nyc_parking_ticket_analysis

May 11, 2023

[3]:

```
import pandas as pd

# Read the file and import all rows.
df = pd.read_csv('violations.csv')

# Change the data type of the 'Issue Date' column to date.
df['Issue Date'] = pd.to_datetime(df['Issue Date'])

# Print out the number of rows imported from the file.
print('Number of Rows: ' + str(len(df)))
```

```
Number of Rows: 50000
```

[4]:

```
# Remove rows containing invalid data.
df = df[(df['Registration State'] != "99") & (df['Plate Type'] != "999") &␣
 ↪(df['Issue Date'] >= '2020-04-01')
                 & (df['Issue Date'] <= '2020-11-30') & (df['Violation Code'] !
 ↪= 0) & (df['Vehicle Make'].notnull())
                 & (df['Violation Time'].notnull()) & (df['Vehicle Year'] != 0)␣
 ↪& (df['Vehicle Year'] <= 2020)]

# Print out the number of rows remaining in the dataset.
print('Number of Rows: ' + str(len(df)))
```

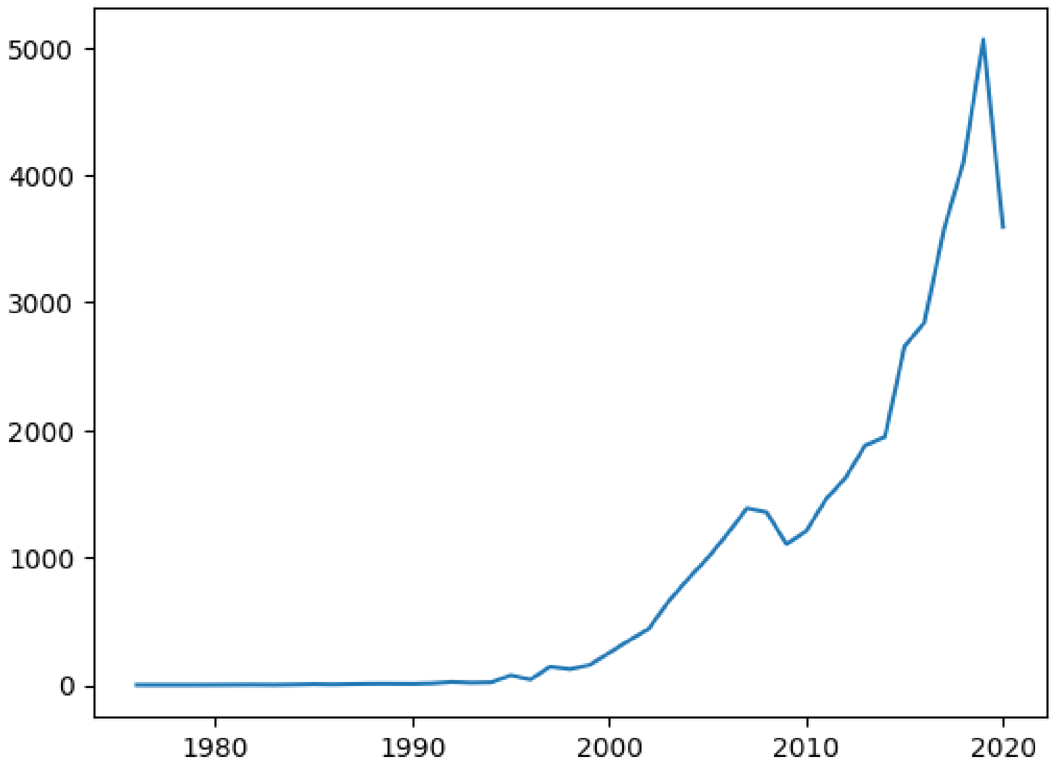
```
Number of Rows: 38937
```

[5]:

```
import matplotlib.pyplot as plt

# Isolate the data to be used in the plot.
df_vehicle_year = df.groupby('Vehicle Year')['Summons Number'].count()

# Create a plot that shows the number of parking violations for each vehicle␣
 ↪year.
plt.plot(df_vehicle_year)
plt.show()
```



[6]:
```
df[df['Registration State'] != 'NY'].groupby('Violation Code')['Summons␣
↪Number'].count().nlargest(5).reset_index(name='Count')
```

[6]:
```
   Violation Code  Count
0              36   2772
1               5    365
2               7    350
3              12     62
4              21     30
```

[7]:
```
df[df['Vehicle Make'] == 'HONDA'].groupby('Street Name')['Summons Number'].
↪count().nlargest(1).reset_index(name='Count')
```

