Institute of System Science, National University of Singapore

Intelligent Reasoning System Project
Financial Sentiment Recommender User Guide

TEAM: IS06PT-GRP-SenTEAMent

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1. Background

Investors thrive on having instant access to information that enables them to make quick decisions. However, reading through articles and discerning the content can be time-consuming and may result in missed opportunities. The objective of this project is to create a solution where a trader can promptly access news data that directly impacts the performance of their stocks and receive recommendation for their securities positions based on the real-time news sentiments.

2. Objective

The objective of this document is to provide an overview of the Financial Sentiment Recommender solution and the necessary information to use the application.

3. Scope

- System Overview
- Installation
- User Manual

4. System Overview

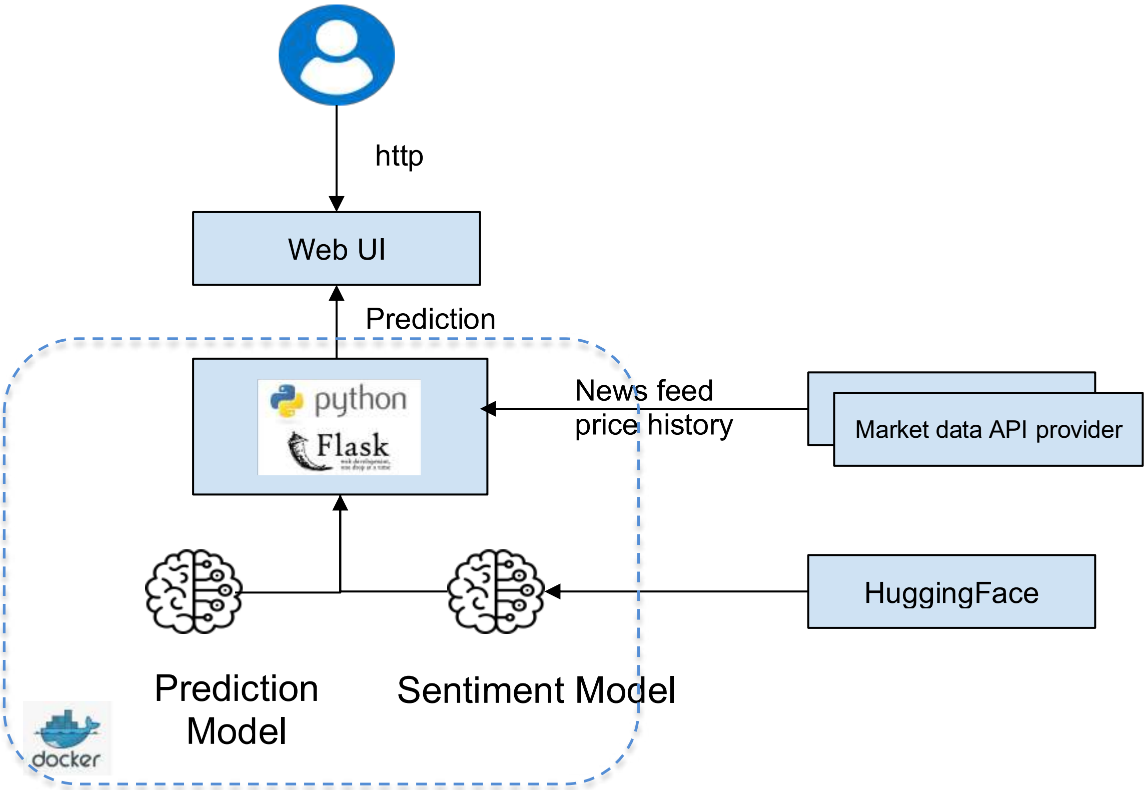


Figure1 : High level system overview

The RapidAPI market data provider offers stock price history and news feeds.

5 Installation

5.1 Requirements

Hardware	CPU: Intel(R) Core(TM) i5-10210U CPU @ 1.60GHz or higher GPU: *Optional RAM: 10 GB or bigger Hard disk: 35GB or bigger
OS/Software	OS: Windows 10 or Ubuntu 22 Software: Python3.11, Docker, Anaconda
Packages	We have included all packages needed in the requirements.txt. Please use pip install command to install them
Web Broswer	Recommended Google Chrome version 136 and above.

