

# **Stock Prediction using Twitter Sentiment Analysis**

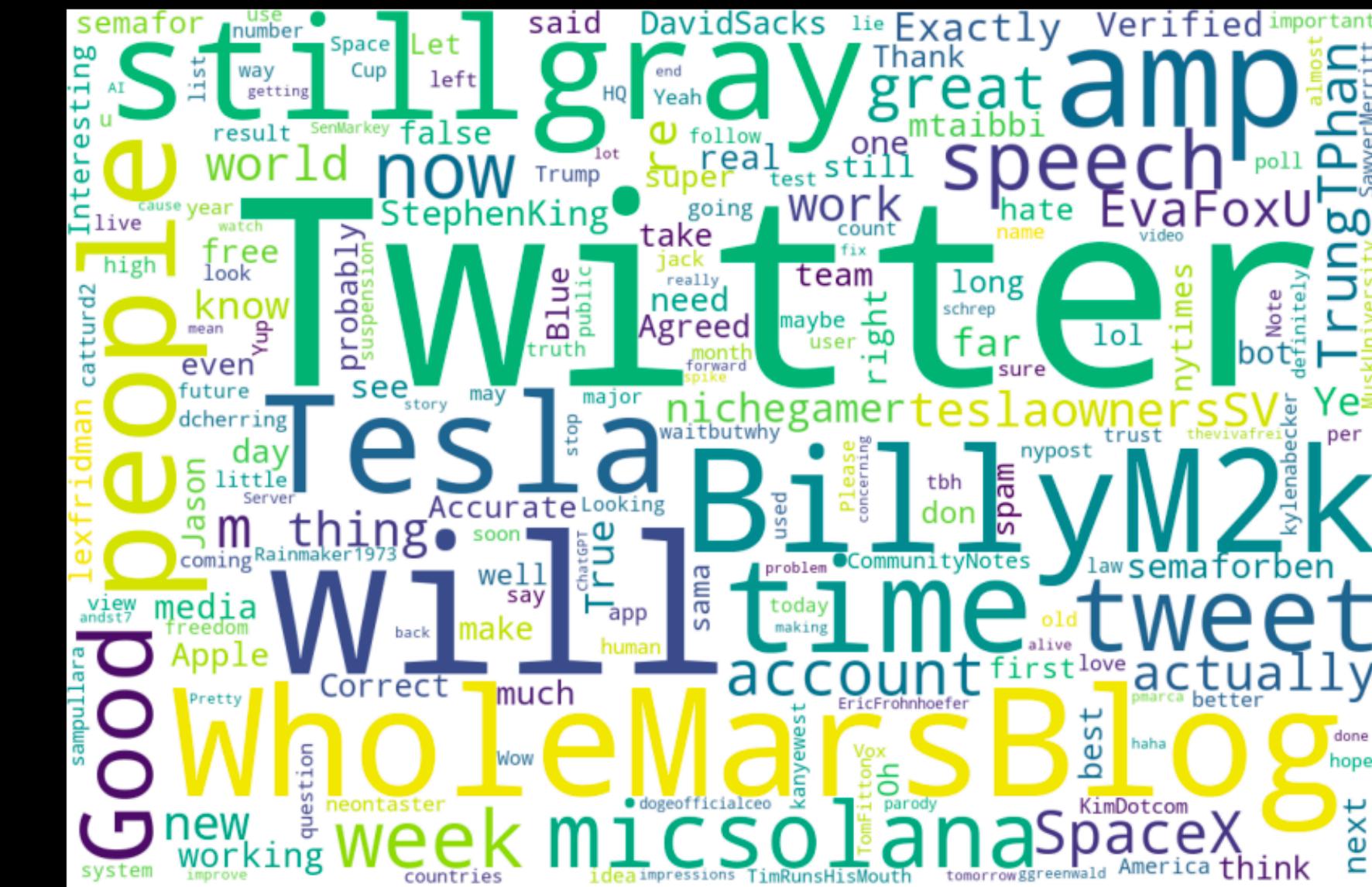
**API, NLP (Sentimental Analysis),  
Grander Causality,  
Random Forest Model**

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# How important is your opinion?

