s)/metrics used to evaluate the proposed approach. *(Refer experimental evaluation/ result discussion)* **(5-8 lines)**								

The right cell contains:

Table 3. Performance summary statistics of daily rebalance strategy.

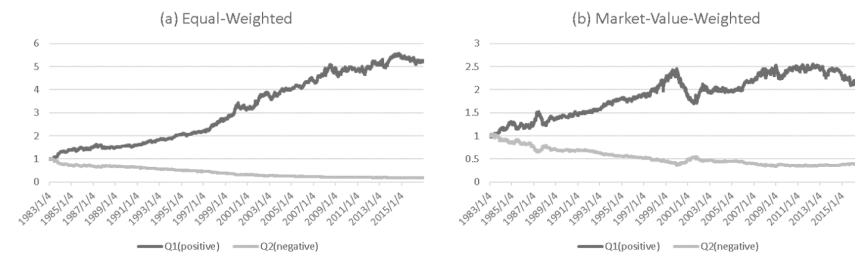|	Equal-Weighted				Market-Value-Weighted			
	Q1(positive)	Q2(negative)	ALL	Q1-Q2	Q1(positive)	Q2(negative)	ALL	Q1-Q2
Return	13.8%	4.0%	8.8%	--	7.8%	2.9%	5.4%	--
Risk	21.1%	21.4%	20.5%	--	23.2%	23.1%	22.2%	--
Return/Risk	0.66	0.19	0.43	--	0.34	0.12	0.24	--
Alpha	5.0%	-4.8%	--	9.8%	2.4%	-2.5%	--	5.0%
T.E.	5.7%	5.3%	--	11.0%	7.5%	7.4%	--	14.4%
IR	0.89	-0.89	--	0.89	0.32	-0.34	--	0.34
p-value	0.00%	0.00%	--	0.00%	5.86%	4.55%	--	4.43%
Turnover	21667%	20968%	18170%	--	19743%	19198%	13812%	--
Names	23	24	46	--	23	24	46	--

Fig. 1. Cumulative excess return of daily rebalance strategy (a) equal-weighed; (b) market-value-weighted.

List of supporting tools/concepts (3-4 lines)

CoreML
A ML model generator to generate a ML model which selects algorithm based on the input and precession.

What are the similar approaches with which the proposed approach is compared? (Refer experimental evaluation/ result discussion) **Explain each of these approach (3-4 lines)**

Approach/method 1: **Performance Graph Observation**
In this approach we study previous stats to analyse the market prediction. This method was the old tradition which we used.

How the results of proposed approach are compared with other similar approaches? (*Refer experimental evaluation/result discussion*)	**Statistical Comparison** Statistics of stock prices are compared with the results obtained through this method. The comparison is done directly using precision rate.
Advantages/merits of proposed solution in your view. (*Refer conclusion / result discussion / experimental evaluation*)	This method seems to be really helpful when market seems to crash or descent. The descent rate of market can be highly reduced using this method.
Disadvantages/limitations of proposed solution in your view. (*Refer conclusion / result discussion / experimental evaluation*)	The disadvantage is making news headlines in order to maintain the share market is against of human faith. Not only this, by this way any government body can easily manipulate future results.
Future work as stated by authors (*Refer conclusion / result discussion / experimental evaluation*)	Future works include making this method more versatile by adding social media app based reviews, comments made on a particular brand. By this way we can achieve more precision rate.
Your one page write-up about this paper	

In this study, we investigate whether news sentiment quantified by a sentiment analyzer utilizing deep learning can be utilized for investment strategies. Concretely, we aggregated sentiment scores by circadianly, hebdomadally(week), and monthly frequency and calculated the performance of the investment at that magnitude. The results show that the performance of the investment strategy is high at the quotidian frequency but not at all at the hebdomadal or monthly frequency. These results show that the impact of news sentiment on the stock market is very short, more than daily and less than hebdomadally. Several antecedent studies have substantiated that the impact of sentiment on the overall market is short in the Japanese market, but the results are homogeneous for individual stocks. This betokens that news is expeditiously woven into both the market as a whole and individual stocks.

Your findings: (possible alternate for the solution proposed)

- This method seems to be life saviour when worst case arise.
- There are certain flaws which might make wrong prediction, but the precision rate is high and cause of irregularity is highly low so we can trust this method.

3.

