LabSession_DataVisualisation

September 20, 2022

[198]:

```
import pandas as pd
import seaborn as sns
import plotly.express as px

import matplotlib.pyplot as plt
%matplotlib inline
```

[199]:

```
import plotly.io as pio
pio.renderers.default = "plotly_mimetype+notebook"
```

1 Matplotlib

For this excercise, we have written the following code to load the stock dataset built into plotly express.

[4]:

```
stocks = px.data.stocks()
stocks.head()
```

[4]:

```
         date      GOOG      AAPL      AMZN        FB      NFLX      MSFT
0  2018-01-01  1.000000  1.000000  1.000000  1.000000  1.000000  1.000000
1  2018-01-08  1.018172  1.011943  1.061881  0.959968  1.053526  1.015988
2  2018-01-15  1.032008  1.019771  1.053240  0.970243  1.049860  1.020524
3  2018-01-22  1.066783  0.980057  1.140676  1.016858  1.307681  1.066561
4  2018-01-29  1.008773  0.917143  1.163374  1.018357  1.273537  1.040708
```

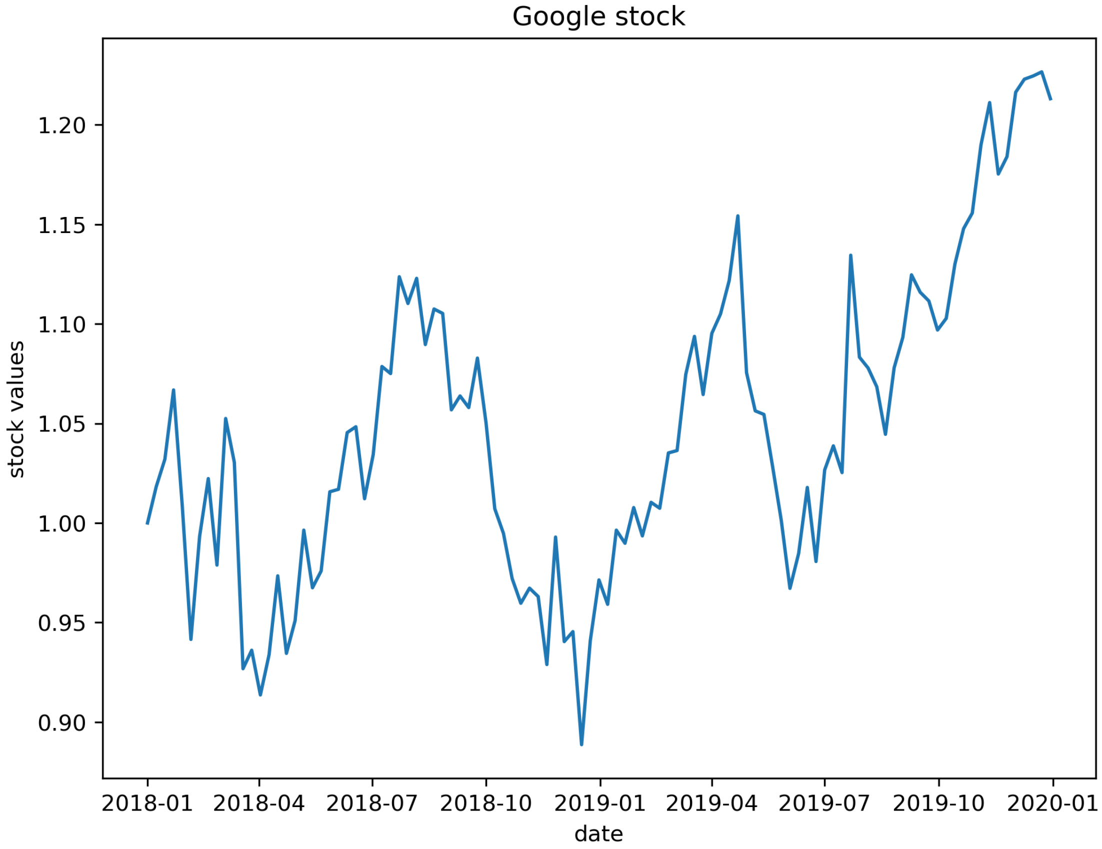
1.1 Question 1:

Select a stock and create a suitable plot for it. Make sure the plot is readable with relevant information, such as date, values.

