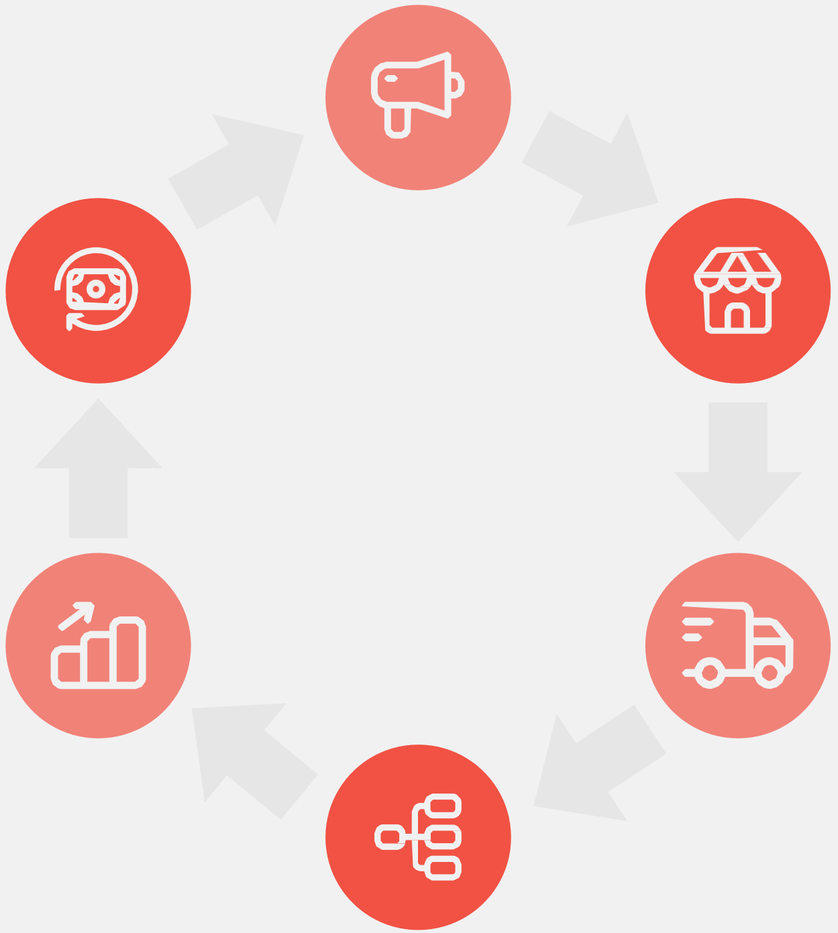
StockPulse



EAT CODE REPEAT

-HACKFEST 2K23
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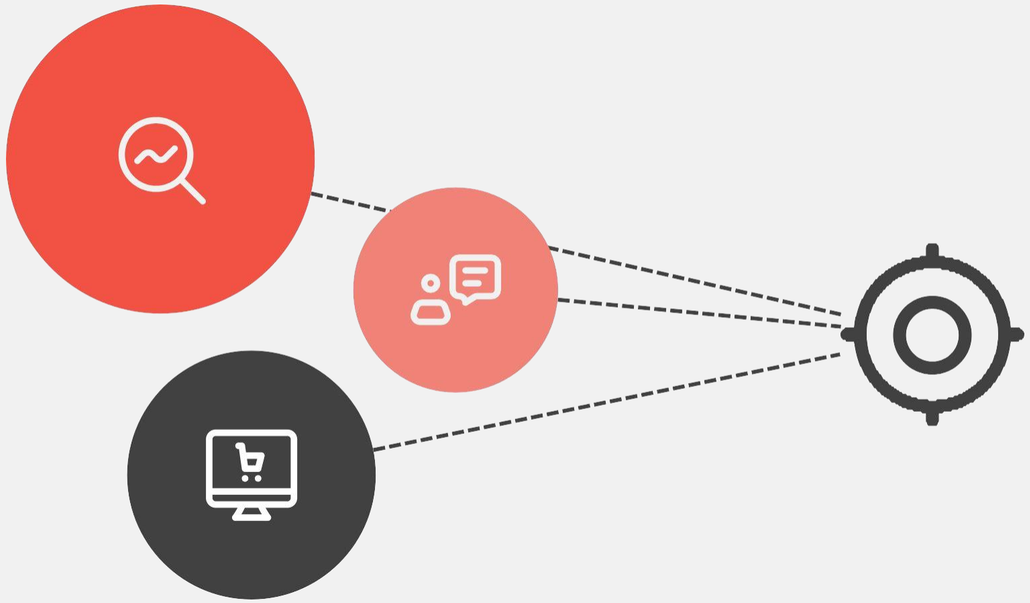
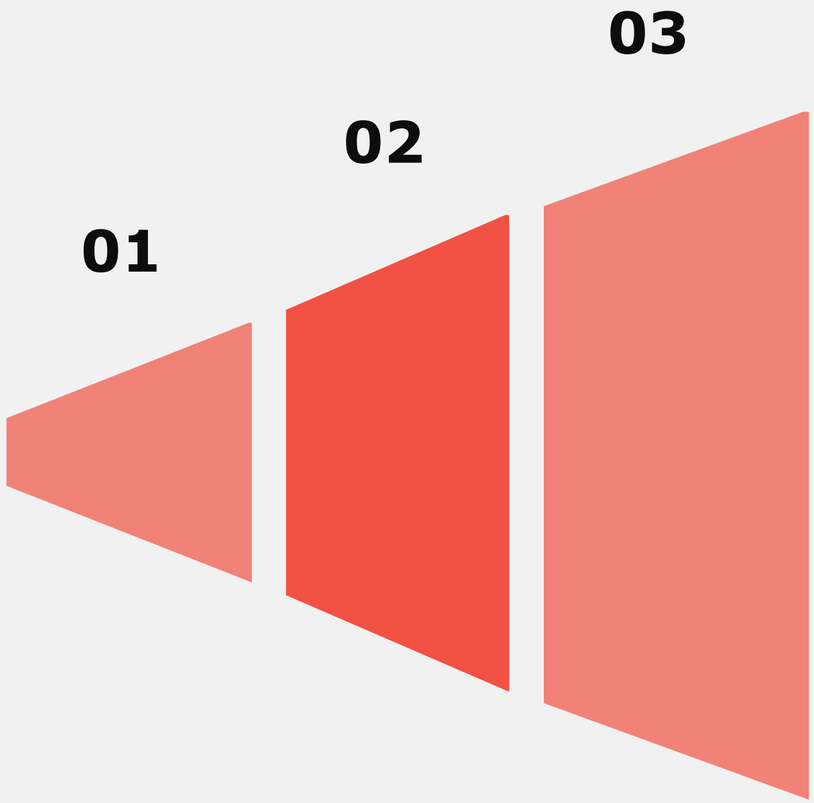
PROBLEM STATEMENT

- You are an analyst at a HFT named ABC Capital and you have observed that nowadays quant algo is giving inaccurate predictions. Your boss has asked you to use sentiment analysis for predicting stock performance. You are required to create a NLP based market sentiment meter for NASDAQ stocks using social media posts of normal users. We recommend you to use twitter's open API to do this.



SOLUTIONS



- To implement the sentiment analysis model, we first pre-process all tweets related to a stock using text cleaning techniques. These tweets are then fed into our BERT model, which has been fine-tuned for sentiment analysis. The BERT model outputs a sentiment score for each tweet, which is then weighted according to its relevance.

- Next, we use a Long Short-Term Memory (LSTM) network to predict the sentiment score for each time-stamp. During training, we pass the ground truth and the predicted sentiment scores through the LSTM network, and the last hidden state of the LSTM gives us the sentiment score for that time-stamp.

- During inference, we fine-tune the LSTM network with the relevant stock's data to obtain the sentiment score for that particular stock. The sentiment score is then displayed to the user on the front-end interface.

