

# Model Evaluation on Financial Tweets and Stock Trend Prediction

**ANLY 580 Final Project**

**Yunhan Zhang, Kaiyue Wei, Ningyuan Zhou, Qiaojuan Tu**



*GEORGETOWN UNIVERSITY*

# Background/Motivation

Before the internet, there could be a significant lag time between the unfolding of an event and the public's awareness of it. With the advent of the social media, information could spread more quickly.

**Twitter** stands out among social media sites as a valuable source of up-to-date breaking news, alerts, and tips that can inform trading decisions.

A single investor can simply monitor Twitter for major announcements and lately financial market trends instead of various websites and other publication channels.

Posts on the social media platform can influence stock returns, according to research led by a West Virginia University financial expert.

BREAKING • BUSINESS

## Eli Lilly Clarifies It's Not Offering Free Insulin After Tweet From Fake Verified Account—As Chaos Unfolds On Twitter

**Marisa Dellatto** Forbes Staff  
*I cover breaking news, arts and entertainment.*

Nov 10, 2022, 05:34pm EST

Follow

Market Summary > Eli Lilly And Co

**371.08** USD

+18.50 (5.25%) ↑ past month

Closed: Nov 30, 7:54 PM EST • Disclaimer

After hours 368.05 -3.03 (0.82%)

1D 5D 1M 6M YTD 1Y 5Y Max



# Goals and Objectives

## Interested Questions:

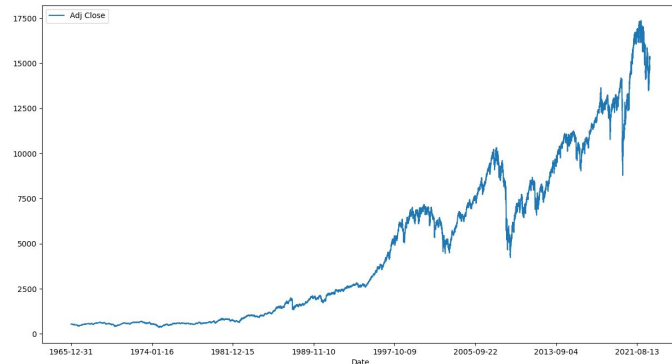
1. Can twitter posts really affect the stock trend?
2. Can we build a model based on financial tweets and use it to predict the stock index prices trend?

**Goal:** Build Model on financial tweets to reflect and predict the stock index prices trend

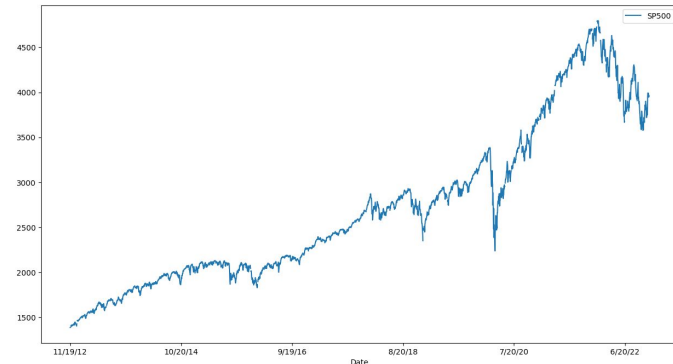
- Train model on financial tweets and stock market price index change (Rise/Fall)
- Predict the next stock index movement within some time frame by using financial text content

# Data Description

- **S&P 500 and NYSE** raw data



S&P 500



NYSE

- **Financial Tweets:** A basket of tweets from each recommended financial account

Home » Investment Banking Resources » Corporate Finance Resources » Top 24 Best Twitter Profiles To Follow in Finance

## Top 24 Best Twitter Profiles To Follow in Finance



Article by  
Sayantan Mukhopadhyay



Reviewed by  
Dheeraj Vaidya, CFA, FRM

## Top Finance Twitter Accounts to Follow

We have gathered 24 accounts from Twitter to enable you to catch a glimpse of the awesomeness of finance. [Finance](#) is not as dull as you think (if you are new to finance chuckle). It has analytics, humor, and timely updates from the world's most influential and important people and institutions.

[#1 – Paul Kedrosky \(@pkedrosky\):](#)

[#2 – Goldman Sachs \(@GoldmanSachs\):](#)

[#3 – Barry Ritholtz \(@ritholtz\):](#)

[#4 – David Schawel \(@DavidSchawel\):](#)

[#5 – Dheeraj Vaidya \(@wallstreetmojo\):](#)

[#6 – Howard Lindzon \(@howardlindzon\):](#)

[#7 – Conor Sen \(@conorsen\):](#)

[#8 – Joshua Brown \(@ReformedBroker\):](#)

[#9 – Mark Dow \(@mark\\_dow\):](#)

[#10 – Meb Faber \(@MebFaber\):](#)

[#11 – Eric Jackson \(@ericjackson\):](#)

[#12 – Michael Kitces \(@michaelkitces\):](#)

[#13 – Aswath Damodaran \(@AswathDamodaran\):](#)

[#14 – Keith Kern \(@stt2318\):](#)

[#15 – Nick Firoozye \(@firoozye\):](#)

[#16 – Mohamed A. El-Erian \(@elermanm\):](#)

[#17 – Value Walk \(@valuwalk\):](#)

[#18 – Morgan Stanley \(@MorganStanley\):](#)

[#19 – Ian Shephardson \(@IanShephardson\):](#)

[#20 – Jason Zweig \(@jasonzweigswj\):](#)

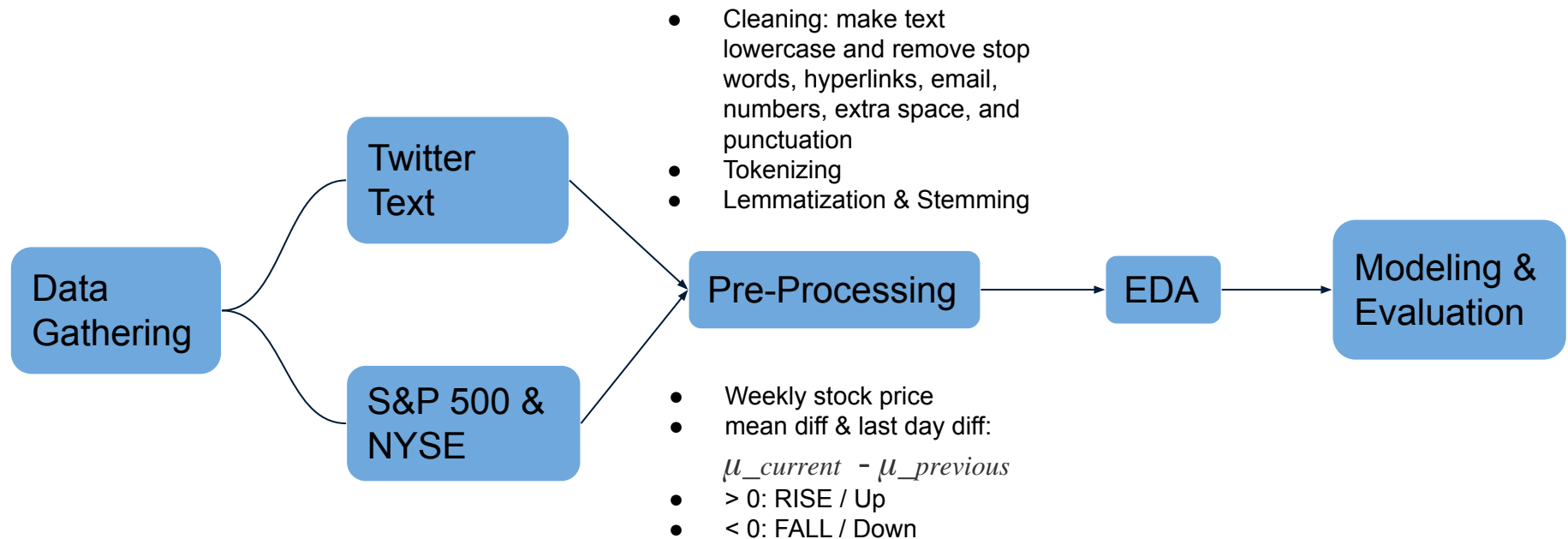
[#21 – Justin Wolfers \(@JustinWolfers\):](#)