[123]:

```
# YOUR CODE HERE
fig, ax = plt.subplots(dpi=300, figsize=(8,6))
date = pd.to_datetime(stocks['date']).dt.date
google = stocks['GOOG']
ax.plot(date, google)
plt.title('Google stock')
plt.ylabel('stock values')
plt.xlabel('date')
```

```
[123]: Text(0.5, 0, 'date')
```

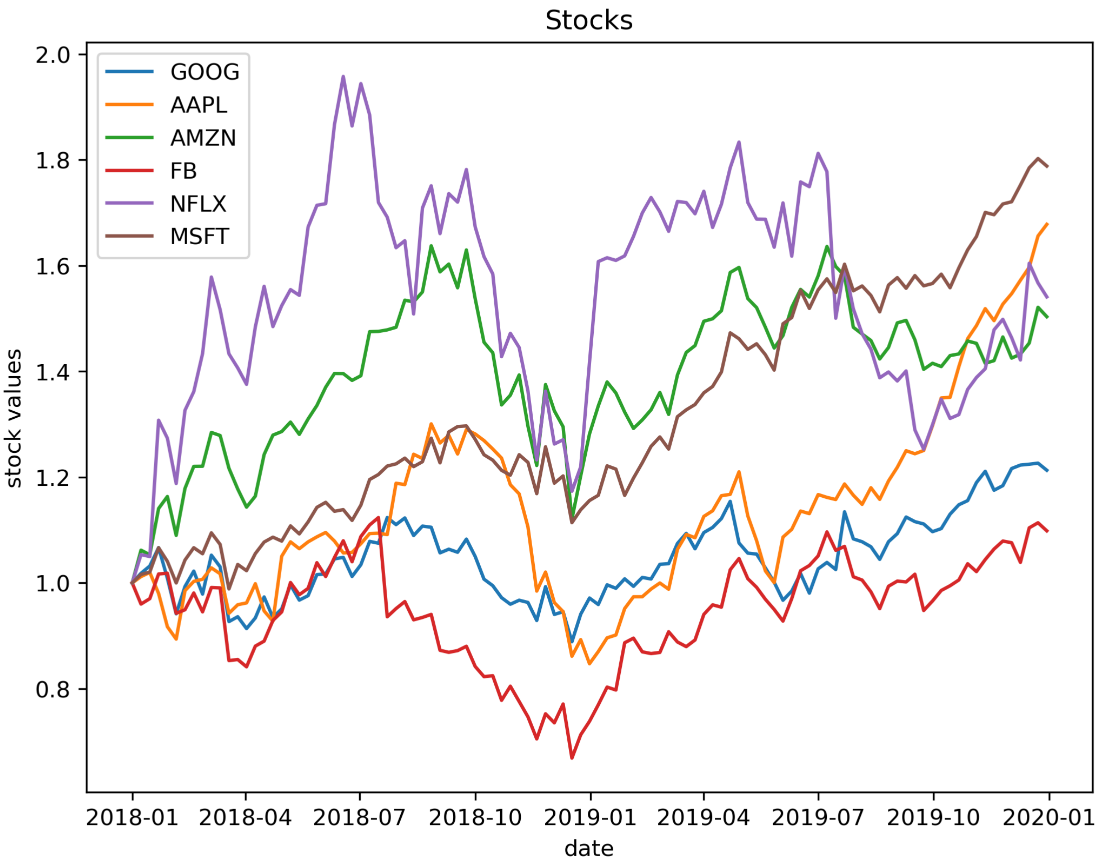


1.2 Question 2:

You've already plot data from one stock. It is possible to plot multiples of them to support comparison.
To highlight different lines, customise line styles, markers, colors and include a legend to the plot.

```
[6]: # YOUR CODE HERE
fig, ax = plt.subplots(dpi=300, figsize=(8,6))
date = pd.to_datetime(stocks['date']).dt.date
GOOG = stocks['GOOG']
AAPL = stocks['AAPL']
AMZN = stocks['AMZN']
FB   = stocks['FB']
NFLX = stocks['NFLX']
MSFT = stocks['MSFT']
ax.plot(date, GOOG)
ax.plot(date, AAPL)
ax.plot(date, AMZN)
ax.plot(date, FB)
ax.plot(date, NFLX)
ax.plot(date, MSFT)
plt.title('Stocks')
plt.ylabel('stock values')
plt.xlabel('date')
plt.legend(['GOOG', 'AAPL', 'AMZN', 'FB', 'NFLX', 'MSFT'])
```

```
[6]: <matplotlib.legend.Legend at 0x15edb3ee0>
```



2 Seaborn

First, load the tips dataset

```
[7]: tips = sns.load_dataset('tips')
     tips.head()
```

```
[7]:    total_bill   tip     sex smoker  day    time  size
     0       16.99  1.01  Female     No  Sun  Dinner     2