# STOCK MARKET FORECASTING

- Different methods and there is a lot of controversy about which one is the best. In the fundamental (Warren Buffet's theory). They affirm that all **public known information about a company**, which includes **OPINIONS**, would affect the stock price.
  - Social Media platforms: Twitter or Reddit have become a variable to consider.



# Data bases & API TWITTER

- Stock Market TESLA (daily open-close):  
232 rows (Jan.-Dec 2022)
- Mentions of TESLA on Twitter: 153.000  
rows (April - Dec. 2022)
- Mentions of Elon Musk on Twitter (last  
week: 06.-13.2022)

The screenshot shows the Twitter Developer Portal interface. At the top, there's a dark header with the Twitter logo and the text "Developer Portal". Below this, a white section is titled "Twitter API v2" with tabs for "Essential", "Elevated" (which is underlined), and "Academic Research".

The main content area has a title "Elevated" and a sub-section "Overview" which states: "Higher levels of access to the Twitter API for free with an approved application." It shows a green checkmark indicating "Your Project has Elevated access: Dumb Stanislas".

On the right side, there are several sections with icons and descriptions:

- "Apps": 3 environments per project
- "Tweets": 2M Tweets per month / Project
- "Cost": free
- "Tweet cap": no
- "Special attributes": -

Below this, there's a table for "Endpoints" with two rows:

Endpoints	Rate limit ⓘ	Tweet cap ⓘ	Special attributes
GET /2/tweets/:id	300 requests / 15 mins PER APP 900 requests / 15 mins PER USER	no	-
GET /2/tweets	300 requests / 15 mins PER APP 900 requests / 15 mins PER USER	no	-

At the bottom, there's a section titled "Use cases" with three images and their descriptions:

- Build for businesses
- Build for the public
- Do research

# Sentimental Analysis

## NLP: study affective states

Libraries: Text Blow & `from nltk.sentiment.vader import SentimentIntensityAnalyzer`

- **positive** sentiment, **compound**  $\geq 0.05$
- **negative** sentiment, **compound**  $\leq -0.05$
- **neutral** sentiment, the **compound** is between  $]-0.05, 0.05[$



```
print(rows)
```

```
[{'text': 'The sale comes as shares of the electric vehicle and solar panel maker have collapsed, losing over half th  
eir value... https://t.co/Zx33J405Rn', 'date': datetime.datetime(2022, 12, 15, 15, 9, 44, tzinfo=datetime.timezone.utc), 'id': 1603406964037386242, 'location': 'Texas, USA', 'compound': -0.3612}]
```