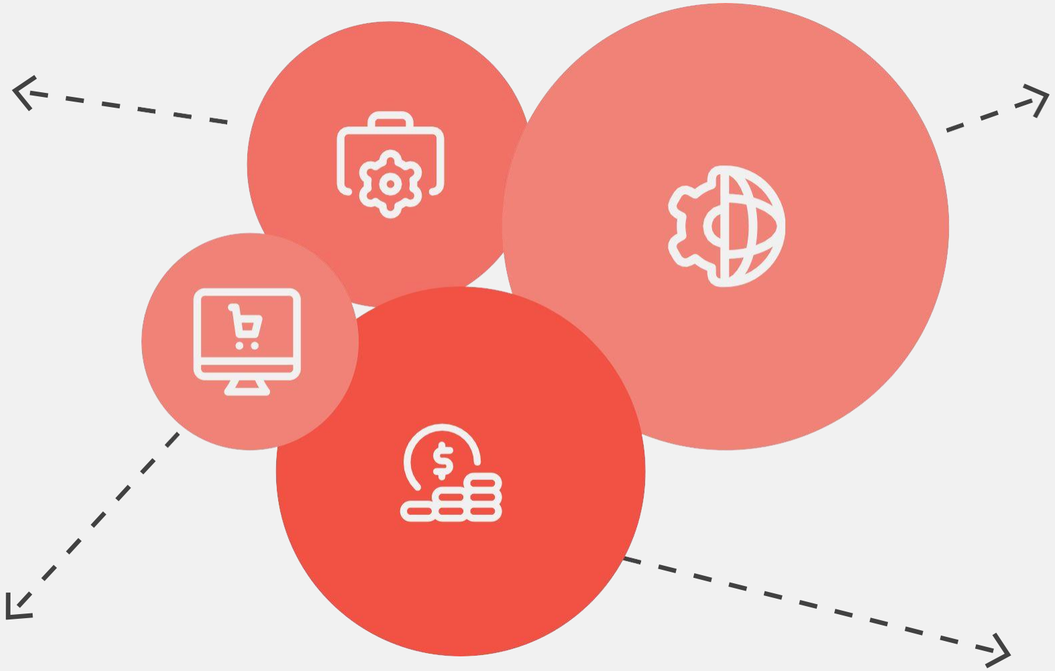
FEATURES

Real-time sentiment analysis:

The system should be able to perform real-time sentiment analysis on a large volume of social media posts related to a particular stock..

Collaboration tools:

Collaboration tools such as discussion forums and social sharing buttons can allow investors to share insights and ideas with others, and can help foster a community of investors who are interested in sentiment analysis-based trading strategies.



Historical sentiment analysis:

The system should be able to analyze historical sentiment data for a stock and provide insights into how it has performed over time.

User Profiles:

Allowing users to create profiles can help in providing personalized content to the users. They can save their frequently searched stocks

BENEFITS OF THIS SOLUTIONS

Accurate predictions

By using sentiment analysis and machine learning algorithms, the proposed solution can provide more accurate predictions for stock performance, which can help investors make better decisions.

Cost-effective

By using social media data and open APIs, the proposed solution can be implemented at a lower cost compared to traditional methods of data collection and analysis.

Competitive advantage

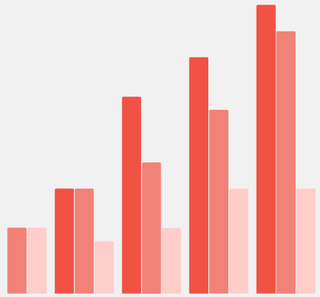
By providing more accurate and timely market insights, the proposed solution can give traders a competitive advantage over their peers.

Timely insights

By using the sentiment analysis-based market sentiment meter, users can get timely insights on the stock market. This can help them make informed decisions in a dynamic and rapidly changing market environment.