     1       10.34  1.66    Male     No  Sun  Dinner     3
     2       21.01  3.50    Male     No  Sun  Dinner     3
     3       23.68  3.31    Male     No  Sun  Dinner     2
     4       24.59  3.61  Female     No  Sun  Dinner     4
```

2.1 Question 3:

Let's explore this dataset. Pose a question and create a plot that support drawing answers for your question.

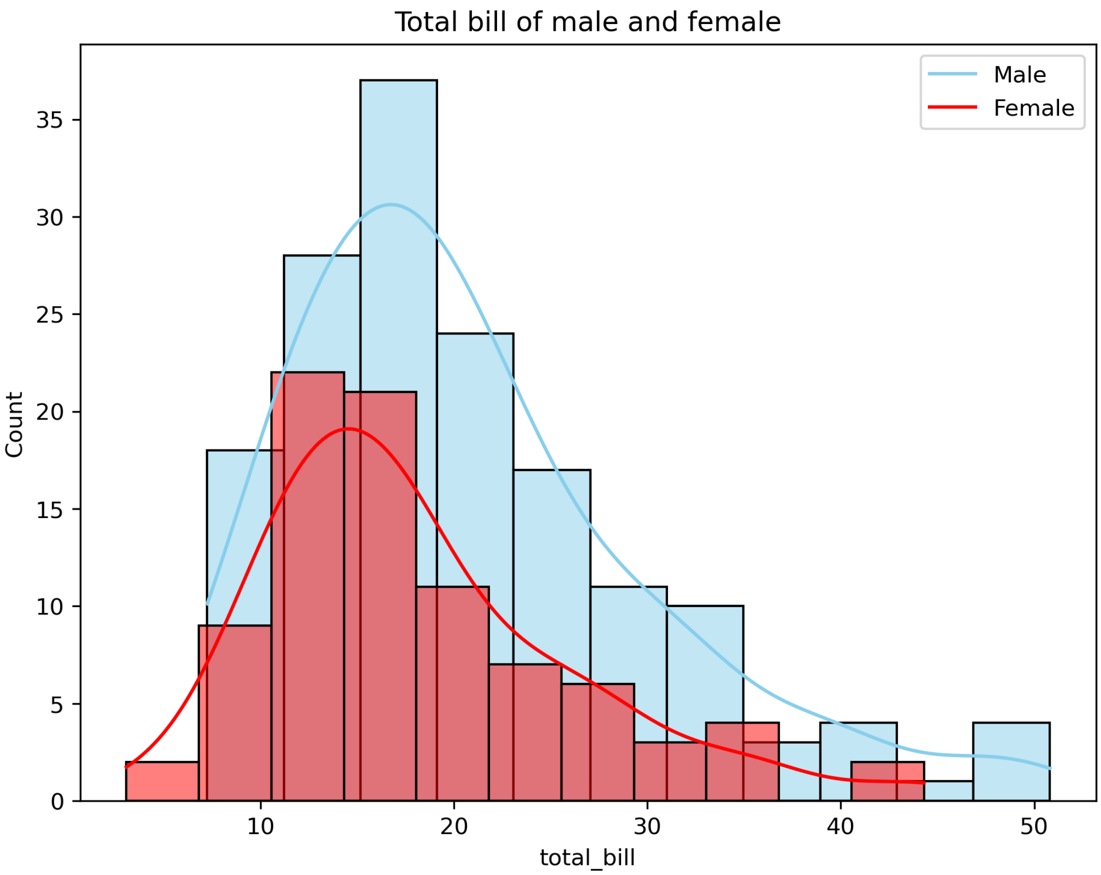
Some possible questions: - Are there differences between male and female when it comes to giving tips? - What attribute correlate the most with tip?

```
[126]: # YOUR CODE HERE
       '''
       Are there differences between male and female when it comes to the total bill?
       '''
       male = tips[tips['sex'] == 'Male']
       female = tips[tips['sex'] == 'Female']

       fig, ax = plt.subplots(dpi=300, figsize=(8,6))
       # sns.histplot(male['tip'])
       # sns.histplot(female['tip'])

       sns.histplot(data=male, x="total_bill", color="skyblue", label="Sepal Length",␣
         ↪kde=True)
       sns.histplot(data=female, x="total_bill", color="red", label="Sepal Width",␣
         ↪kde=True)
       plt.legend(['Male', 'Female'])
       plt.title("Total bill of male and female")
```

```
[126]: Text(0.5, 1.0, 'Total bill of male and female')
```