[7]:
```
  Street Name  Count
0    Broadway     34
```

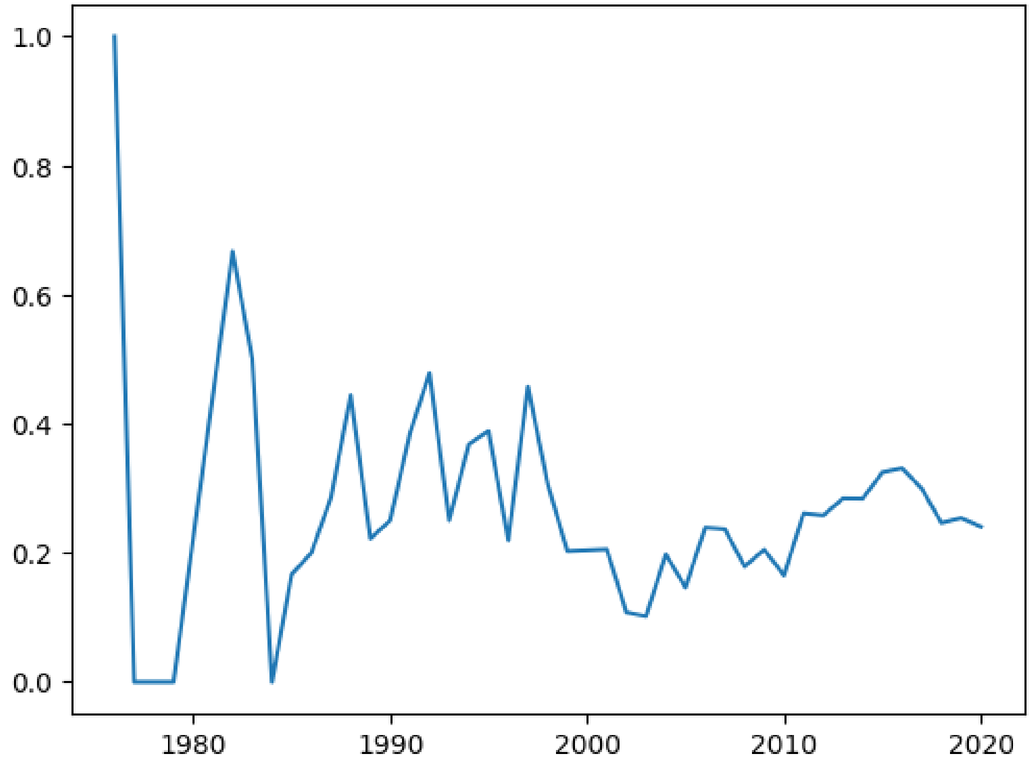
[8]:
```
# Subset for only rows where the Registration State is NY.
df_ny = df[df['Registration State'] == 'NY']

# Calculate the ratio of non-passenger plates to all plates, grouped by year.
df_ny_notpas = df_ny[df_ny['Plate Type'] != 'PAS'].groupby('Vehicle␣
↪Year')['Summons Number'].count()
```

```
df_ny_all = df_ny.groupby('Vehicle Year')['Summons Number'].count()
ratio = df_ny_notpas / df_ny_all

# Replace nulls with 0.
ratio.fillna(0, inplace = True)

# Create and show plot.
plt.plot(ratio)
plt.show()
```



```
[9]: df[df['Plate Type'] == 'PAS'].groupby('Vehicle Color')['Summons Number'].
      ↪count().nlargest(1).reset_index(name='Count')
```

```
[9]:   Vehicle Color  Count
     0            GY   7797
```

```
[10]: print('Number of Registration States: ' + str(df['Registration State'].
       ↪nunique()))

      print('Average Number of Parking Violations per Registration State: ' +
            str(df.groupby('Registration State')['Summons Number'].count().mean()))
```

```
Number of Registration States: 45
Average Number of Parking Violations per Registration State: 865.2666666666667
```

[11]:
```
df.groupby('Violation Code')['Plate Type'].apply(lambda x: x.value_counts().
 ↪head(1)).reset_index(name='Count').rename(columns={'level_1': 'Plate Type'})
```

[11]:
```
    Violation Code Plate Type  Count
0                4        COM      4
1                5        PAS   1080
2                6        APP      3
3                7        PAS   1398
4                8        PAS      1
..             …          …    …
70              91        PAS      2
71              94        PAS      2
72              95        PAS      1
73              98        PAS     92
74              99        PAS      4

[75 rows x 3 columns]
```

[12]:
```
# Count the number of parking violations in each county.
df_county = df.groupby('Violation County')['Summons Number'].count().
 ↪reset_index(name='Percentage')

# Calculate the number of parking violations in each county as a percentage of␣
 ↪all parking violations.
df_county['Percentage'] = df_county['Percentage'] / df_county['Percentage'].
 ↪sum() * 100

# Sort and display the resulting dataframe.
df_county.sort_values(by='Percentage', ascending=False).reset_index(drop=True)
```

[12]:
```
  Violation County  Percentage
0               NY   20.769903
1               BK   15.104917
2               QN   13.734314
3               BX   13.371734
4                K   13.104300
5                Q   12.983440
6               MN    6.912158
7               ST    3.342934
8                R    0.676301
```

[ ]:
```

```