TECH-STACK

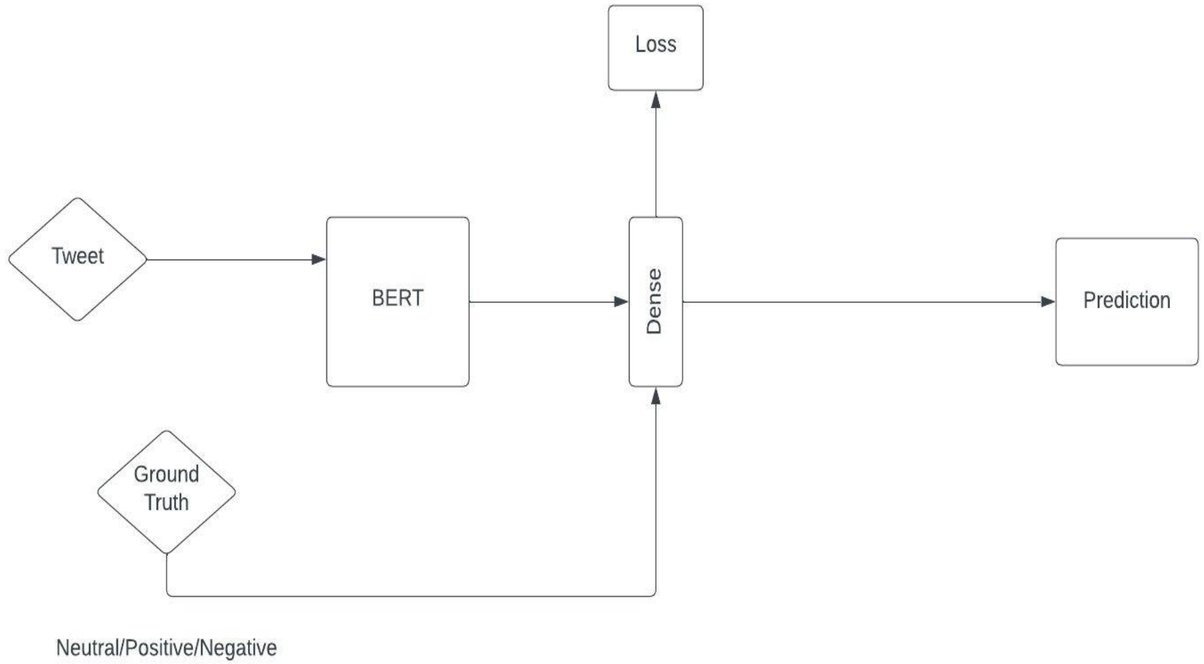
- **PyTorch**
- **TensorFlow**
- **NLTK**
- **Flask**
- **Tweepy**
- **Snscrape**