3 Plotly Express

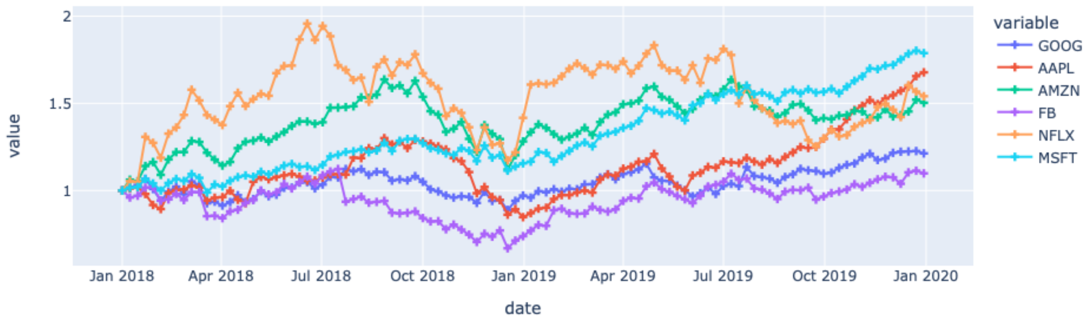
3.1 Question 4:

Redo the above exercises (challenges 2 & 3) with plotly express. Create diagrams which you can interact with.

3.1.1 The stocks dataset

Hints: - Turn stocks dataframe into a structure that can be picked up easily with plotly express

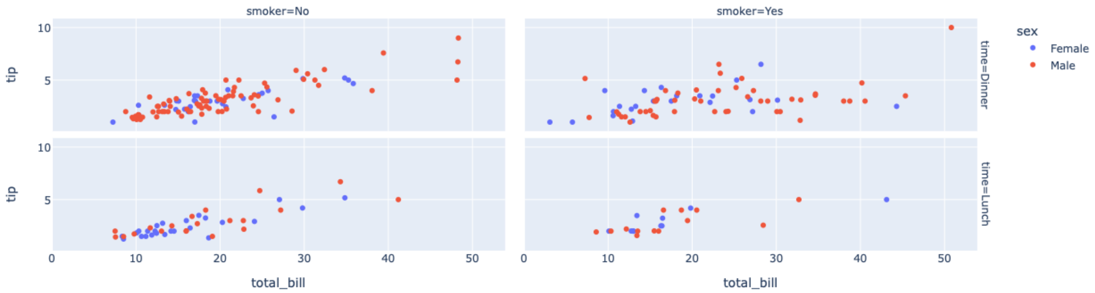
[154]:
```
# YOUR CODE HERE
px.line(
    data_frame=stocks,
    x='date',
    y=['GOOG', 'AAPL', 'AMZN', 'FB', "NFLX", "MSFT"],
    markers=True,
    symbol_sequence=('cross',)
)
```



