

11_LB_Vaccination_Correlation

July 13, 2021

0.1 Imports

```
[1]: import plotly.graph_objects as go
import plotly.express as px
import pandas as pd
from scipy import signal
from plotly.subplots import make_subplots
```

0.1.1 Reading Data

```
[2]: data = pd.read_csv("../data/interim/Overall_data.csv")
vaccine_data = pd.read_csv("../data/interim/Vaccine_data.csv")
```

```
[3]: #Adjusting Data for Plot
data_feb = data.drop(data[data['month'] == 11].index)
data_feb
```

```
[3]:      Unnamed: 0      created_at      id \
0              0  2021-04-01 07:37:52+00:00  1.377526e+18
1              1  2021-04-01 10:15:04+00:00  1.377565e+18
2              2  2021-04-01 07:40:49+00:00  1.377526e+18
3              3  2021-04-01 06:54:13+00:00  1.377515e+18
4              4  2021-04-01 08:07:34+00:00  1.377533e+18
...          ...          ...          ...
110688      110688  2020-12-01 02:19:25+00:00  1.333597e+18
110689      110689  2020-12-01 02:46:51+00:00  1.333603e+18
110690      110690  2020-12-01 02:40:56+00:00  1.333602e+18
110691      110691  2020-12-01 01:22:18+00:00  1.333582e+18
110692      110692  2020-12-01 01:48:01+00:00  1.333589e+18

      id_str \
0      1377525606708088832
1      1377565168662503424
2      1377526350408388608
3      1377514620718551040
4      1377533079603064832
...          ...
110688  1333596536199143424
```

110689 1333603436462559232
 110690 1333601950525509632
 110691 1333582161941729280
 110692 1333588630737022976

| | | full_text | truncated | \ |
|--------|---------------------------------------------------|-----------|-----------|---|
| 0 | Last climb in Singapore was stellar. Thanks fo... | | False | |
| 1 | Fighting Stigma: Covid-19: Government row erup... | | False | |
| 2 | Today firtst dose of the covid 19 vaccine @ Ja... | | False | |
| 3 | @daringfireball The doses currently being dist... | | False | |
| 4 | They should be banned from this years all Irel... | | False | |
| ... | ... | | ... | |
| 110688 | My new digs in Kauai for the 14 days of quaran... | | False | |
| 110689 | The Baylor Project Earns GRAMMY® Nod for Quara... | | False | |
| 110690 | In times of quarantine. All you need after cur... | | False | |
| 110691 | Really !!!\n#bestbuyriverside \n#collectorsite... | | False | |
| 110692 | Just posted a photo @ Quarantine Nola 2020 htt... | | False | |

| | display_text_range | | entities | \ |
|--------|--------------------|---------------------------------------------------|----------|---|
| 0 | [0, 192] | {'hashtags': [{'text': 'bplusclimbinggym', 'in... | | |
| 1 | [0, 264] | {'hashtags': [], 'symbols': [], 'user_mentions... | | |
| 2 | [0, 73] | {'hashtags': [], 'symbols': [], 'user_mentions... | | |
| 3 | [16, 192] | {'hashtags': [], 'symbols': [], 'user_mentions... | | |
| 4 | [0, 76] | {'hashtags': [], 'symbols': [], 'user_mentions... | | |
| ... | ... | | ... | |
| 110688 | [0, 138] | {'hashtags': [{'text': 'aloha', 'indices': [68... | | |
| 110689 | [0, 101] | {'hashtags': [], 'symbols': [], 'user_mentions... | | |
| 110690 | [0, 219] | {'hashtags': [{'text': 'sfcurfew', 'indices': ... | | |
| 110691 | [0, 182] | {'hashtags': [{'text': 'bestbuyriverside', 'in... | | |
| 110692 | [0, 66] | {'hashtags': [], 'symbols': [], 'user_mentions... | | |

| | source | \ |
|--------|---------------------------------------------------|---|
| 0 | ... | |
| 1 | d... | |
| 2 | ... | |
| 3 | <a href="http://tapbots.com/tweetbot" rel="nof... | |
| 4 | <a href="http://tapbots.com/tweetbot" rel="nof... | |
| ... | ... | |
| 110688 | ... | |
| 110689 | <a href="http://www.squarespace.com" rel="nofo... | |
| 110690 | ... | |
| 110691 | ... | |
| 110692 | ... | |

| | in_reply_to_status_id | ... | in_reply_to_user_id_str | \ |
|---|-----------------------|-----|-------------------------|---|
| 0 | NaN | ... | NaN | |
| 1 | NaN | ... | NaN | |

| | | | |
|--------|--------------|-----|------------|
| 2 | NaN | ... | NaN |
| 3 | 1.377404e+18 | ... | 10760422.0 |
| 4 | NaN | ... | NaN |
| ... | ... | ... | ... |
| 110688 | NaN | ... | NaN |
| 110689 | NaN | ... | NaN |
| 110690 | NaN | ... | NaN |
| 110691 | NaN | ... | NaN |
| 110692 | NaN | ... | NaN |

| | in_reply_to_screen_name \ |
|--------|---------------------------|
| 0 | NaN |
| 1 | NaN |
| 2 | NaN |
| 3 | daringfireball |
| 4 | NaN |
| ... | ... |
| 110688 | NaN |
| 110689 | NaN |
| 110690 | NaN |
| 110691 | NaN |
| 110692 | NaN |