[#22 – Michael McDonough \(@M\\_McDonough\):](#)

[#23 – Cullen Roche \(@cullenroche\):](#)

[#24 – Eric Scott Hunsader \(@nanexllc\):](#)

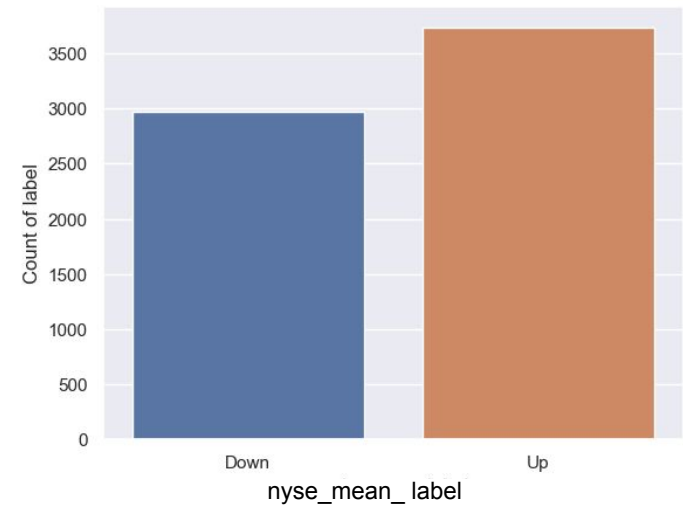
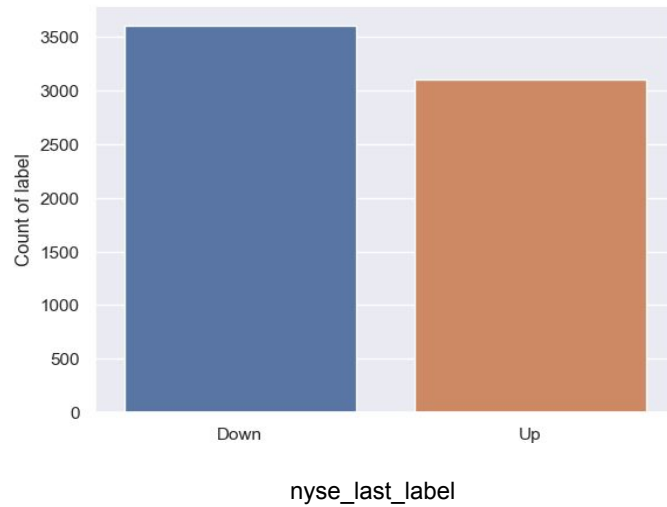
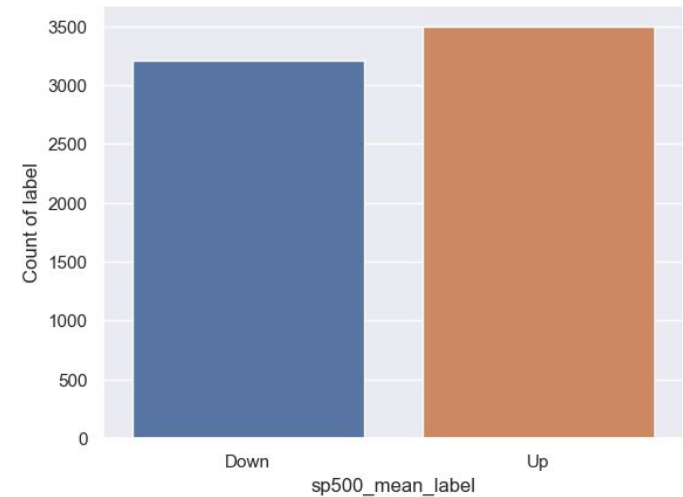
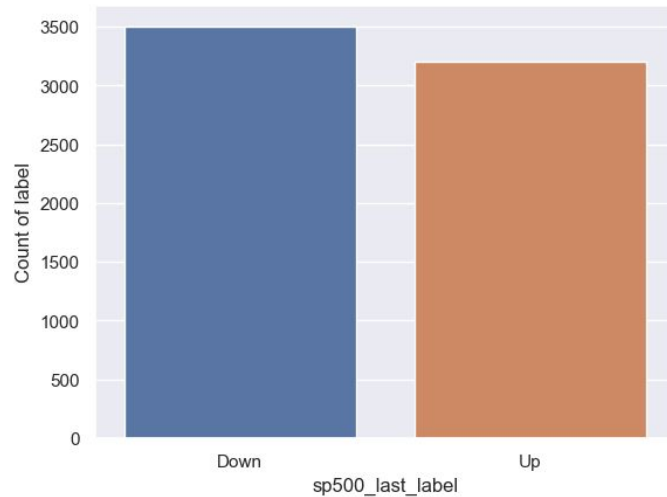
# Workflow