3.1.2 The tips dataset

[206]:

```python
# YOUR CODE HERE
fig = px.scatter(tips, x="total_bill", y="tip", color="sex",
                 facet_col="smoker", facet_row="time",
                 width=900, height=400)
# fig.update_layout(
#     xaxis = dict(
#         tickmode = 'linear',
#         tick0 = 0,
#         dtick = 10
#     )
# )
fig.show()
```



3.2 Question 5:

Recreate the barplot below that shows the population of different continents for the year 2007.

Hints:

- Extract the 2007 year data from the dataframe. You have to process the data accordingly
- use plotly bar
- Add different colors for different continents
- Sort the order of the continent for the visualisation. Use axis layout setting
- Add text to each bar that represents the population

[13]:

```
#load data
df = px.data.gapminder()
df.head()
```

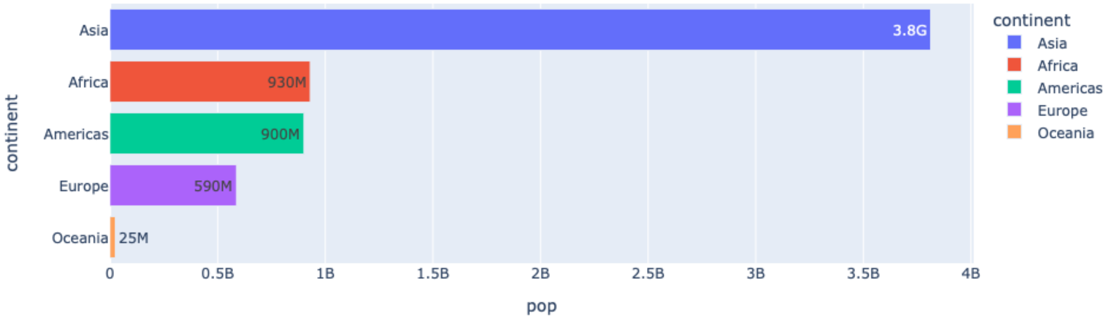
[13]:

```
       country continent  year  lifeExp       pop   gdpPercap iso_alpha  \
0  Afghanistan      Asia  1952   28.801   8425333  779.445314       AFG
1  Afghanistan      Asia  1957   30.332   9240934  820.853030       AFG
2  Afghanistan      Asia  1962   31.997  10267083  853.100710       AFG
3  Afghanistan      Asia  1967   34.020  11537966  836.197138       AFG
4  Afghanistan      Asia  1972   36.088  13079460  739.981106       AFG

   iso_num
0        4
1        4
2        4
3        4
4        4
```

[72]:

```
# YOUR CODE HERE
pop_2007 = df[df['year'] == 2007].groupby('continent').sum().reindex() # group␣
 ↪by the continent
pop_2007 = pop_2007.sort_values('pop', ascending=False) # sort in descending␣
 ↪order
pop_2007 = pop_2007.reset_index() # reset the continent index into column values
fig = px.bar(
    data_frame=pop_2007,
    y='continent',
    x='pop',
    color='continent',
    orientation='h',
    text=['3.8G', '930M', '900M', '590M', '25M'],
) # bar plotting
fig.show()
```


Asia
Africa
Americas
Europe
Oceania
continent
3.8G
930M
900M
590M
25M
0
0.5B
1B
1.5B
2B
2.5B
3B
3.5B
4B
pop
continent
Asia
Africa
Americas
Europe
Oceania