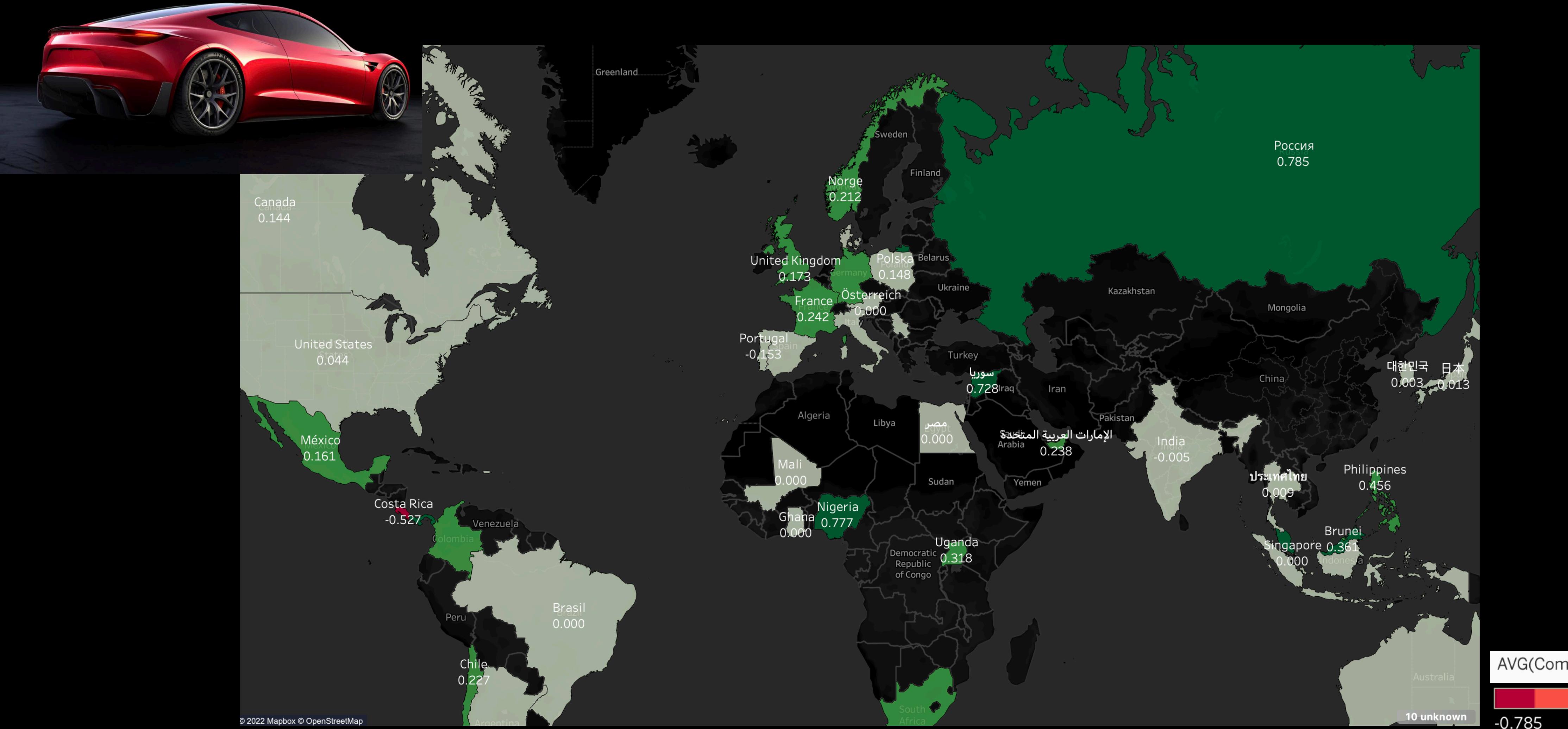


```
print(rows)
```

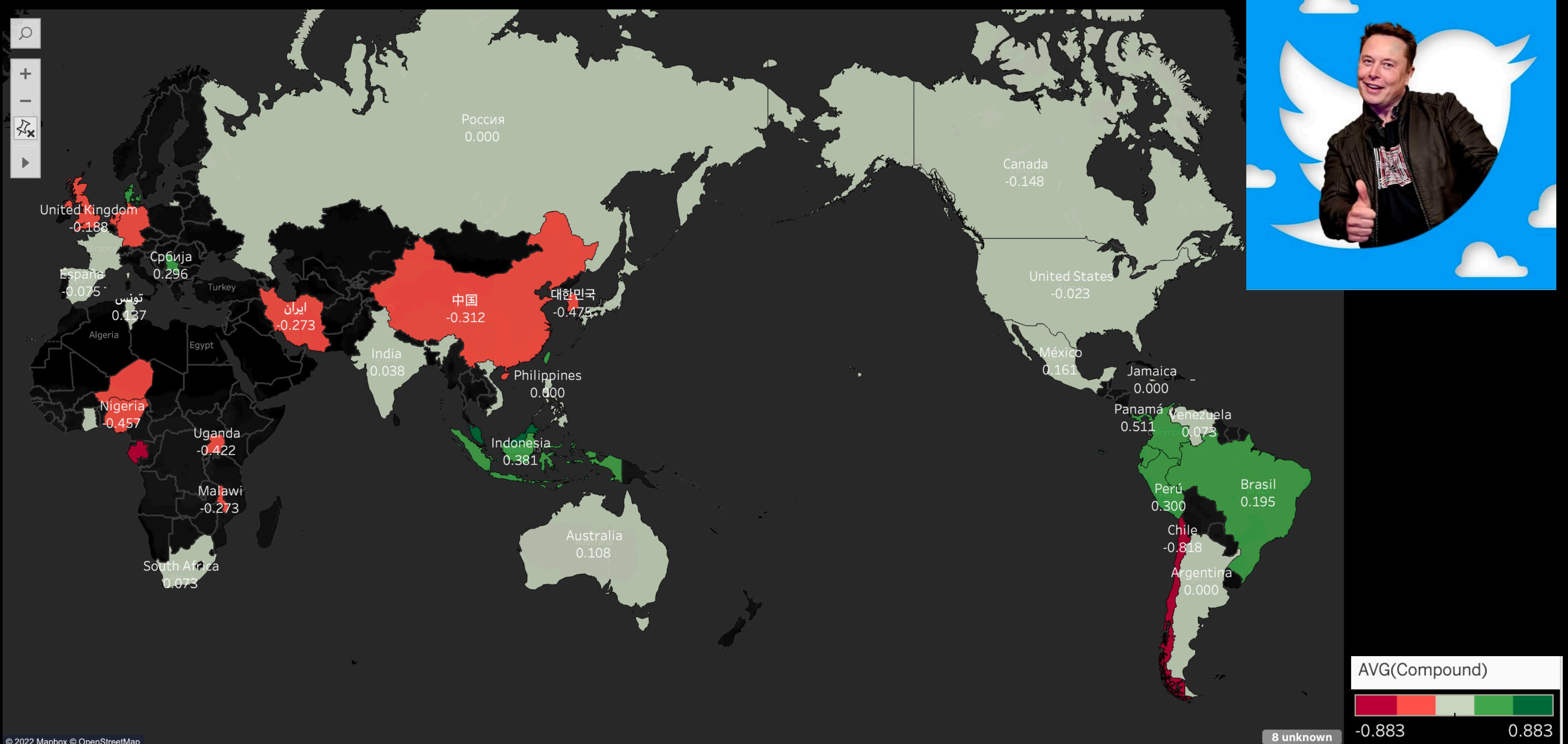
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# Multi-Country TESLA opinion on Twitter (last 7 days)