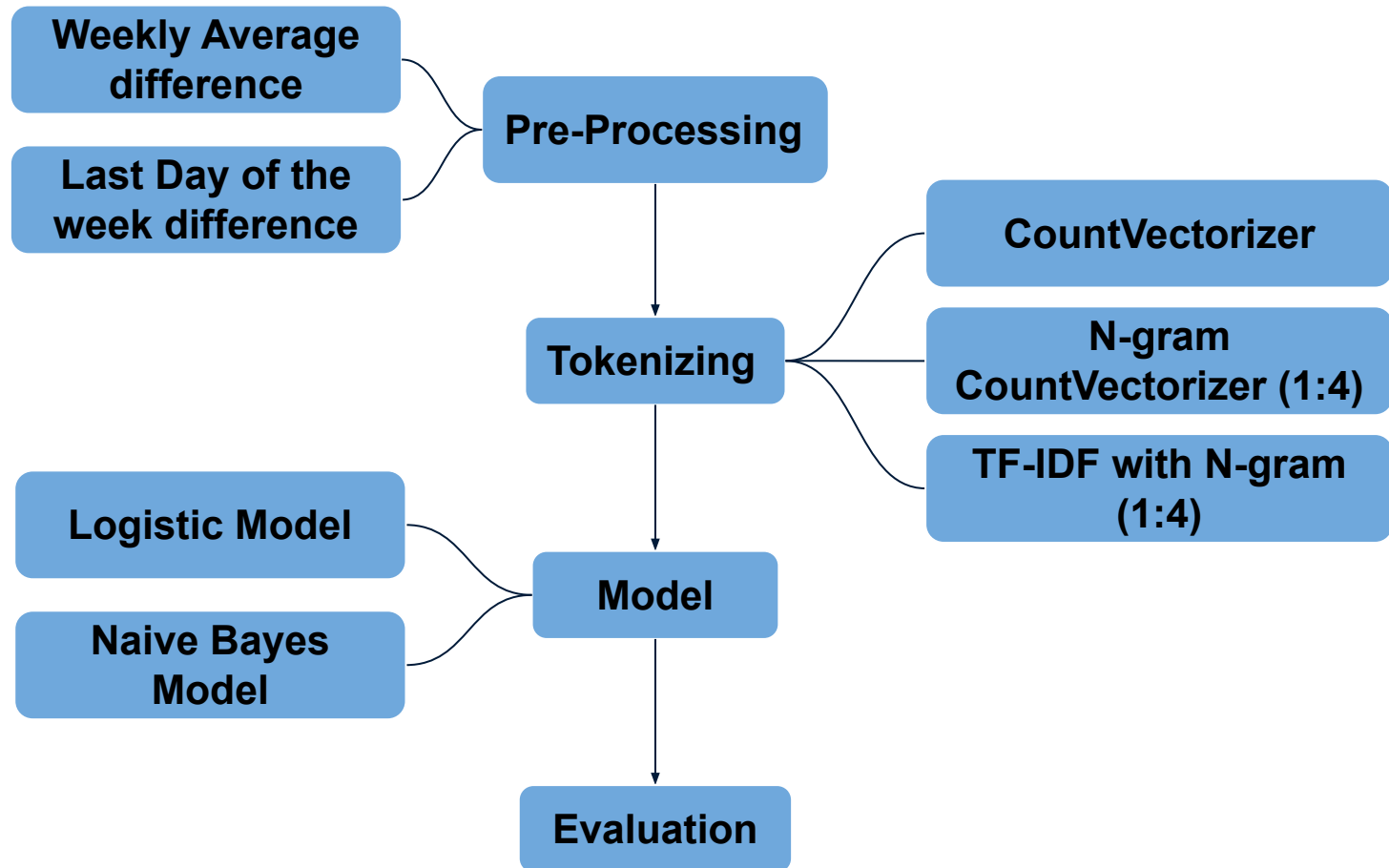
## EDA - Tweets Word Cloud



# EDA - Rise/Fall Labels Distribution

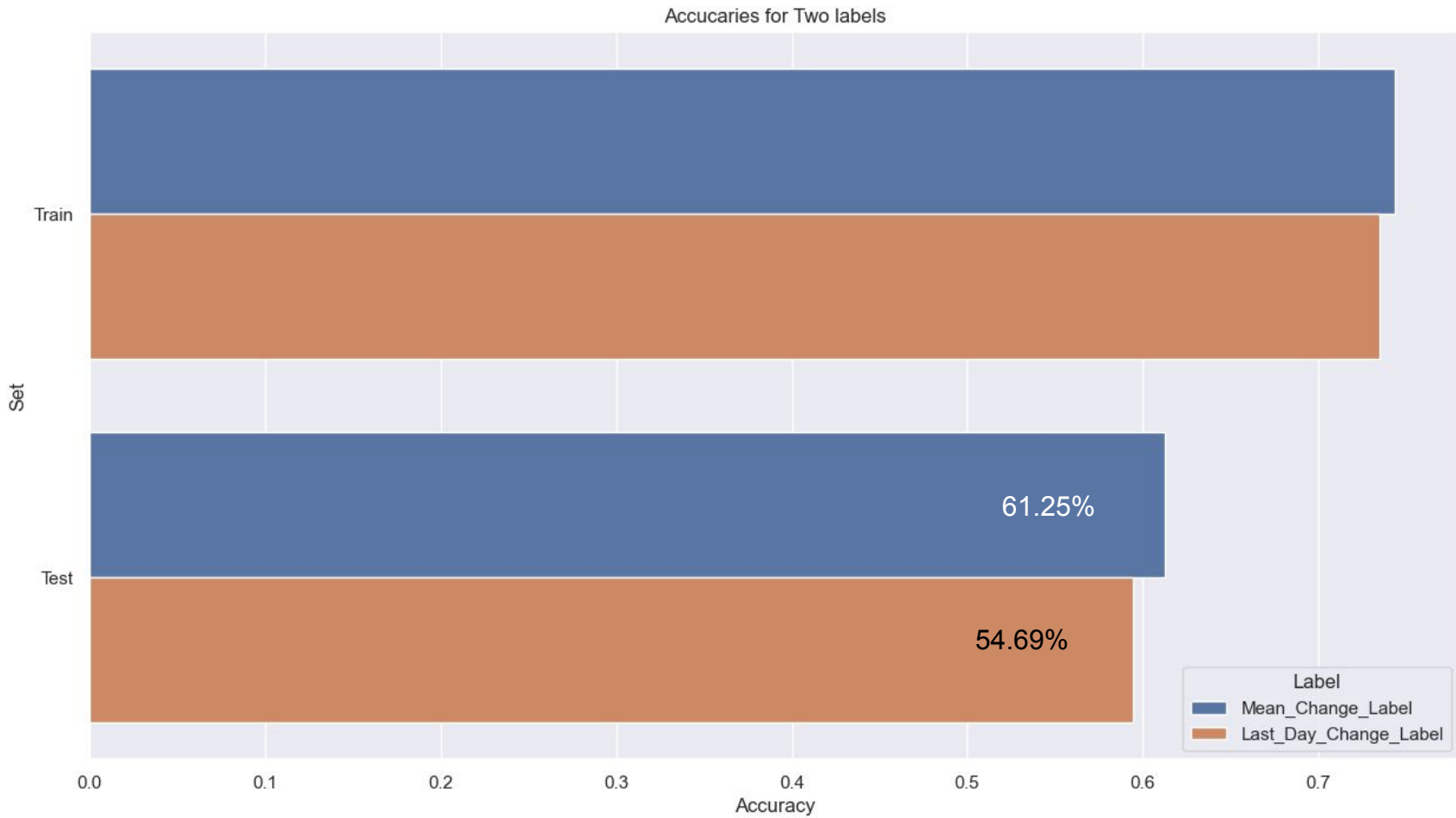


# Pipeline

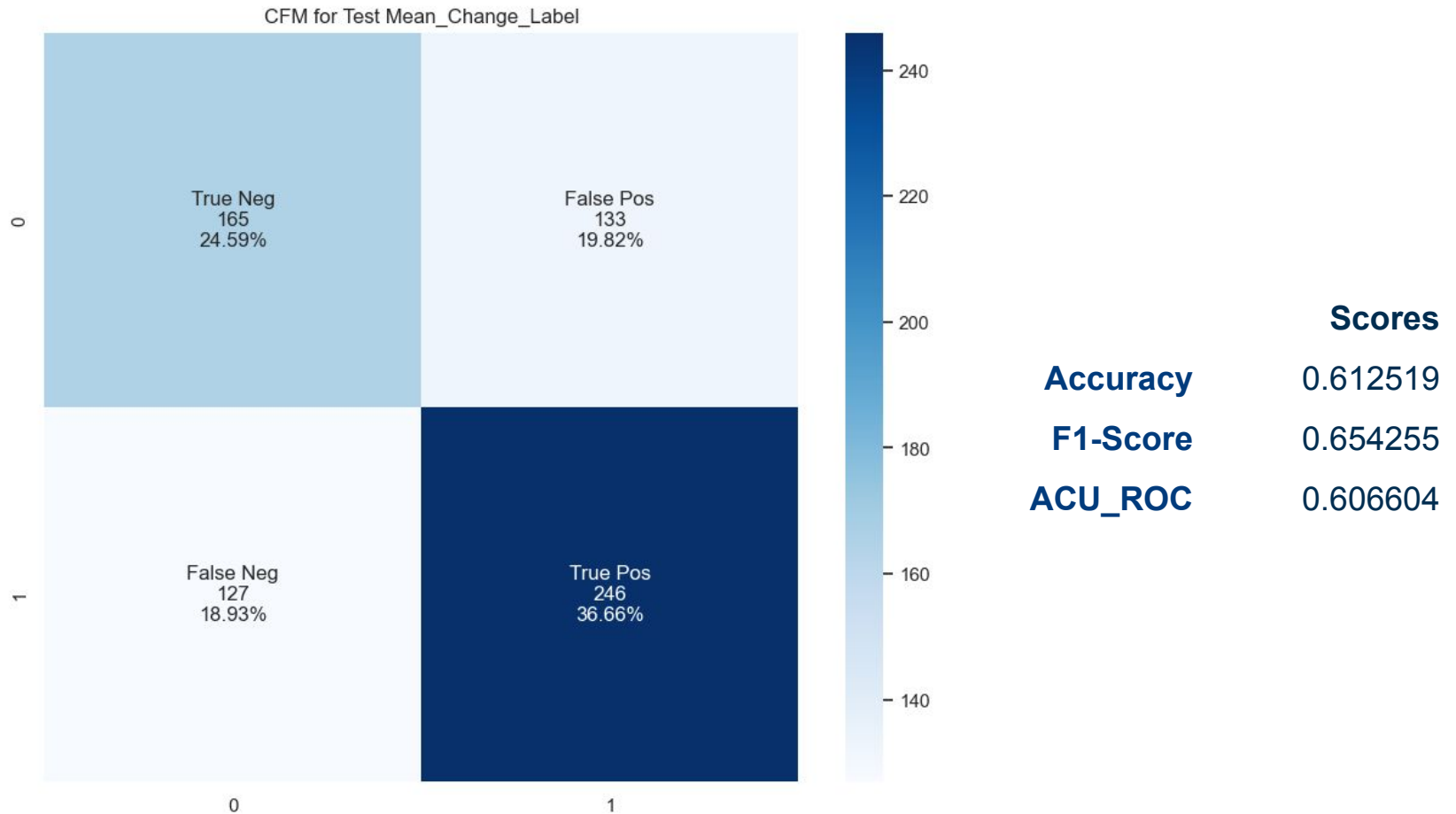




