Final-project

March 28, 2021

```
In [1]: # BTC Price Analysis
        #
        # Steps:
        # 1. Get BTC prices from Yahoo Finance
        # 2. Get the frequency of searches by the key word 'Bitcoin' from Google Trends
        # 3. Run a linear regression to finde the correlation between the BTC price and the fr
        # 4. Summerize the results of regression
```

```
In [27]: import numpy as np
         import pandas as pd

         #python3 -m pip install pandas-datareader
         import pandas_datareader.data as pdr

         import matplotlib.pyplot as plt

         #pip3 install statsmodels
         import statsmodels.api as sm

         from datetime import datetime
```

```
In [3]: #Let's take end date to be today
        end = datetime.today()

        #Get cryptocurrency data from yahoo finance
        BTC = pdr.get_data_yahoo('BTC-USD',start = "2015-1-1",end = datetime.today(),interval=
```

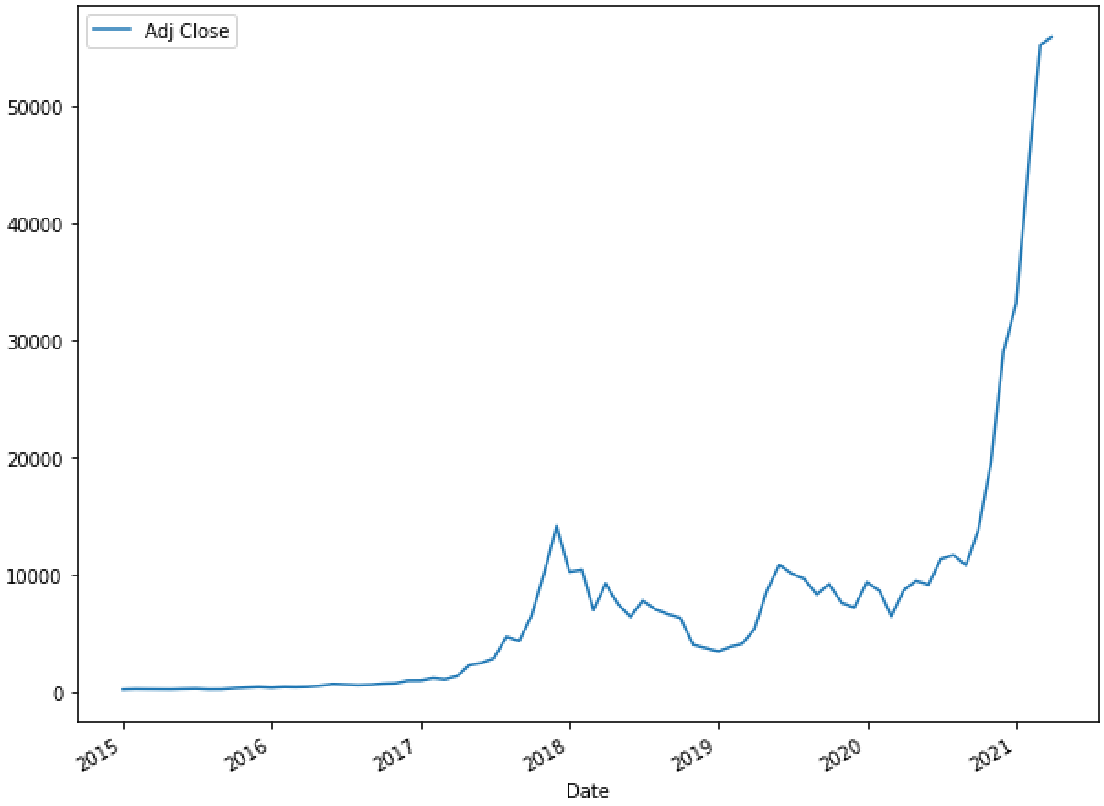
```
In [4]: #BTC price
        BTC
```

```
Out[4]:                   High         Low        Open       Close  \
        Date
        2015-01-01  320.434998  171.509995  320.434998  217.464005
        2015-02-01  265.610992  212.014999  216.867004  254.263000
        2015-03-01  300.044006  236.514999  254.283005  244.223999
        2015-03-31  261.798004  214.873993  244.223007  236.145004
        2015-04-30  247.804001  228.572998  235.938995  230.190002
        ...                ...         ...         ...         ...