- **MongoDB**
- **ExpressJs**
- **NodeJs**

TRAINING-BERT

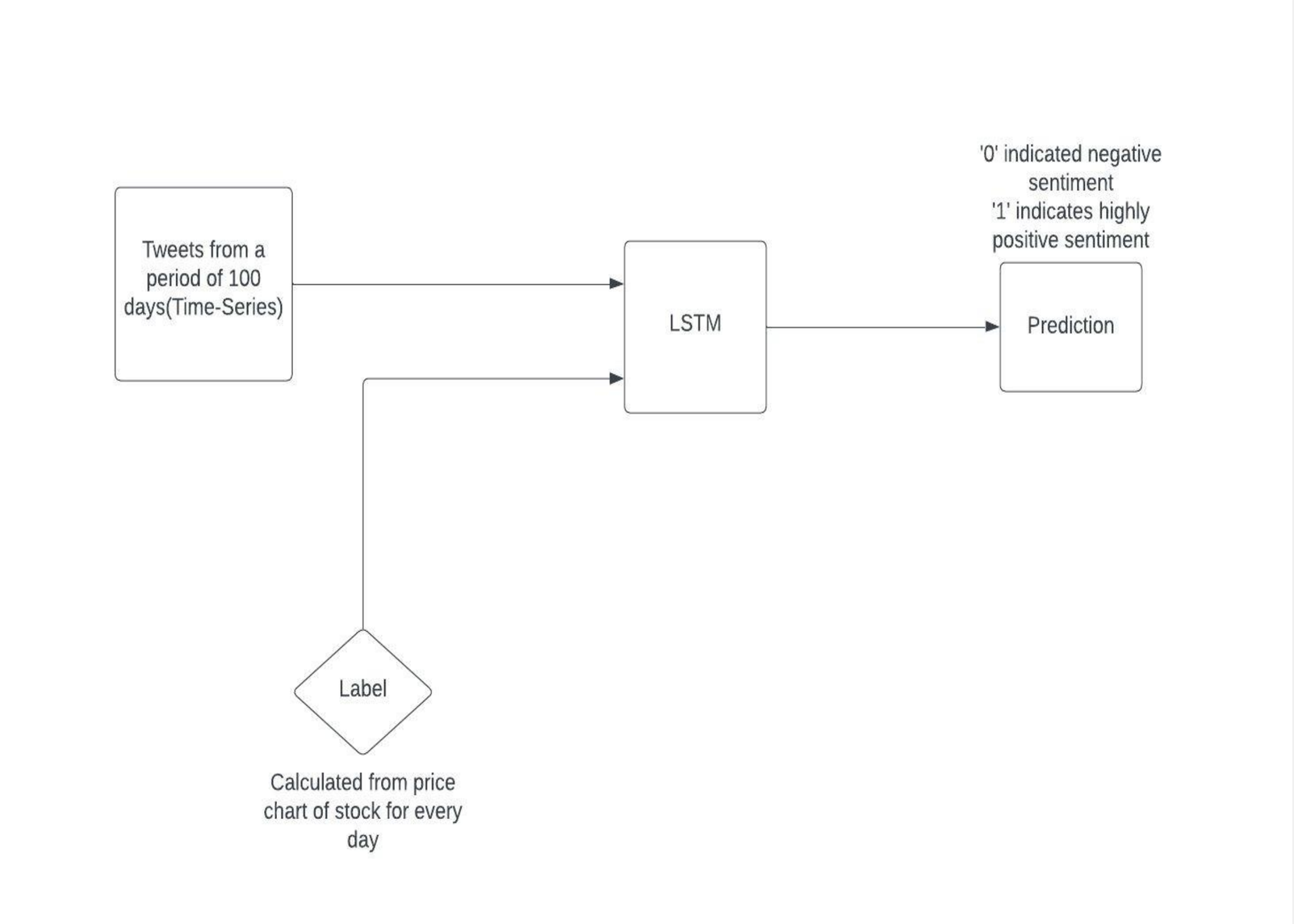
First we get the pre-trained weights, then we fine-tuned the BERT on the tweets of NASDAQ stocks data. We obtain a f1 score of 0.89, 0.91, and 0.92 for the 3 classes respectively.



TRAINING-LSTM

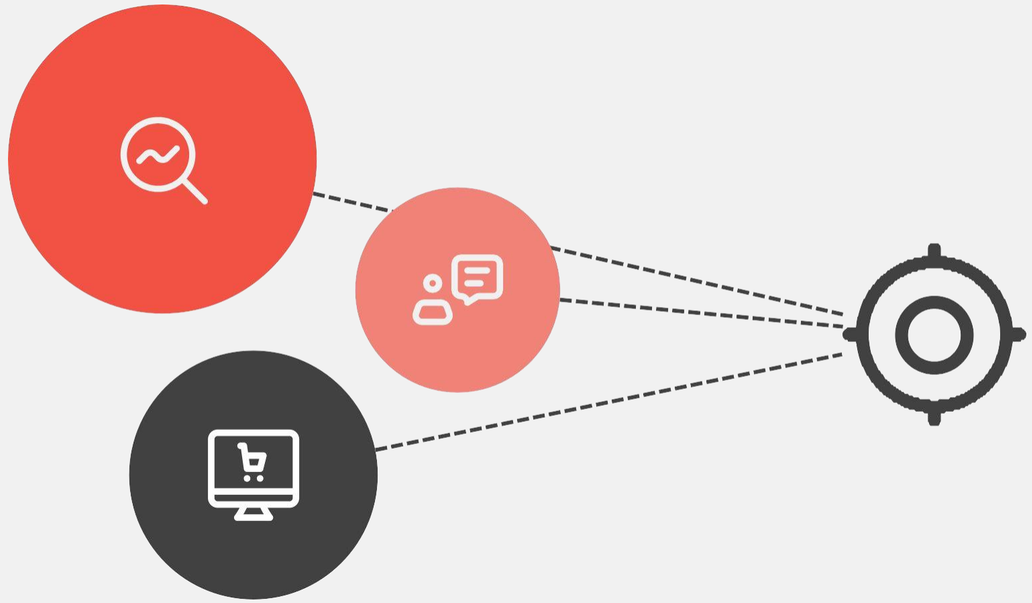
This LSTM model is the backbone of our solution. It maps the sentiment of the users about the stock to the change in its stock price.