5.2 Pre-requisite.

1. Install docker on Ubuntu.
   a. `sudo apt install docker.io -y`
   b. `sudo snap install docker`
   c. `docker –version`

2. Clone or download the package from the GitHub repository.
   https://github.com/iss-senteament/stock-sentiment-analysis.git

3. Register for an API key from RapidAPI website for the API call to Mboum Finance. Remember to subscribe to Mboum Finance first.
   https://rapidapi.com/sparior/api/mboum-finance

5.3 Deployment steps

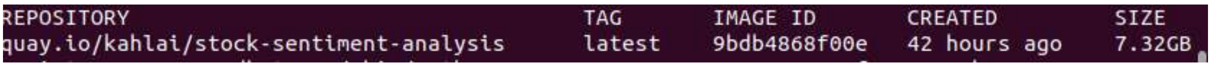
Option 1: Docker Installation on Ubuntu

1. Build the docker image using the Dockerfile provided in the package.

```
docker build -f ./Docker/Dockerfile --platform linux/amd64 -t
quay.io/kahlai/stock-sentiment-analysis .
```

2. Check if the docker image is built successfully.

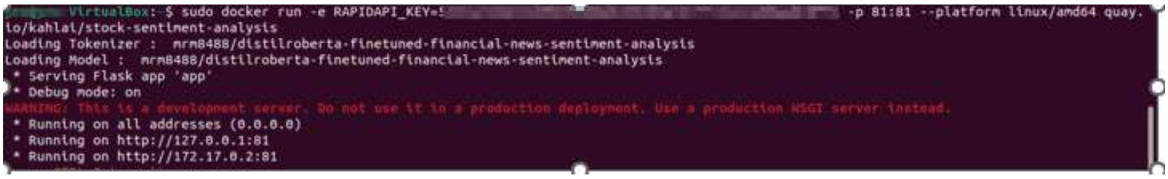
```
docker image ls
```



```
REPOSITORY                                  TAG       IMAGE ID       CREATED          SIZE
quay.io/kahlai/stock-sentiment-analysis     latest    9bdb4868f00e   42 hours ago     7.32GB
```

3. Create the docker container. Replace the `<mykey>` with the RapidAPI Key.

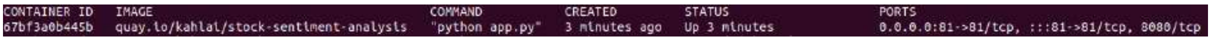
```
docker run -e RAPIDAPI_KEY=<mykey> -p 81:81 --platform
linux/amd64 quay.io/kahlai/stock-sentiment-analysis
```



```
[redacted]VirtualBox:~$ sudo docker run -e RAPIDAPI_KEY=[redacted] -p 81:81 --platform linux/amd64 quay.
io/kahlai/stock-sentiment-analysis
Loading Tokenizer :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
Loading Model :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:81
 * Running on http://172.17.0.2:81
```

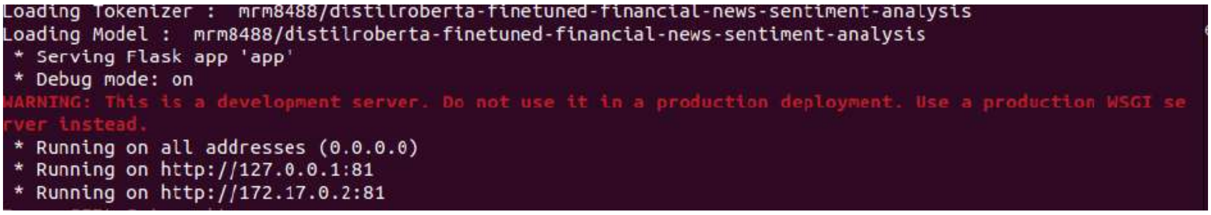
4. Check if the container is created successfully.

```
docker ps -a
```



```
CONTAINER ID   IMAGE                                     COMMAND           CREATED         STATUS         PORTS
67bf3a0b445b   quay.io/kahlai/stock-sentiment-analysis   "python app.py"   3 minutes ago   Up 3 minutes   0.0.0.0:81->81/tcp, :::81->81/tcp, 8080/tcp
```