TABLE 2	
Problem answered in this paper. **(1-2 lines)**	Due to its dynamics, non-linearity and complexity nature, stock market is inherently difficult to predict.
Detailed description about the problem **(5-8 lines)**	Stock market prediction has become highly unpredictable due to various kind of dynamics which are changing with high rate. With this high rate of change, prediction had become really hard. The reason is with every second a new data gets added and to manage prediction of such huge dataset is tough. Not only that, with the traditional methods predictions are made with repetition of certain events at every uniform duration.
Why that problem is chosen in this paper? Scope of the problem and solution (*Refer Introduction*) **(5-8 lines)**	Stock market movement prediction has massive benefits in academia and industry. In particular, accurate prediction helps investors make decisions and gain profit in the stock exchange. However, this prediction task is challenging due to the financial data nature that comprises noise, non-stationary, high degree of uncertainty, and chaotic characteristics. More- over, the complex interaction of political and economic fac- tors makes market prediction more difficult.
History of the problem. (*Refer Introduction*) **(8-10 lines)**	The need of this matter arose when traditional methods couldn't manage to predict precise price. This was the reason why we were supposed to find a new method.
List of the related/similar problems (*Refer Related work*) – Describe each with proposed solutions	
Related problem 1 – Describe **(3-4 lines)**	**Machine Learning Techniques and Use of Event Information for Stock Market Prediction: A Survey and Evaluation**
Paper in APA style	Yoo, P. D., Kim, M. H., & Jan, T. (2005, November). Machine learning techniques and use of event information for stock market prediction: A survey and evaluation. In International Conference on Computational Intelligence for Modelling, Control and Automation and International Conference on Intelligent Agents, Web Technologies and Internet Commerce (CIMCA-IAWTIC'06) (Vol. 2, pp. 835-841). IEEE.

Related problem 2 – Describe **(3-4 lines)**	**A survey on opinion mining and sentiment analysis: Tasks, approaches and applications**
Paper in APA style	Ravi, K., & Ravi, V. (2015). A survey on opinion mining and sentiment analysis: tasks, approaches and applications. *Knowledge-based systems*, *89*, 14-46.
Related problem 3 – Describe **(3-4 lines)**	**Twitter Mood as a Stock Market Predictor**
Paper in APA style	Bollen, J., & Mao, H. (2011). Twitter mood as a stock market predictor. *Computer*, *44*(10), 91-94.
Related problem 4 – Describe **(3-4 lines)**	**Social media as a source of knowledge for customers and enterprises**
Paper in APA style	Zembik, M. (2014). Social media as a source of knowledge for customers and enterprises. *Online Journal of Applied Knowledge Management*, *2*(2), 132-148.
Related problem 5 – Describe **(3-4 lines)**	**Modeling Public Mood and Emotion: Twitter Sentiment and Socio-Economic Phenomena**
Paper in APA style	Bollen, J., Mao, H., & Pepe, A. (2011, July). Modeling public mood and emotion: Twitter sentiment and socio-economic phenomena. In *Proceedings of the international AAAI conference on web and social media* (Vol. 5, No. 1).
What is the proposed solution in this paper for the problem chosen? (*Refer Proposed work*) **(5-8 lines)**	A comparison of our approach with other sentiment-based stock market prediction approaches including Deep learning, establishes that our proposed model is performing adequately and predicting stock movements with a higher accuracy of 60%.
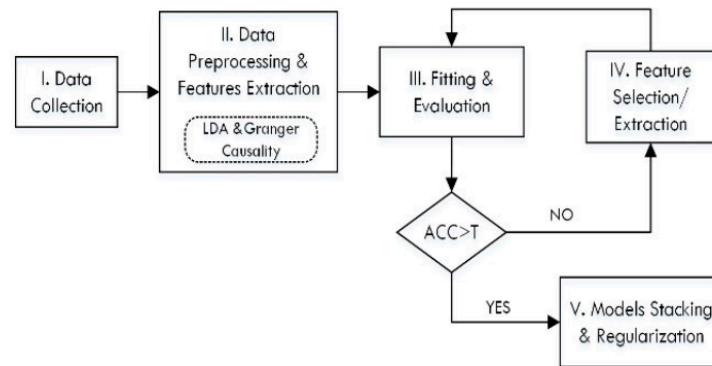
Architecture of the proposed solution. (*Refer proposed work*) **Diagram**	
Name of the approach as stated by the authors (if not, you try to give a name based on the concepts used)	**Dickey-fuller test to check stationarity.** **Machine learning techniques.** **Granger causality test for the four stocks.**