We obtained the label of the change in price of the stock using the open low volume and then we mapped this to the tweets sentiment using LSTM model, which takes into account of past 100 days.



PROBLEMS FACED

- Since Twitter has shut down its free access to its open API, we had to rely upon other scraping tools. Due to this, the fetched tweets might not be the ideal ones, resulting in non-consistent performance.
- Also, scraping was found to be very time consuming.



PROBLEMS IN EXISTING SOLUTIONS

Inability to capture social sentiment

Many existing solutions rely on historical data and are not equipped to analyze real-time data, which can result in delayed or inaccurate predictions.

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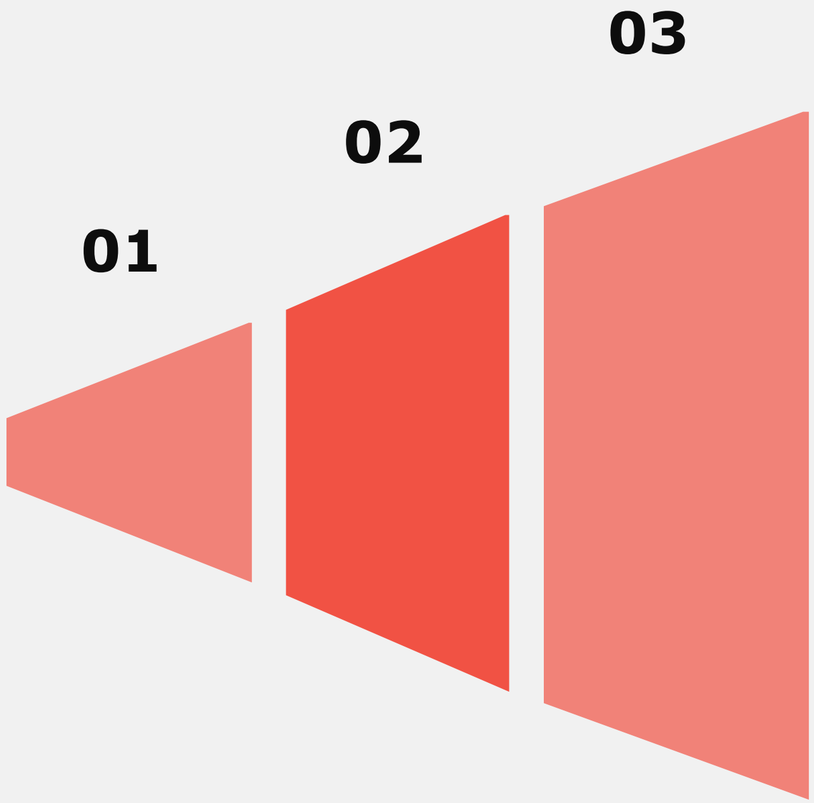
Limited data sources

Some existing sentiment analysis solutions only analyze data from a limited number of sources, such as news articles or financial reports, which can lead to biased or incomplete analyses.

Difficulty in predicting sudden events

Traditional methods may not be able to predict sudden events that can impact the market, such as natural disasters or political upheavals.