# Logistic Model



# Logistic Model

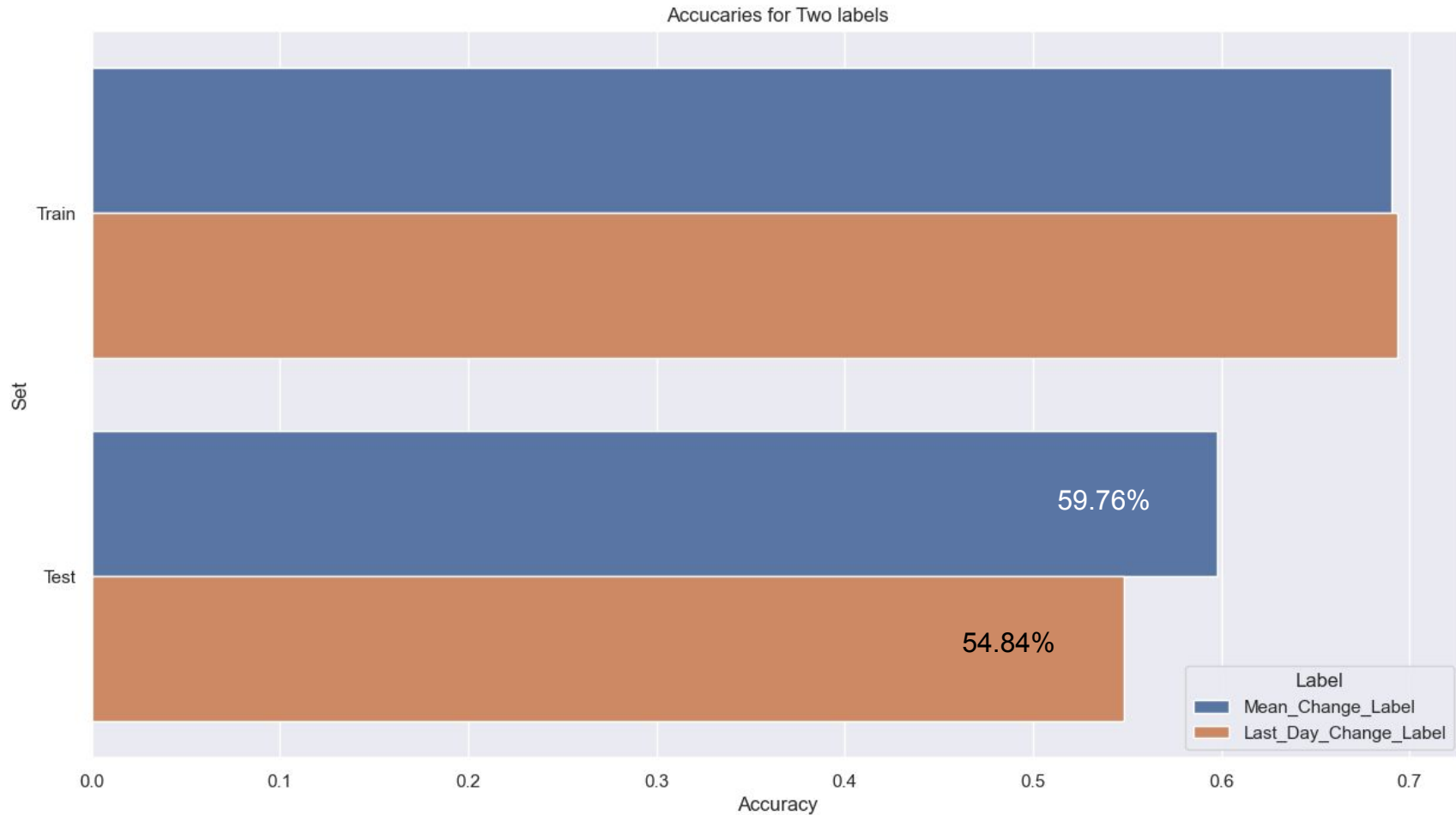


# Top words from Logistic Model

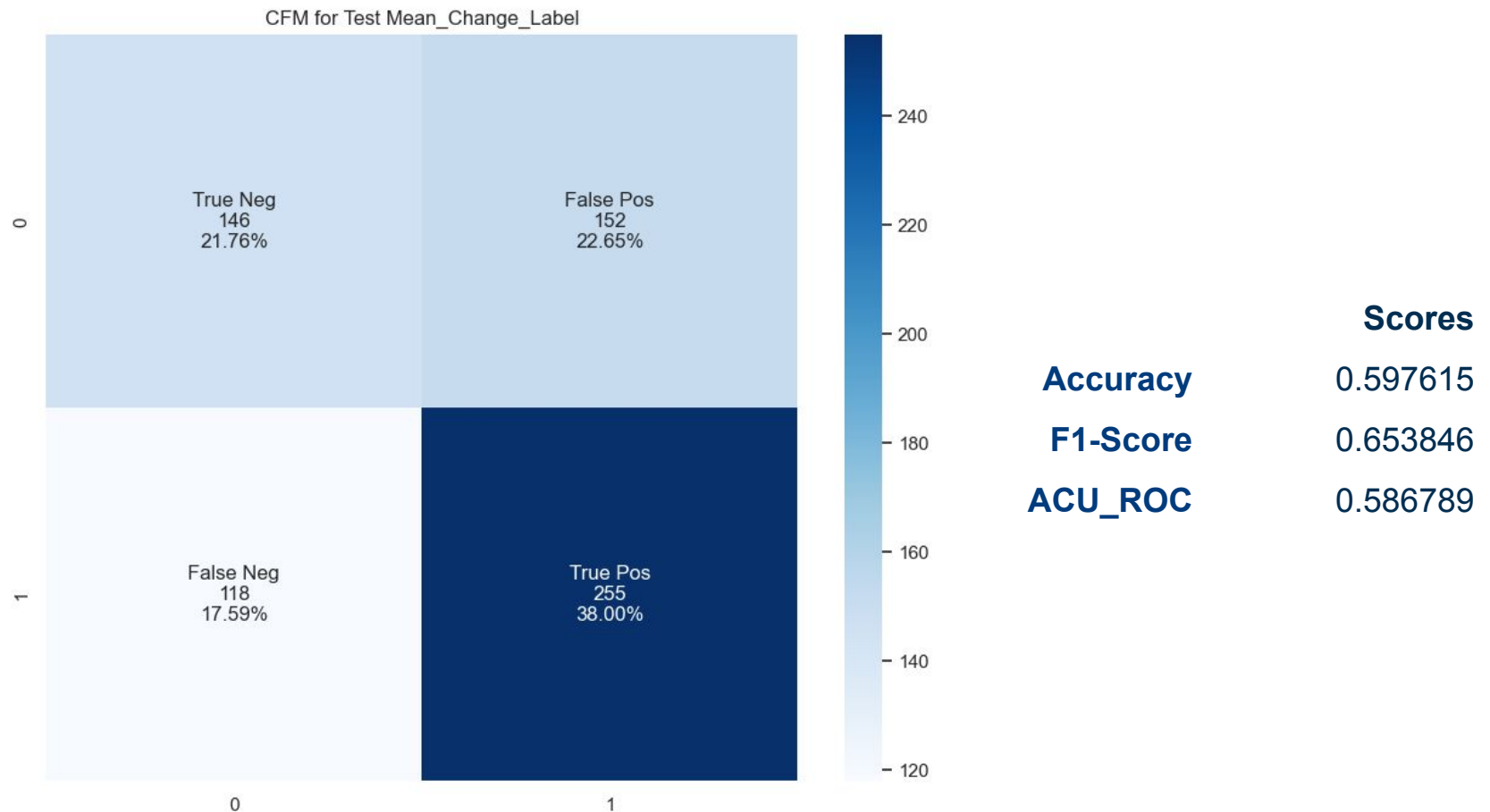
Word	Coefficient
trump	1.732485
recess	1.582953
actual	1.378291
love	1.231099
vaccin	1.171420
exchang	1.139246
advis	1.107863
buyback	1.089638
ceo	1.079779
shift	1.072818

Word	Coefficient
book	-1.631081
selloff	-1.587054
stagflat	-1.431557
myth	-1.386647
break	-1.345357
earli	-1.281100
omicron	-1.275406
polici	-1.245375
sell	-1.244793
freedom	-1.215873