List of existing algorithms used by the authors to complete the proposed work. (1-2 lines for each algorithm)	**DNN** A DNN is a collection of neurons organized in a sequence of multiple layers, where neurons receive as input the neuron activations from the previous layer, and perform a simple computation **Deep CNN** A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other **LSTM** Long short-term memory (LSTM) is an artificial recurrent neural network (RNN) architecture used in the field of deep learning. Relative insensitivity to gap length is an advantage of LSTM over RNNs, hidden Markov models and other sequence learning methods in numerous applications.
List of datasets used. (*Refer experimental evaluation/result discussion*) (3-4 lines)	**NASDQ Stock Price** The Nasdaq Stock Market is an American stock exchange based in New York City. It is ranked second on the list of stock exchanges by market capitalization of shares traded, behind the New York Stock
References/links to each of the dataset used in this paper (in APA style)	https://www.nasdaq.com
Why the above dataset(s) used? (*Refer experimental evaluation/ result discussion*) (3-4 lines)	NASDQ is the second largest stock market in the world in terms of its capitalisation. Being such huge share holders their data sets will be numerous, such that we can achieve high precision.

List of equations that are very well applied in this problem domain	where p_t is the price of the stock price at time t. In other words, y_i indicates whether the stock price is '1 = up' or '0 = down'. We will apply different machine learning algorithms to predict y_i. $$y_t = \begin{cases} 1, & \text{if } p_t > p_{t-1} \\ 0, & \text{otherwise} \end{cases}$$
List of method(s)/metrics used to evaluate the proposed approach. (*Refer experimental evaluation/ result discussion*) (5-8 lines)	**Dickey-fuller test to check stationarity.** **Machine learning techniques.** **Granger causality test for the four stocks.** **Tweet mining**
List of supporting tools/concepts (3-4 lines)	**Twitter Developer APIs** In order to access Twitter APIs, you must first apply for a developer account **NLP Kit** Natural Language Processing, or NLP for short, is broadly defined as the automatic manipulation of natural language, like speech and text, by software.

What are the similar approaches with which the proposed approach is compared? (Refer experimental evaluation/ result discussion) **Explain each of these approach (3-4 lines)**	Approach/method 1: **Statistical Comparison** Comparing statistics of traditional and sentimental datas. By this we can find the precision rate. Approach/method 2: **Graphical Comparison** Comparing graphical data to find difference between both methods.
How the results of proposed approach are compared with other similar approaches? (*Refer experimental evaluation/result discussion*)	**Statistical Comparison** Statistics of stock prices are compared with the results obtained through this method. The comparison is done directly using precision rate.
Advantages/merits of proposed solution in your view. (*Refer conclusion / result discussion / experimental evaluation*)	The best advantage is we can predict stock price more accurately and more precise. Using this method will help us in avoiding high mathematical computation.
Disadvantages/limitations of proposed solution in your view. (*Refer conclusion / result discussion / experimental evaluation*)	The demerit is still there are chances that data might get false in some exceptional case when false reviews are done.
Future work as stated by authors (*Refer conclusion / result discussion / experimental evaluation*)	For the sake of maturing sentiment analysis for stock market predictions, more researches are needed towards (1) improving the representation of sentiment as a set textual features and (2) leveraging the abilities of machine learning algorithms. Accordingly, given the dynamic and complex nature of stock time series data, our future research involves mainly the investigation of variations of deep learning techniques for both sentiment features engineering and predic- tion modelling of the stock movement.

Your one page write-up about this paper

Due to its dynamics, non-linearity, and complexity, the stock market is inherently difficult to predict. One of the attractive goals is to predict the direction of the stock market movement by using public opinion analysis. However, there is intense debate about the usefulness of this method and the strength of the causal relationship between stock market trends and sentiment. The researchers' opinions range from rejecting this relationship to confirming that there is a clear causal relationship between sentiment and stock market transactions. However, many advanced computing methods have adopted emotion-based features, but have not yet reached maturity and performance. In this article, they have used improved sentiment analysis methods to conduct empirical research on the predictability of stock market trends and make a constructive contribution to this debate. To be precise, they experimented with stock price history, sentiment polarity, subjectivity, Ngrams, text-based custom features, and feature lag for more detailed analysis. Five research questions have been investigated to answer questions related to the use of sentiment analysis to predict stock market trends.

Your findings: (possible alternate for the solution proposed)

- The work shows computation is really easy with this method rather than the traditional method.
- This works targets on one of the largest stock exchange market, thus the precision rate will be really high.