```

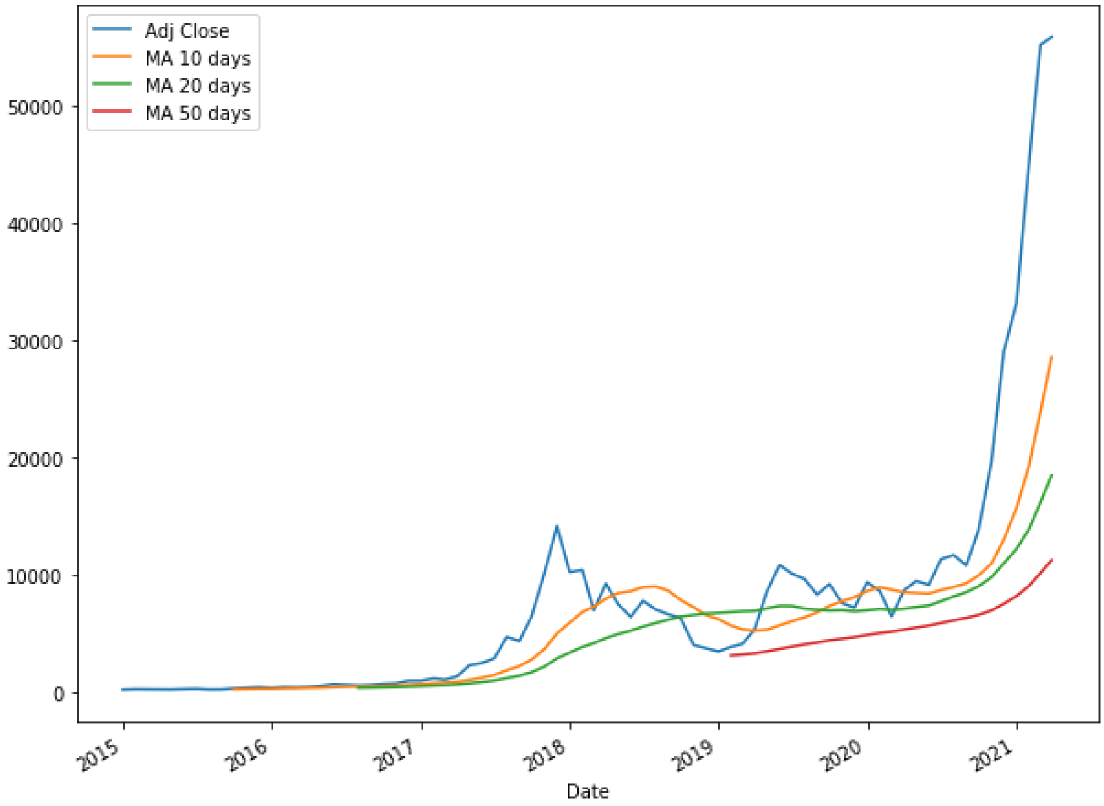
```
2020-12-01  29244.876953  17619.533203  19633.769531  29001.720703
2021-01-01  41946.738281  28722.755859  28994.009766  33114.359375
2021-02-01  58330.570312  32384.228516  33114.578125  45137.769531
2021-03-01  61683.863281  45115.093750  45159.503906  55137.312500
2021-03-28  56605.703125  55667.890625  56278.683594  55788.871094

                   Volume     Adj Close
Date
2015-01-01     1098811912    217.464005
2015-02-01      711518700    254.263000
2015-03-01      959098300    244.223999
2015-03-31      672338700    236.145004
2015-04-30      568122600    230.190002
...                   ...           ...