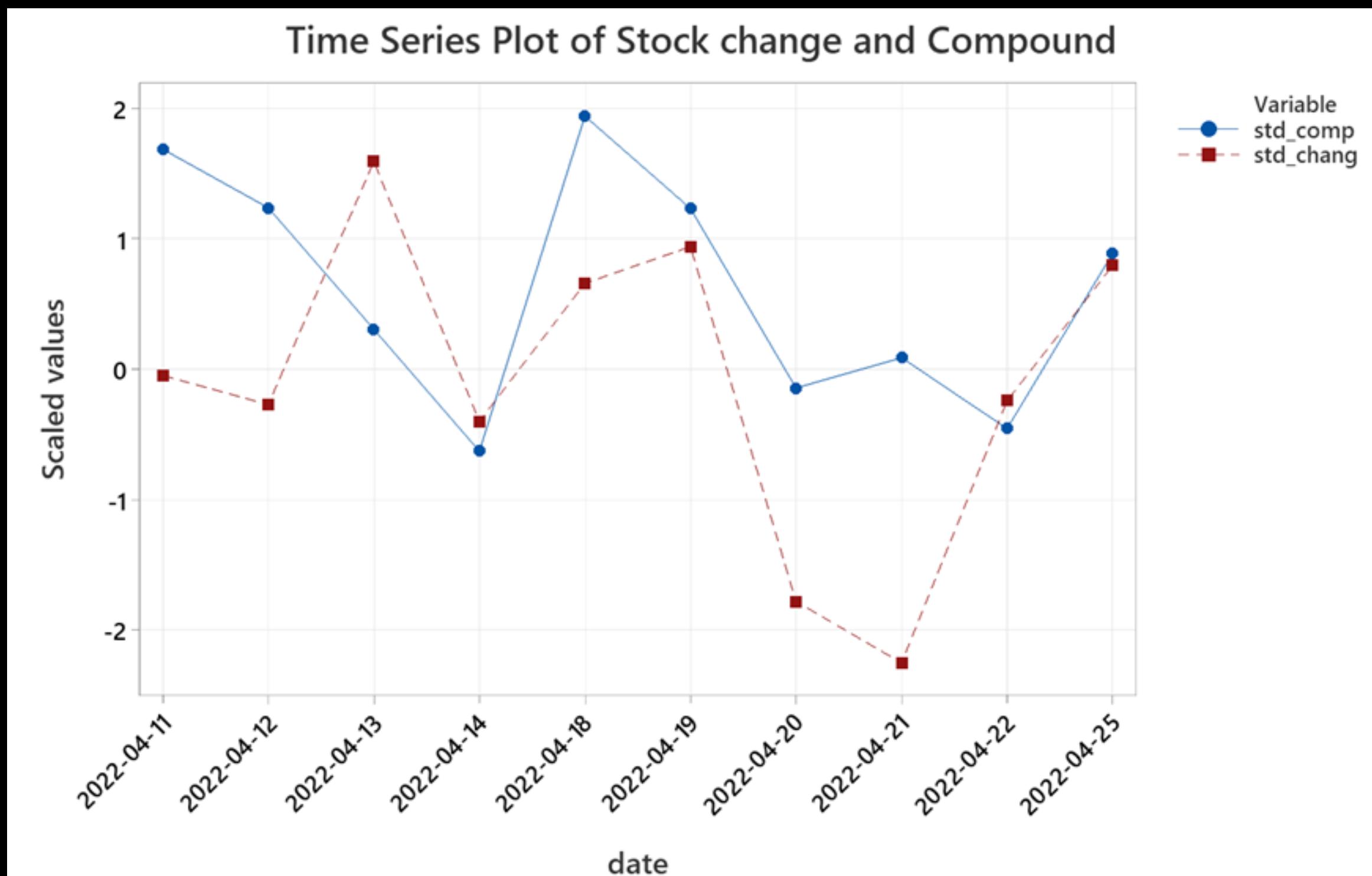
# Multi-Country Musk opinion on Twitter (last 7 days)