5. Launch the web browser and access the application via port 81 on either localhost or IP address assigned.



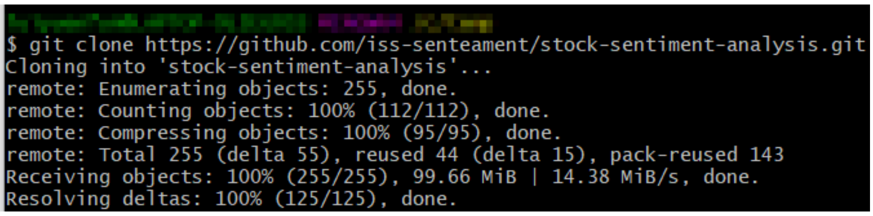
```
Loading Tokenizer :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
Loading Model :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI se
rver instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:81
 * Running on http://172.17.0.2:81
```

Option 2: Local deployment on Windows10.

1. Download the zip or git clone the package from the GitHub repository.
   https://github.com/iss-senteament/stock-sentiment-analysis

   For git clone:
   a) Open Git Bash
   b) Change the current working directory to the location where you want the cloned directory.
   c) Type git clone and then paste the URL.

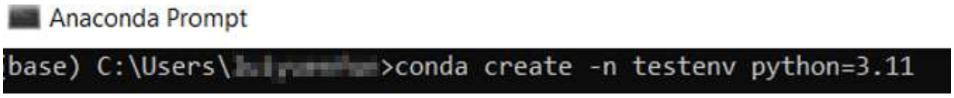
   ```
   git clone https://github.com/iss-senteament/stock-
   sentiment-analysis.git
   ```



```
[redacted]
$ git clone https://github.com/iss-senteament/stock-sentiment-analysis.git
Cloning into 'stock-sentiment-analysis'...
remote: Enumerating objects: 255, done.
remote: Counting objects: 100% (112/112), done.
remote: Compressing objects: 100% (95/95), done.
remote: Total 255 (delta 55), reused 44 (delta 15), pack-reused 143
Receiving objects: 100% (255/255), 99.66 MiB | 14.38 MiB/s, done.
Resolving deltas: 100% (125/125), done.
```

2. Open anaconda prompt and run the following command to create the environment.

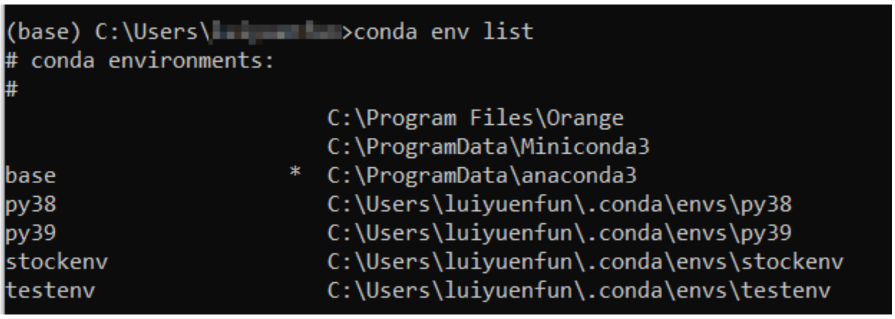
   ```
   conda create -n <enviornment> python=3.11
   ```



```
(base) C:\Users\[redacted]>conda create -n testenv python=3.11
```

3. Run the following command to check that the environment is created successfully.

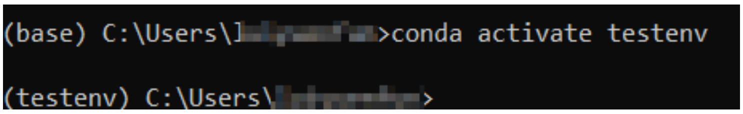
```
conda env list
```



```
(base) C:\Users\[redacted]>conda env list
# conda environments:
#
                         C:\Program Files\Orange
                         C:\ProgramData\Miniconda3
base                  *  C:\ProgramData\anaconda3
py38                     C:\Users\luiyuenfun\.conda\envs\py38
py39                     C:\Users\luiyuenfun\.conda\envs\py39
stockenv                 C:\Users\luiyuenfun\.conda\envs\stockenv
testenv                  C:\Users\luiyuenfun\.conda\envs\testenv
```

4. Run the following command to activate the environment that you have created, where <environment> is the name of the environment.

```
conda activate <environment>
```