2020-12-01  1212259707946  29001.720703
2021-01-01  2155904438233  33114.359375
2021-02-01  2267152936675  45137.769531
2021-03-01  1408670611852  55137.312500
2021-03-28    48896380928  55788.871094

[76 rows x 6 columns]
```

```
In [5]: #Set the figure sizes
        plt.rcParams['figure.figsize'] = (10,8)
```

```
In [6]: #Bitcoin price movements from 2015-1-1 till today
        BTC['Adj Close'].plot(legend = True);
```



```
In [7]: #10,20,and 50 days moving average with Bitcoin prices

        ma_days = [10,20,50]

        for ma in ma_days:
             column_name = "MA %s days"%(str(ma))
             BTC[column_name] = BTC['Adj Close'].rolling(window=ma,center=False).mean()

In [8]: BTC[['Adj Close','MA 10 days','MA 20 days','MA 50 days']].plot(legend=True);
```



```
In [9]: #Downloaded Bitcoin Google Seraches from Google Trends

        BTC_searches= pd.read_csv('./multiTimeline.csv',skiprows=1)
```

```
In [10]: BTC_searches.columns = ['Date','Bitcoin']
```

```
In [11]: BTC_searches
```

```
Out[11]:        Date  Bitcoin
         0   2015-01        3
         1   2015-02        3
         2   2015-03        2
         3   2015-04        2
         4   2015-05        2
         ..      ...      ...
         70  2020-11       17
         71  2020-12       25
         72  2021-01       48
         73  2021-02       50
         74  2021-03       36

         [75 rows x 2 columns]
```

```
In [12]: #Combine Two Dataframes

         BTC_prices = BTC['Adj Close'].iloc[:-1]
         BTC_prices

Out[12]: Date
         2015-01-01      217.464005
         2015-02-01      254.263000
         2015-03-01      244.223999
         2015-03-31      236.145004
         2015-04-30      230.190002
                            ...
         2020-11-01    19625.835938
         2020-12-01    29001.720703
         2021-01-01    33114.359375
         2021-02-01    45137.769531
         2021-03-01    55137.312500
         Name: Adj Close, Length: 75, dtype: float64
```

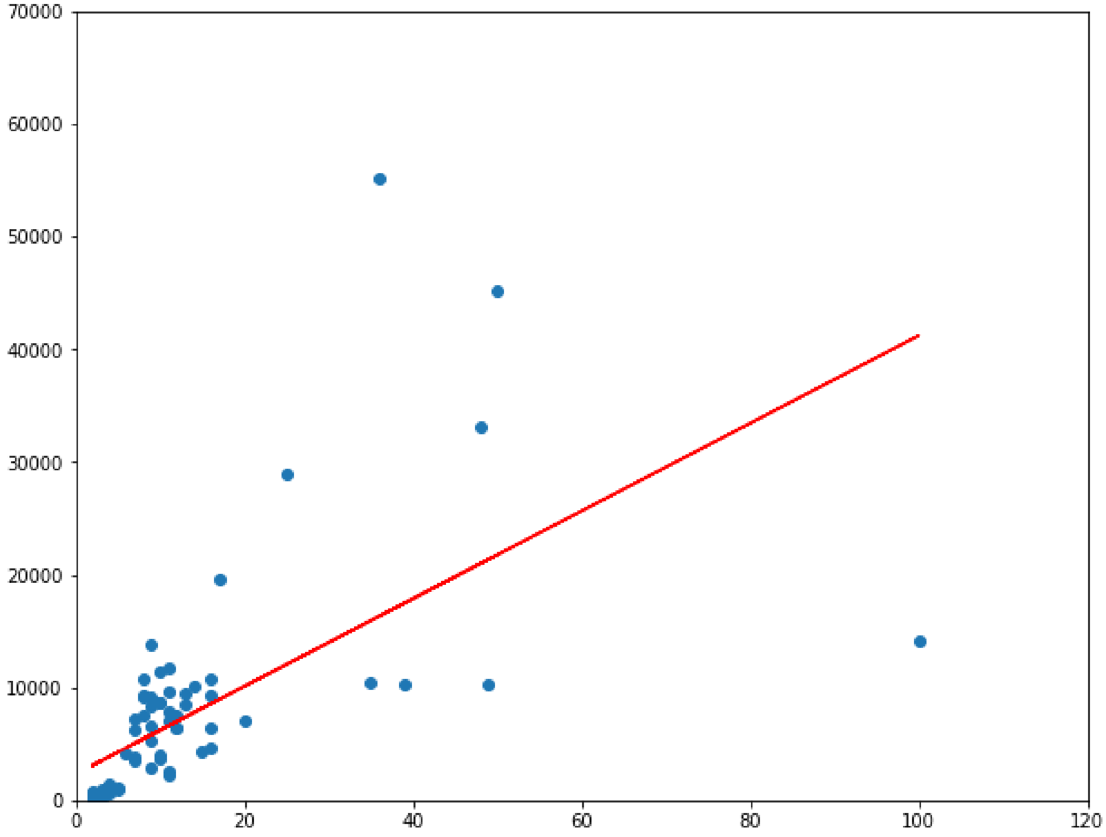
```
In [13]: df = pd.concat([BTC_searches.reset_index(drop=True),BTC_prices.reset_index(drop=True)]
```

```
In [14]: df.head(5)

Out[14]:       Date  Bitcoin   Adj Close
         0  2015-01        3  217.464005
         1  2015-02        3  254.263000
         2  2015-03        2  244.223999
         3  2015-04        2  236.145004
         4  2015-05        2  230.190002
```

```
In [15]: df.tail(5)

Out[15]:        Date  Bitcoin     Adj Close
         70  2020-11       17  19625.835938
         71  2020-12       25  29001.720703
         72  2021-01       48  33114.359375
         73  2021-02       50  45137.769531
         74  2021-03       36  55137.312500
```

```
In [19]: # Linear Regression Statistics with 1 variable

         # Scaterplot where Price(Y) is a dependant on number of searches for 'Bitcoin' (X)