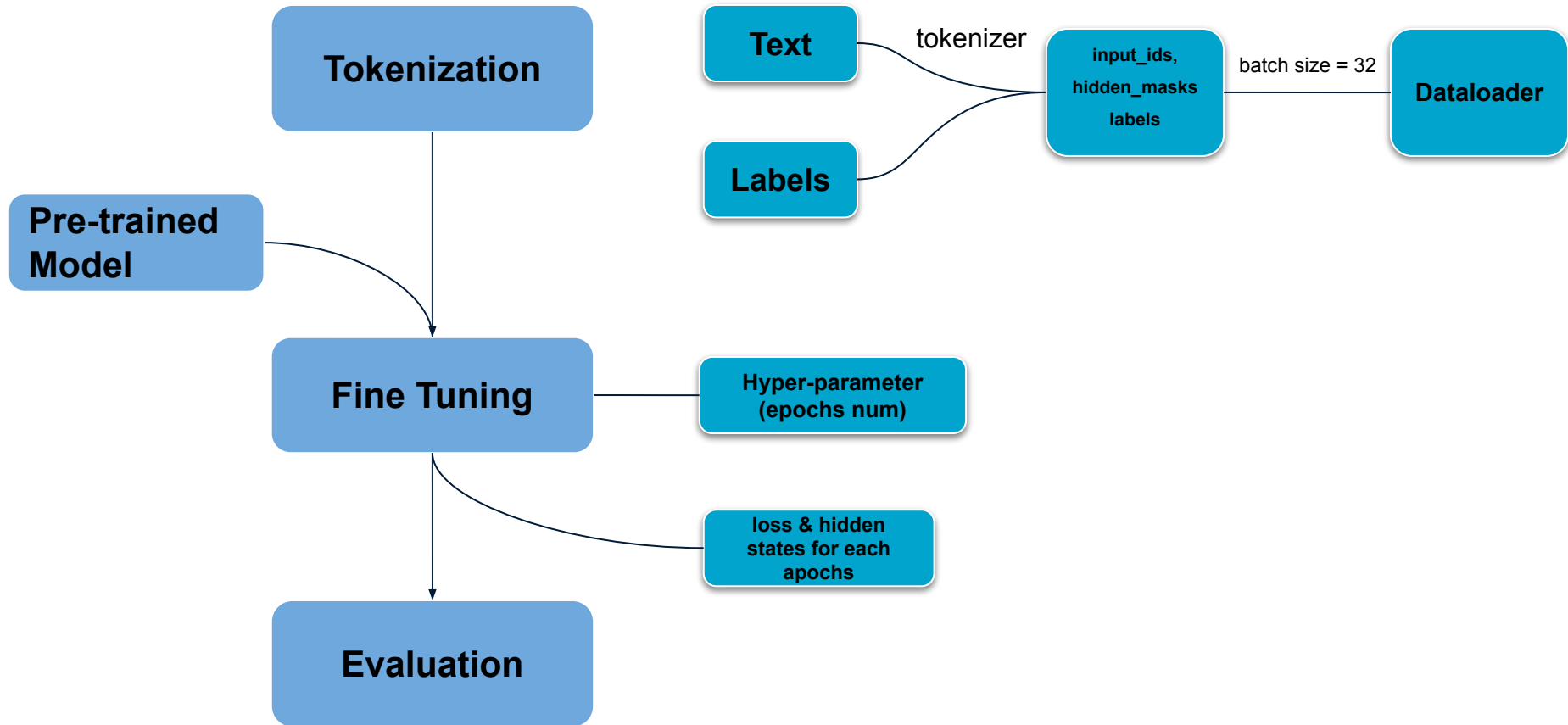
# Naive Bayes Classifier Model



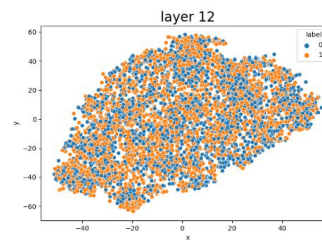
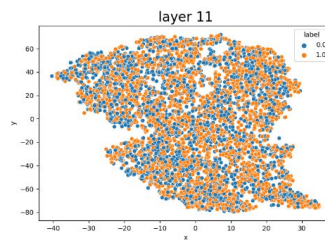
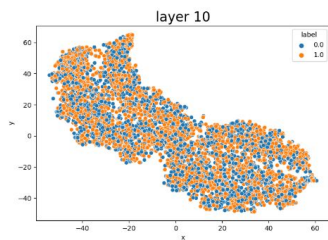
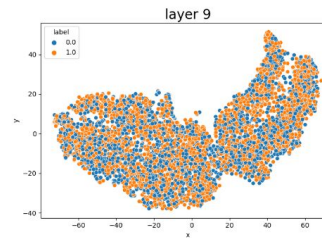
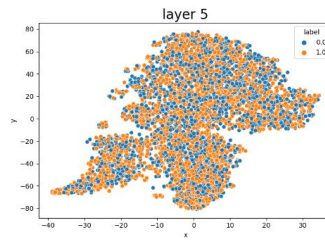
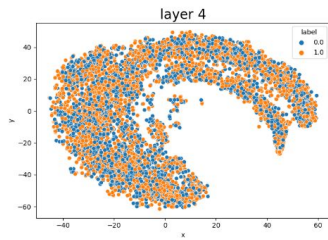
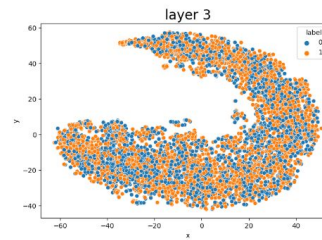
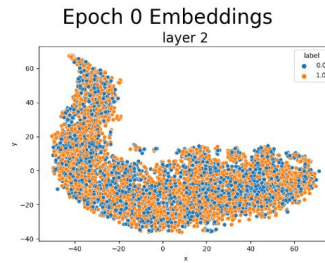
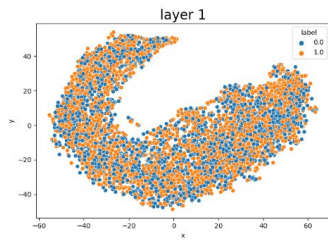
# Naive Bayes Classifier Model



# Bert Model



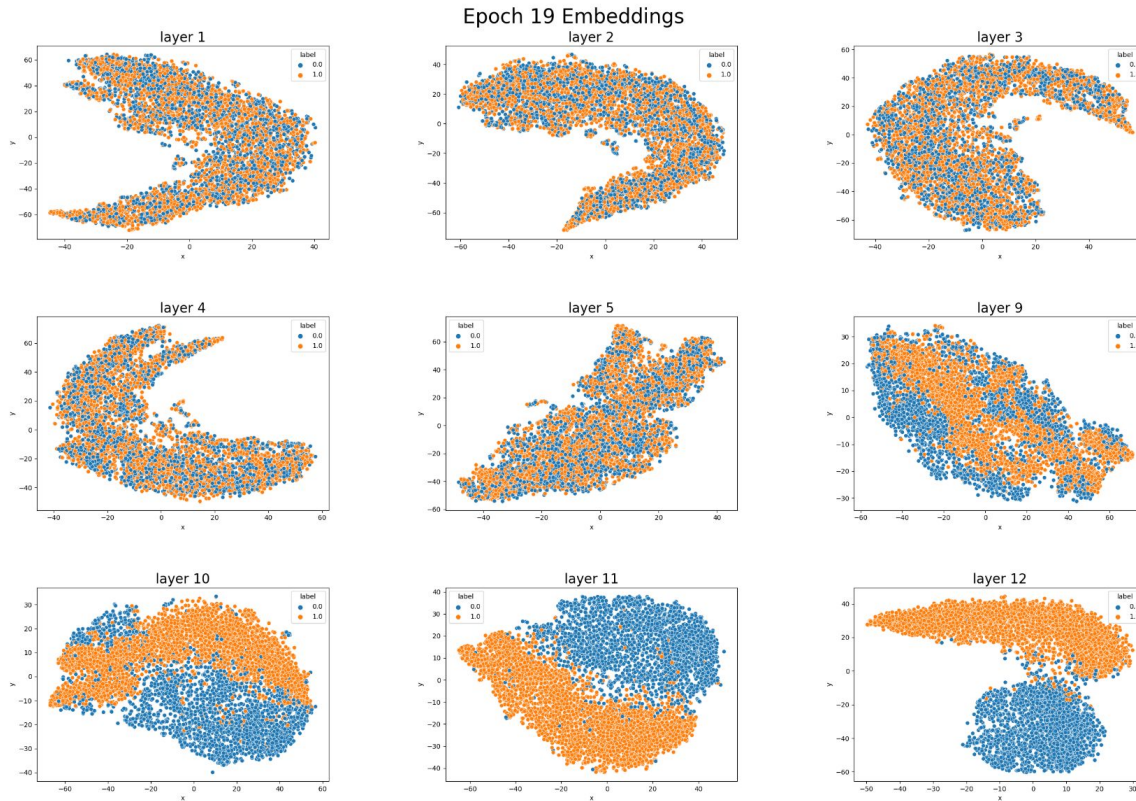
# Bert Model



TSNE Visualization:

Reducing the 768 dimension in Bert hidden states to 2

# Bert Model



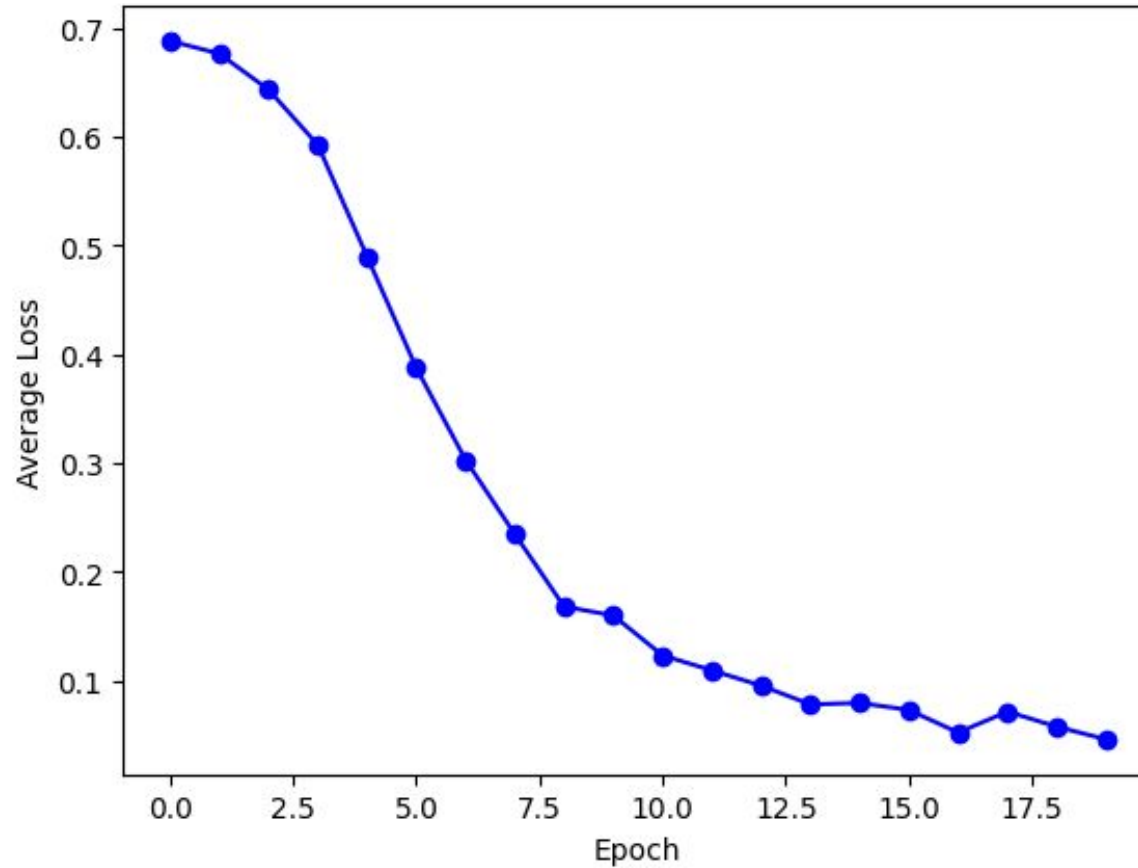
TSNE Visualization:

Reducing the 768 dimension in  
Bert hidden states to 2

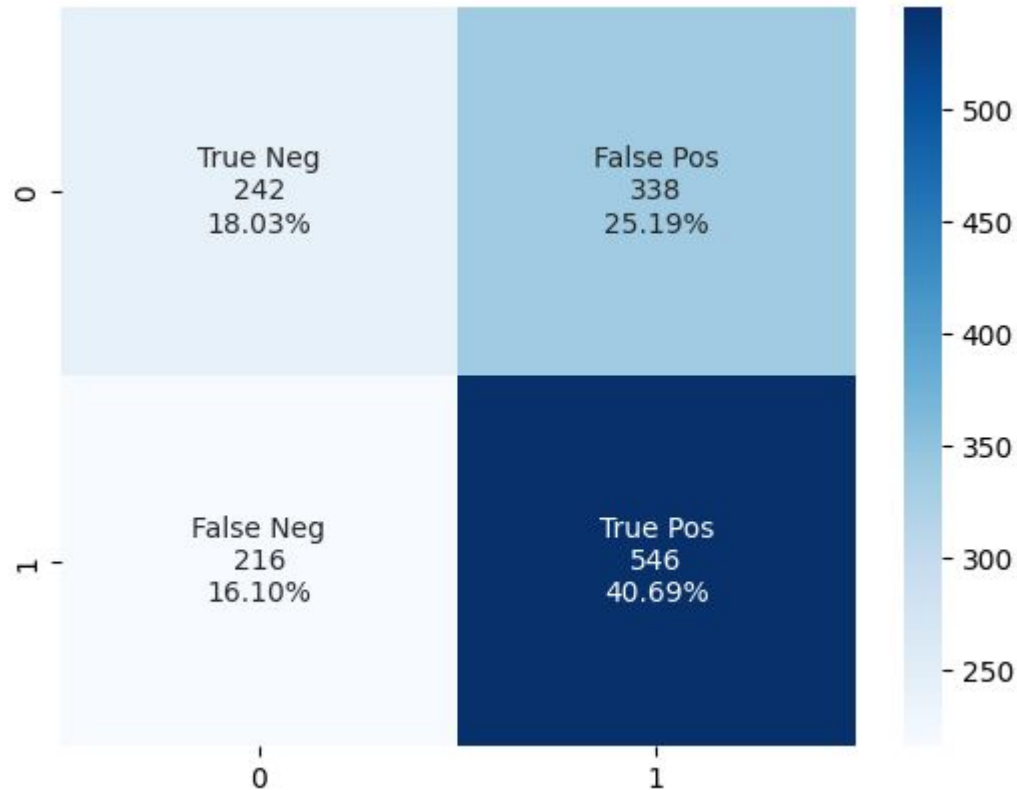


# Bert Model

## Loss changing with epochs

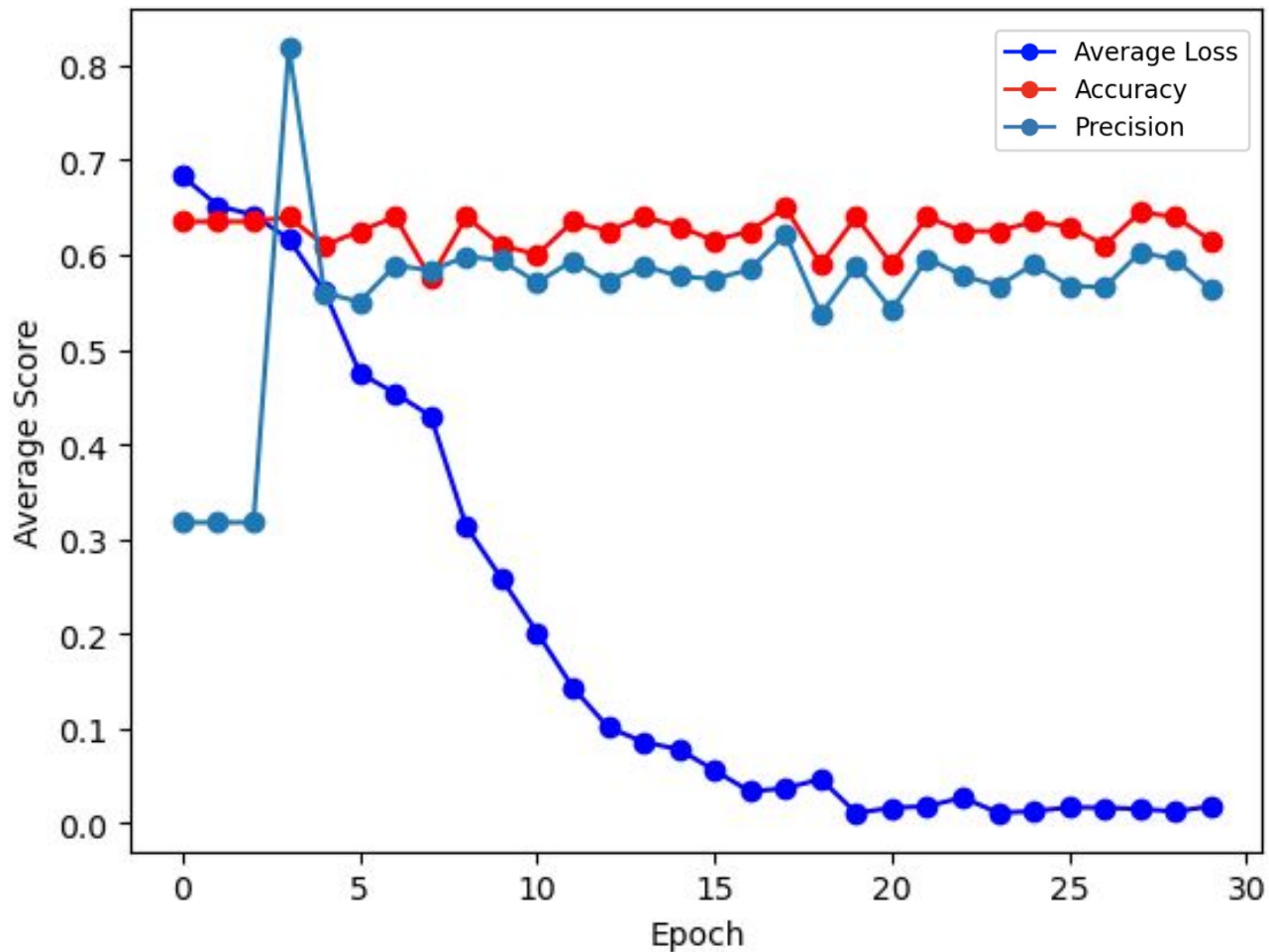


# Model Accuracy



Scores	
Accuracy	0.587183
Precision	0.573016
Recall	0.566888
Macro F1	0.564854

# Problems with the training



# Bert Model:

## Example from test data

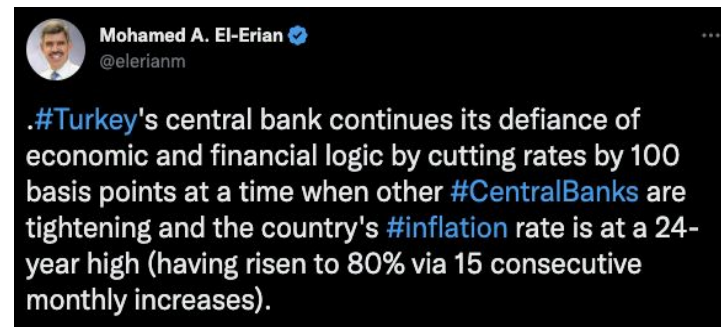
- Successfully prediction of stock price going up:



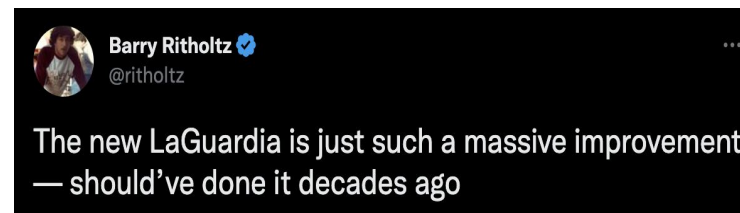
- Successfully prediction of stock price going down:



- Failed to predict:

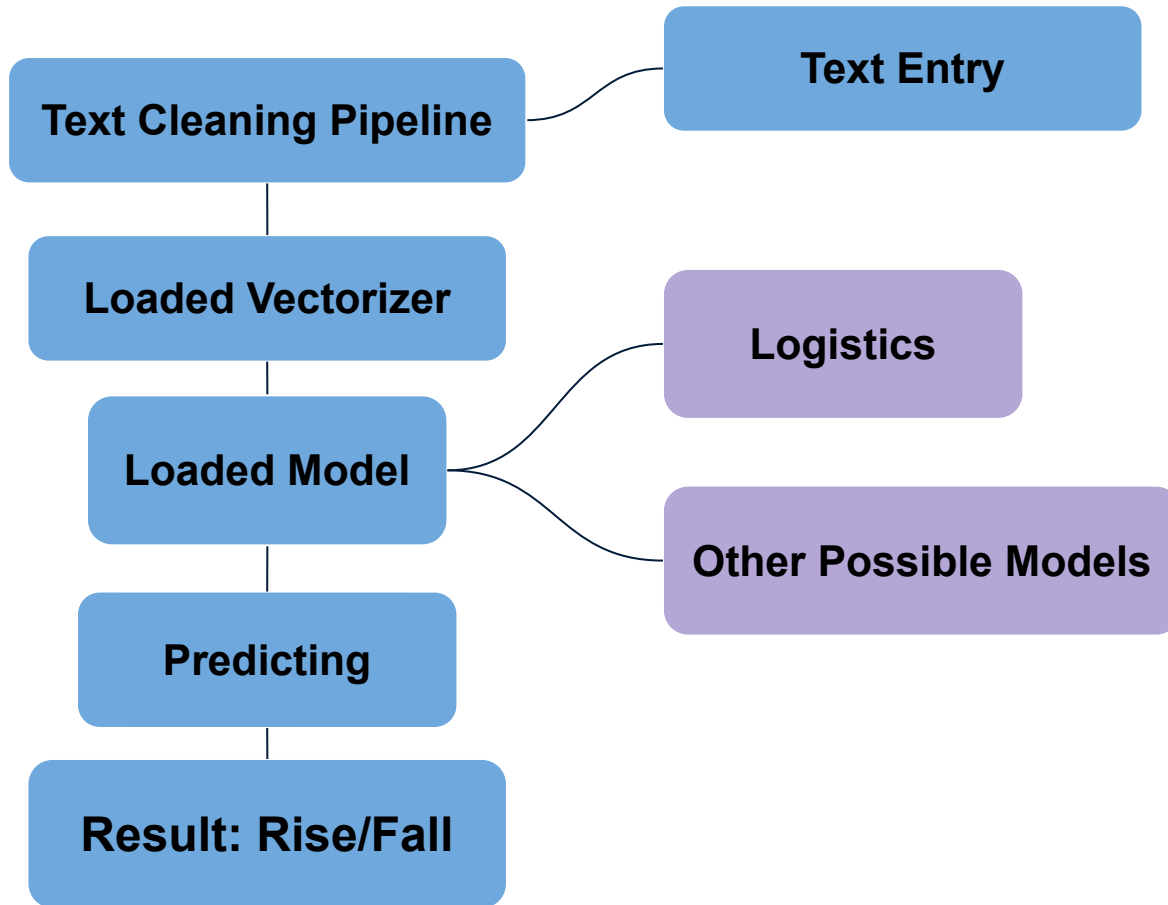


News about other countries



Irrelevant tweets

# Prediction



# Conclusion, Drawback, and Further Works

# Questions?

# Citations

Parker, Tim. "10 Twitter Feeds Investors Should Follow." *Investopedia*, Investopedia, 26 July 2022, <https://www.investopedia.com/financial-edge/0712/10-twitter-feeds-investors-should-follow.aspx>.

Mukhopadhyay, Sayantan. "Top 24 Best Twitter Profiles to Follow in Finance." *WallStreetMojo*, 14 July 2022, <https://www.wallstreetmojo.com/twitter-profiles-to-follow-in-finance/#h-1-paul-kedrosky-pkedrosky>.

Dellatto, M. (2022) *Eli Lilly clarifies it's not offering free insulin after tweet from fake verified account-as Chaos unfolds on Twitter*, *Forbes*. Forbes Magazine. Available at: <https://www.forbes.com/sites/marisadellatto/2022/11/10/eli-lilly-clarifies-its-not-offering-free-insulin-after-tweet-from-fake-verified-account-as-chaos-unfolds-on-twitter/?sh=55a8129e51a3> (Accessed: December 1, 2022).

Tassi, P. (2022) *'middle finger mario' becomes mascot of Elon Musk's Twitter blue verification free-for-all*, *Forbes*. Forbes Magazine. Available at: <https://www.forbes.com/sites/paultassi/2022/11/10/middle-finger-mario-becomes-mascot-of-elon-musks-twitter-blue-verification-free-for-all/?sh=de81b1e25a63> (Accessed: December 1, 2022).

Garg, T. (2021) *Visualize Bert Sequence Embeddings: An unseen way*, *Medium*. Towards Data Science. Available at: <https://towardsdatascience.com/visualize-bert-sequence-embeddings-an-unseen-way-1d6a351e4568> (Accessed: December 1, 2022).