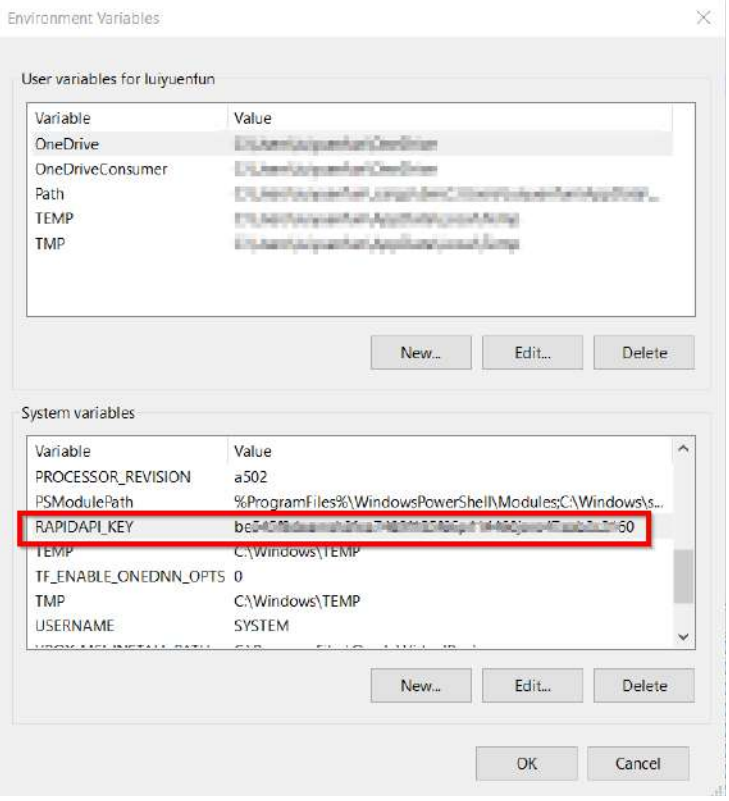
```
(base) C:\Users\[redacted]>conda activate testenv

(testenv) C:\Users\[redacted]>
```

5. On the anaconda command prompt, change directory to directory of the downloaded package "*stock-sentiment-analysis*" where the *requirements.txt* is located.

6. Run the following command to install the packages:

```
pip install -r requirements.txt
```

8. Configure the RAPIDAPI_KEY on the Windows environment System variable.



User variables for luiyuenfun

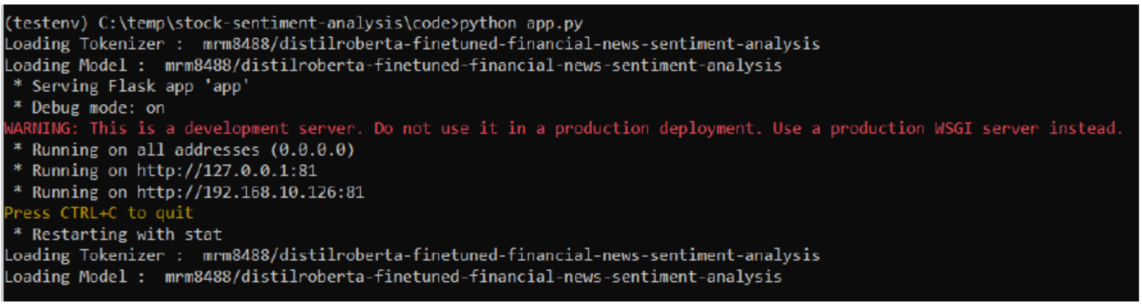
Variable	Value
OneDrive	[redacted]
OneDriveConsumer	[redacted]
Path	[redacted]
TEMP	[redacted]
TMP	[redacted]

System variables

Variable	Value
PROCESSOR_REVISION	a502
PSModulePath	%ProgramFiles%\WindowsPowerShell\Modules;C:\Windows\s...
RAPIDAPI_KEY	[redacted]
TEMP	C:\Windows\TEMP
TF_ENABLE_ONEDNN_OPTS	0
TMP	C:\Windows\TEMP
USERNAME	SYSTEM