| | geo \ |
|--------|---------------------------------------------------|
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| 1 | {'type': 'Point', 'coordinates': [45.75975883,... |
| 2 | {'type': 'Point', 'coordinates': [32.7138, 74... |
| 3 | {'type': 'Point', 'coordinates': [50.85421753,... |
| 4 | {'type': 'Point', 'coordinates': [53.25738525,... |
| ... | ... |
| 110688 | {'type': 'Point', 'coordinates': [22.06444444,... |
| 110689 | {'type': 'Point', 'coordinates': [40.7207559, ... |
| 110690 | {'type': 'Point', 'coordinates': [37.7793, -12... |
| 110691 | {'type': 'Point', 'coordinates': [33.8753, -11... |
| 110692 | {'type': 'Point', 'coordinates': [29.948479, -... |

| | coordinates | country \ |
|--------|---------------------------------------------------|---------------|
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| 1 | {'type': 'Point', 'coordinates': [-73.56725453... | Canada |
| 2 | {'type': 'Point', 'coordinates': [74.8697, 32... | India |
| 3 | {'type': 'Point', 'coordinates': [4.46104347, ... | Belgium |
| 4 | {'type': 'Point', 'coordinates': [-6.21839164,... | Ireland |
| ... | ... | ... |
| 110688 | {'type': 'Point', 'coordinates': [-159.3838888... | United States |
| 110689 | {'type': 'Point', 'coordinates': [-74.0007613,... | United States |
| 110690 | {'type': 'Point', 'coordinates': [-122.419, 37... | United States |
| 110691 | {'type': 'Point', 'coordinates': [-117.566, 33... | United States |

```
110692 {'type': 'Point', 'coordinates': [-90.070864, ... United States
```

| | sentiment | date | month | year | tweet_amount |
|--------|-----------|------------|-------|------|--------------|
| 0 | 0.268750 | 2021-04-01 | 4 | 2021 | NaN |
| 1 | 0.062500 | 2021-04-01 | 4 | 2021 | NaN |
| 2 | 0.000000 | 2021-04-01 | 4 | 2021 | NaN |
| 3 | 0.350000 | 2021-04-01 | 4 | 2021 | NaN |
| 4 | 0.285714 | 2021-04-01 | 4 | 2021 | NaN |
| ... | ... | ... | ... | ... | ... |
| 110688 | 0.170455 | 2020-12-01 | 12 | 2020 | NaN |
| 110689 | -0.155556 | 2020-12-01 | 12 | 2020 | NaN |
| 110690 | 0.000000 | 2020-12-01 | 12 | 2020 | NaN |
| 110691 | 0.070312 | 2020-12-01 | 12 | 2020 | NaN |
| 110692 | 0.000000 | 2020-12-01 | 12 | 2020 | NaN |

```
[92829 rows x 22 columns]
```

0.2 Comparison between Amount of Tweets and Vaccination status worldwide

```
[4]: #Scatter Plot combined with a Bar Chart with two y axis
fig = go.Figure()

fig.add_trace(go.Bar(
    x= vaccine_data.groupby(['date']).count().reset_index(drop=False)['date'],
    y= vaccine_data.groupby(['date'])['total_vaccinations'].sum(),
    name='Amount of Vaccine Doses',
    marker_color='darkorange',
    yaxis = 'y1',
))

fig.add_trace(go.Scatter(
    x= data_feb.sort_values('created_at')['created_at'],
    y= signal.savgol_filter(
        data_feb.sort_values('created_at')['sentiment'].dropna(),
        401,
        4
    ),
    name = 'Sentiment over time',
    yaxis = 'y2',
))

fig.update_layout(
    title_text="Sentiment on Amount of Vaccinations over time worldwide"
)
```

```

fig.update(layout=go.Layout(yaxis1 = go.YAxis(title='Amount of Vaccinations',
↪titlefont=go.Font(color='orange'), side="right"),
                                yaxis2 = go.YAxis(title='Average Sentiment',
↪titlefont=go.Font(color='red'), overlaying='y', side="left")))

#Adjusting Axis range
fig.update_layout(yaxis1 = dict(range = [0,3500000000]))
fig.update_layout(yaxis2 = dict(range = [-0.3,0.3]))

#Export as HTML
fig.write_html("../reports/figures/OverallCovidTweets/Vaccination_on_Sentiment.
↪html")

fig.show()

```

c:\users\lukas\appdata\local\programs\python\python36\lib\site-packages\plotly\graph_objs_deprecations.py:329: DeprecationWarning:

plotly.graph_objs.Font is deprecated.

Please replace it with one of the following more specific types

- plotly.graph_objs.layout.Font
- plotly.graph_objs.layout.hoverlabel.Font
- etc.

c:\users\lukas\appdata\local\programs\python\python36\lib\site-packages\plotly\graph_objs_deprecations.py:578: DeprecationWarning:

plotly.graph_objs.YAxis is deprecated.

Please replace it with one of the following more specific types

- plotly.graph_objs.layout.YAxis
- plotly.graph_objs.layout.scene.YAxis