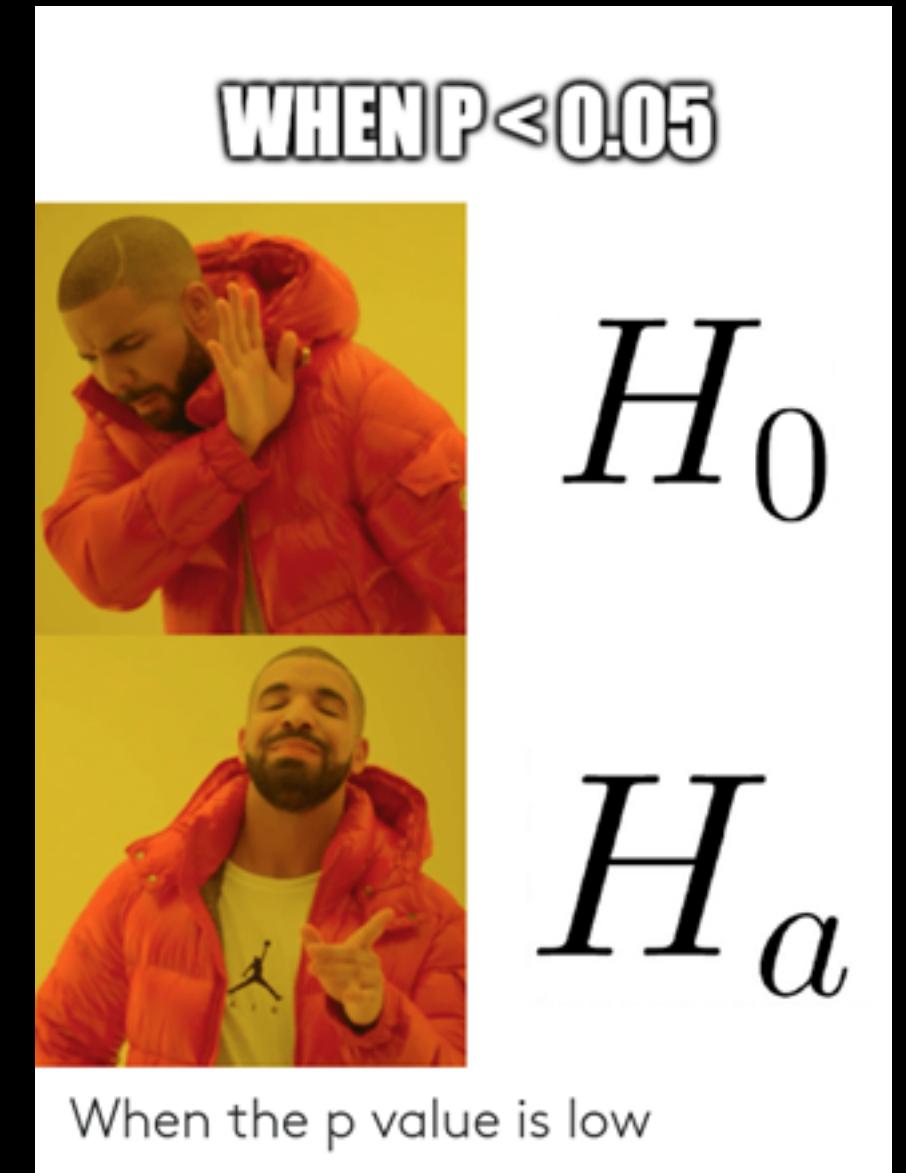
# Methodology

## Grander Causality Analysis

- Correlate Tesla Stock change to Twitter Tesla mood



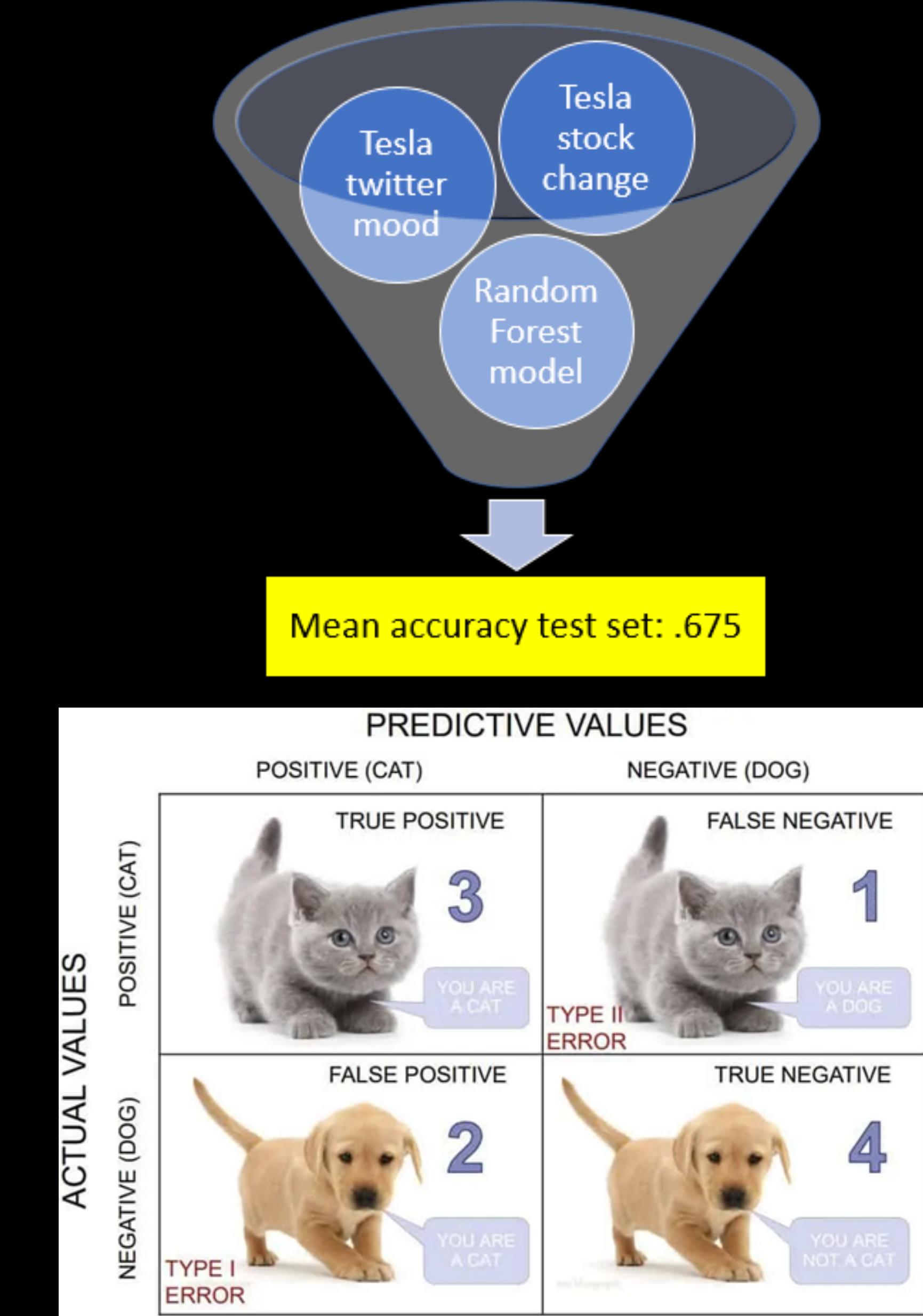
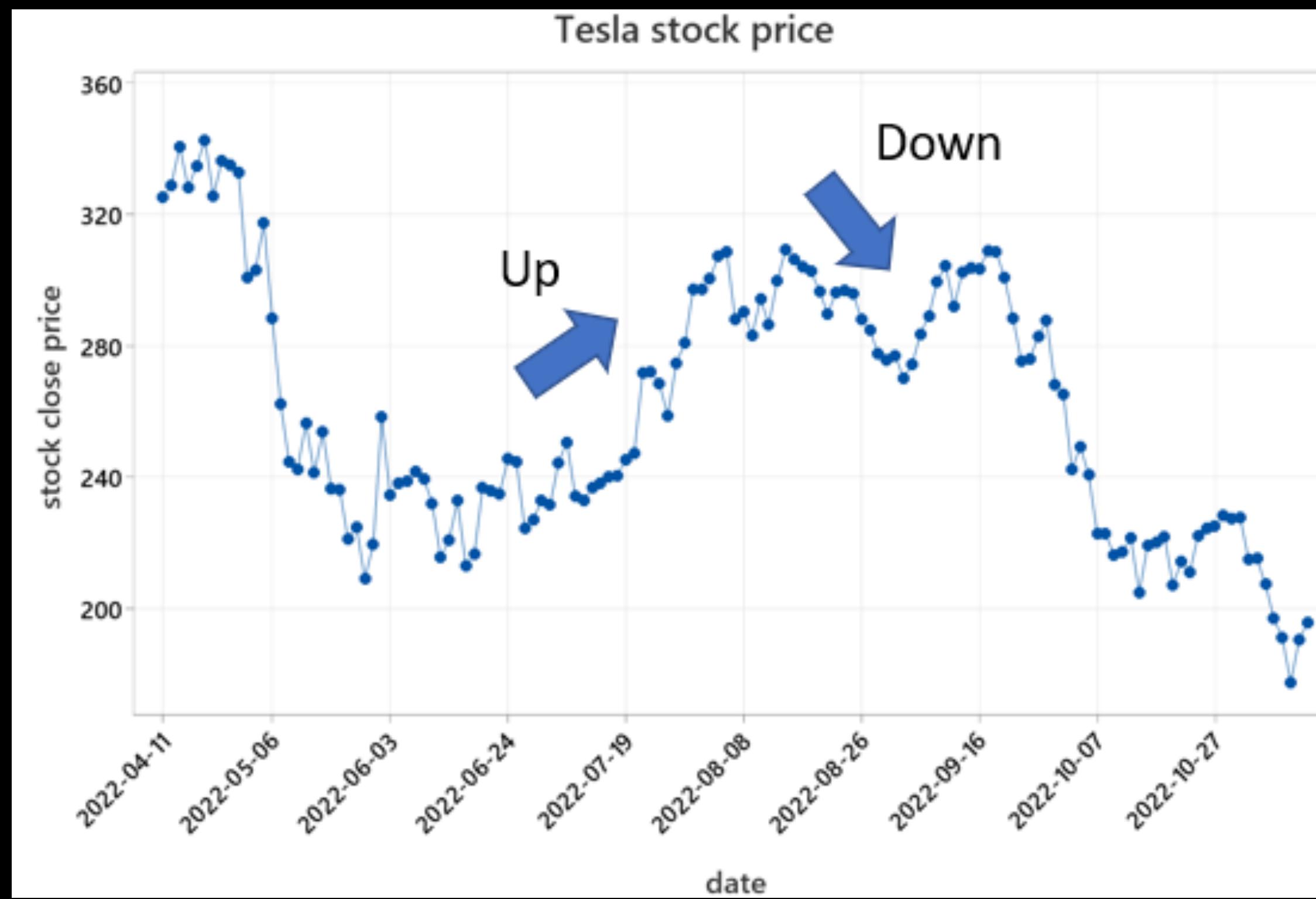
STATISTICAL SIGNIFICANCE (P-VALUES) OF BIVARIATE GRANGER-CAUSALITY CORRELATION BETWEEN MOODS AND TESLA STOCK IN PERIOD APRIL 2022 TO NOVEMBER 2022.



Lag	Compound
1 day	0.5212
2 days	0.806
3 days	0.9414
4 days	0.0312
5 days	0.0413

# Classification Model

## Random Forest Classifier



**According According to our model the stock direction will go down for the following days**

	date	Compound	open	close	change	direction	pred	new
0	2022-12-07	0.128022	175.03	174.04	-0.99	down	NaN	up
1	2022-12-08	0.155608	172.20	173.44	1.24	up	NaN	up
2	2022-12-09	0.029505	173.84	179.05	5.21	up	NaN	down
3	2022-12-10	0.069755	173.84	179.05	5.21	up	NaN	down
4	2022-12-11	0.010891	173.84	179.05	5.21	up	up	down
5	2022-12-12	0.005500	176.10	167.82	-8.28	down	up	down
6	2022-12-13	0.069047	174.87	160.95	-13.92	down	down	down
7	2022-12-14	0.143605	159.25	156.80	-2.45	down	down	up



# Your opinion matters