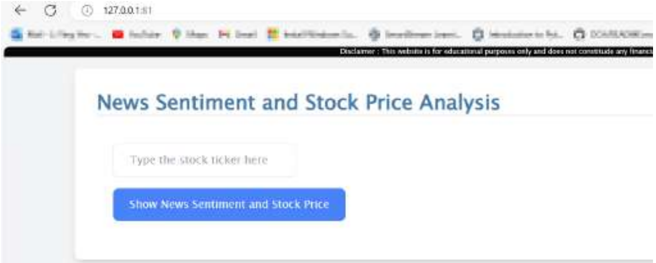
9. Change to the code directory and execute the app.py.

```
python app.py
```



```
(testenv) C:\temp\stock-sentiment-analysis\code>python app.py
Loading Tokenizer :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
Loading Model :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:81
 * Running on http://192.168.10.126:81
Press CTRL+C to quit
 * Restarting with stat
Loading Tokenizer :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
Loading Model :  mrm8488/distilroberta-finetuned-financial-news-sentiment-analysis
```

10. Launch the web browser http://127.0.0.1:81/ and access the application via port 81


127.0.0.1:81
YouTube
Maps
Gmail

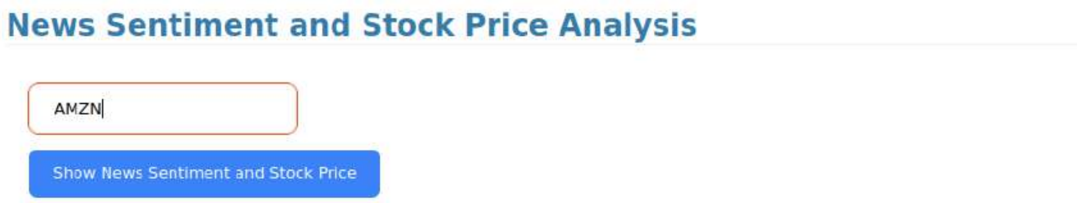
Disclaimer : This website is for educational purposes only and does not constitude any financi

News Sentiment and Stock Price Analysis
Type the stock ticker here
Show News Sentiment and Stock Price

Note:
The system is hosted on a dedicate server and is accessible on https://iss.justexample.com/

6. User Manual

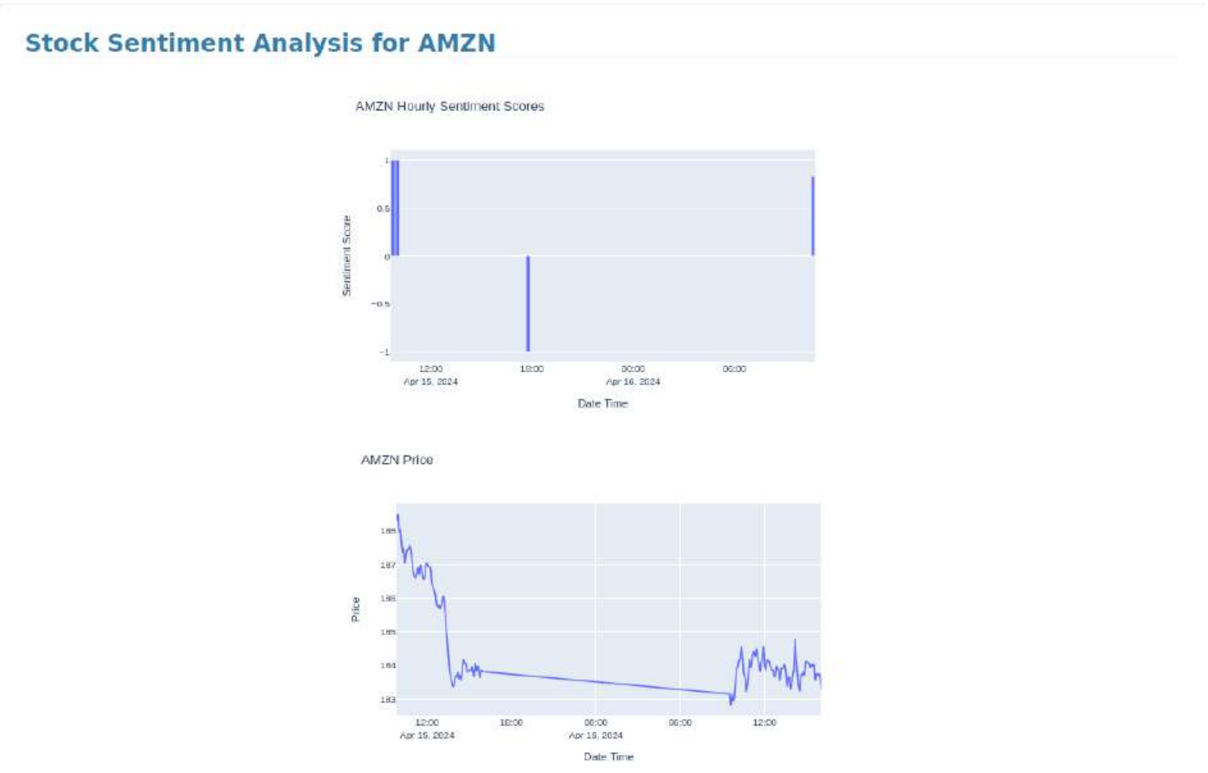
1. On the homepage, enter the ticker name (for example AMZN) to preview the latest news feeds and stock price leveraging on market data API.