         X = df['Bitcoin']
         Y = df['Adj Close']
         plt.scatter(X,Y)
         plt.axis([0,120,0,70000])


         #Draw the trend line
         z = np.polyfit(X,Y,1)
         p = np.poly1d(z)
         plt.plot(X,p(X),"r")
         plt.show()
```

```
/Library/Frameworks/Python.framework/Versions/3.7/lib/python3.7/site-packages/matplotlib/cbook/
  x[:, None]
/Library/Frameworks/Python.framework/Versions/3.7/lib/python3.7/site-packages/matplotlib/axes/
  x = x[:, np.newaxis]
```



```
In [22]: #Regression
         X1 = sm.add_constant(X)
         reg = sm.OLS(Y, X1).fit()

In [23]: reg.summary()

Out[23]: <class 'statsmodels.iolib.summary.Summary'>
         """
                                     OLS Regression Results
         ==============================================================================
         Dep. Variable:              Adj Close   R-squared:                       0.381
         Model:                            OLS   Adj. R-squared:                  0.372
         Method:                 Least Squares   F-statistic:                     44.89
         Date:                Sun, 28 Mar 2021   Prob (F-statistic):           3.74e-09
         Time:                        22:52:10   Log-Likelihood:                -774.70
         No. Observations:                  75   AIC:                             1553.
         Df Residuals:                      73   BIC:                             1558.
         Df Model:                           1
         Covariance Type:            nonrobust
         ==============================================================================
                          coef    std err          t      P>|t|      [0.025      0.975]
         ------------------------------------------------------------------------------
         const       2307.0079   1106.216      2.085      0.041     102.323    4511.693
         Bitcoin      389.0915     58.076      6.700      0.000     273.346     504.837
         ==============================================================================
         Omnibus:                       54.714   Durbin-Watson:                   0.300
         Prob(Omnibus):                  0.000   Jarque-Bera (JB):              450.565
         Skew:                           1.889   Prob(JB):                     1.45e-98
         Kurtosis:                      14.397   Cond. No.                         24.3
         ==============================================================================

         Notes:
         [1] Standard Errors assume that the covariance matrix of the errors is correctly spec
         """
```

```
In [29]: # Summery:
         #p-values for the slope is smaller than 0.01.
         #That means that the number of Google searches for 'Bitcoin' significantly predict th
```