FEATURES TO BE ADDED IN FUTURE



- **Language detection: The system will be able to detect and analyze social media posts in different languages, as the sentiment can vary across different languages and cultures.**

- **Customizable alerts: The system could be customized to send alerts to users when a stock's sentiment score reaches a certain threshold or when there is a significant change in sentiment.**

- **A performance evaluation module that compares the predicted stock price movements with the actual ones and calculates the accuracy metrics such as RMSE.**

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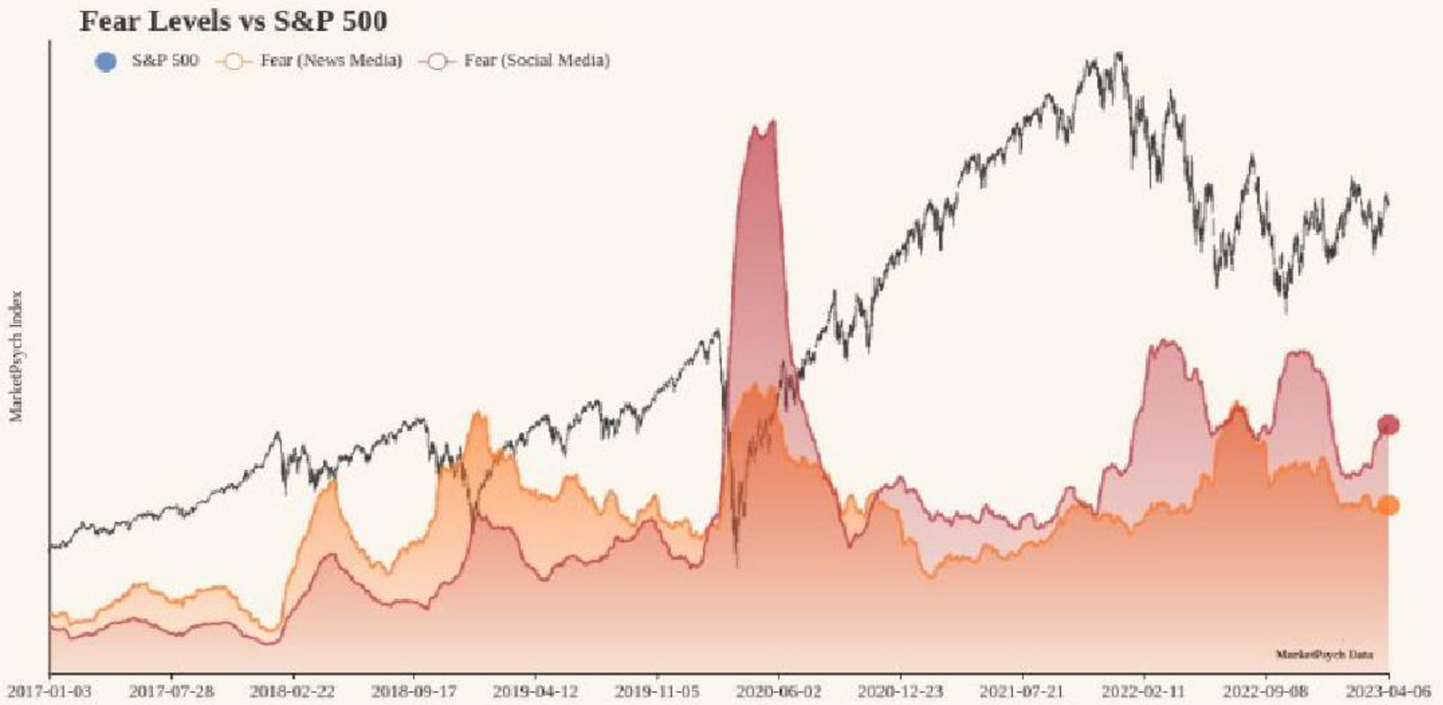
Bringing data to life

Breakthrough research

In the Markets

In the Markets

Spotlight on current market sentiments



Its all about data

Track market sentiment in real-time with our advanced machine learning algorithms analyzing social media posts. Stay ahead of the competition and make informed trading decisions based on real data, not guesswork. Start using our powerful sentiment analysis tool today for NASDAQ stocks.

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Track market sentiment in real-time with our advanced machine learning

TEAM MEMBERS

- Dheemant Dixit
- Sarthak Saumya
- Himanshu Mittal
- Krish Sahu
- Vibhanshu Sharma

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THANK YOU