News Sentiment and Stock Price Analysis

AMZN

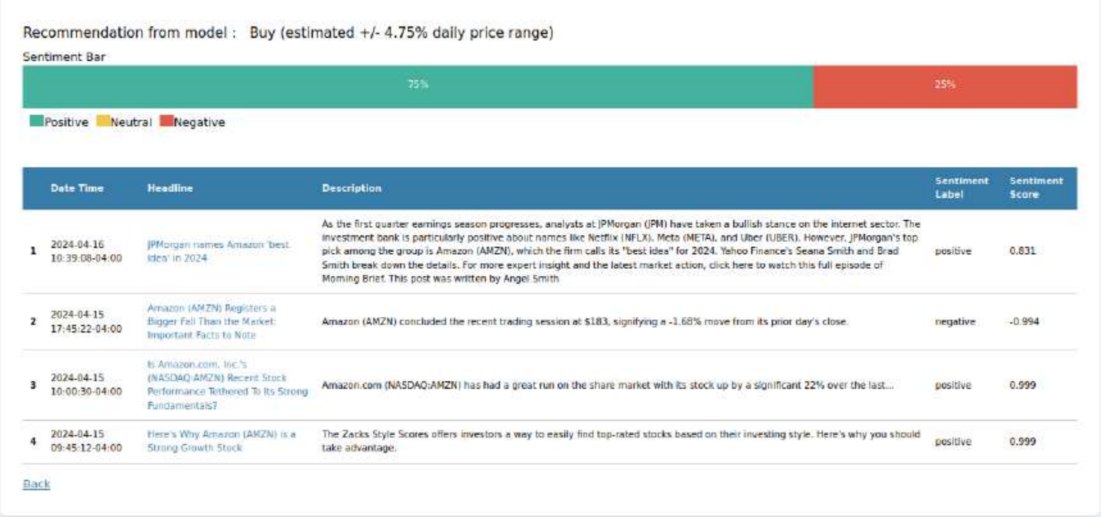
2. Sentiment score and stock price is displayed to demonstrate any correlation between news sentiment and stock price performance over the same period.



Stock Sentiment Analysis for AMZN

Note:
News feeds with sentiment label ‘neutral’ are displayed with sentiment score of zero, while news feeds with sentiment label ‘positive’ are displayed with positive sentiment score, new feeds with sentiment label ‘negative’ as displayed with negative sentiment score.

3. Sentiment bar shows the distribution of postive, neutral and negative news to give users a general sense of the overall sentiment of the stock for the day. A recommendation is also provided based on the prediction of the model.



Recommendation from model : Buy (estimated +/- 4.75% daily price range)

Sentiment Bar

	Date Time	Headline	Description	Sentiment Label	Sentiment Score
1	2024-04-16 10:39:08-04:00	JPMorgan names Amazon 'best idea' in 2024	As the first quarter earnings season progresses, analysts at JPMorgan (JPM) have taken a bullish stance on the internet sector. The investment bank is particularly positive about names like Netflix (NFLX), Meta (META), and Uber (UBER). However, JPMorgan's top pick among the group is Amazon (AMZN), which the firm calls its "best idea" for 2024. Yahoo Finance's Seana Smith and Brad Smith break down the details. For more expert insight and the latest market action, click here to watch this full episode of Morning Brief. This post was written by Angel Smith	positive	0.831
2	2024-04-15 17:45:22-04:00	Amazon (AMZN) Registers a Bigger Fall Than the Market: Important Facts to Note	Amazon (AMZN) concluded the recent trading session at $183, signifying a -1.68% move from its prior day's close.	negative	-0.994
3	2024-04-15 10:00:30-04:00	Is Amazon.com, Inc.'s (NASDAQ:AMZN) Recent Stock Performance Tethered To Its Strong Fundamentals?	Amazon.com (NASDAQ:AMZN) has had a great run on the share market with its stock up by a significant 22% over the last...	positive	0.999
4	2024-04-15 09:45:12-04:00	Here's Why Amazon (AMZN) is a Strong Growth Stock	The Zacks Style Scores offers investors a way to easily find top-rated stocks based on their investing style. Here's why you should take advantage.	positive	0.999

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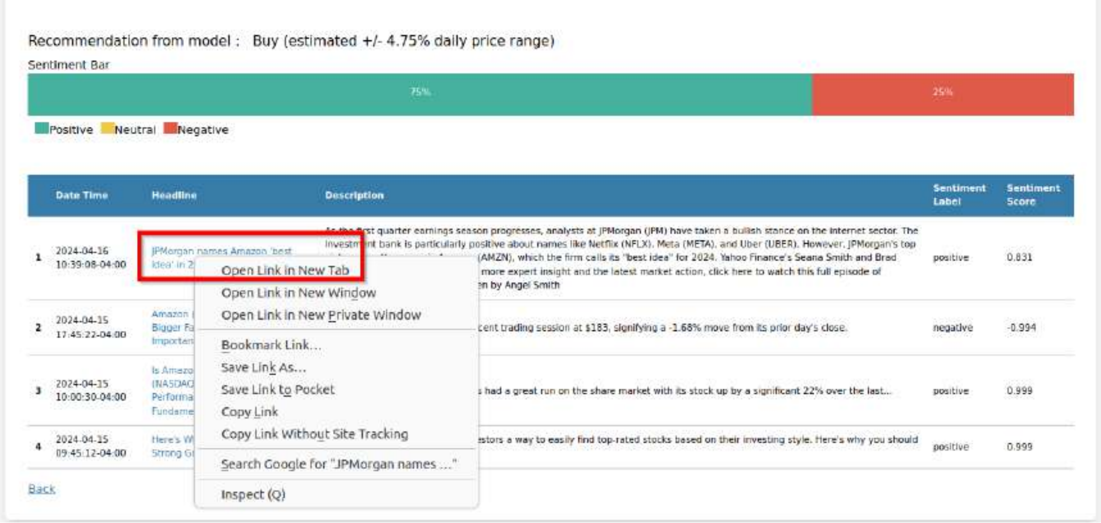
4. For those users who are interested to read through the actual news, a link to the actual new data is provided. Upon clicking on the link, user should be re-directed to the actual news article.



Recommendation from model : Buy (estimated +/- 4.75% daily price range)

Sentiment Bar

75%
25%
🟩Positive 🟨Neutral 🟥Negative
Open Link in New Tab
Open Link in New Window
Open Link in New Private Window
Bookmark Link...
Save Link As...
Save Link to Pocket
Copy Link
Copy Link Without Site Tracking
Search Google for "JPMorgan names ..."
Inspect (Q)

	Date Time	Headline	Description	Sentiment Label	Sentiment Score
1	2024-04-16 10:39:08-04:00	JPMorgan names Amazon 'best idea' in 2	As the first quarter earnings season progresses, analysts at JPMorgan (JPM) have taken a bullish stance on the internet sector. The investm nt bank is particularly positive about names like Netflix (NFLX), Meta (META), and Uber (UBER). However, JPMorgan's top (AMZN), which the firm calls its "best idea" for 2024. Yahoo Finance's Seana Smith and Brad more expert insight and the latest market action, click here to watch this full episode of en by Angel Smith	positive	0.831
2	2024-04-15 17:45:22-04:00	Amazon (Bigger Fa Importan	cent trading session at $183, signifying a -1.68% move from its prior day's close.	negative	-0.994
3	2024-04-15 10:00:30-04:00	Is Amazo (NASDAQ Performa Fundame	s had a great run on the share market with its stock up by a significant 22% over the last...	positive	0.999
4	2024-04-15 09:45:12-04:00	Here's W Strong Gr	estors a way to easily find top-rated stocks based on their investing style. Here's why you should	positive	0.999

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