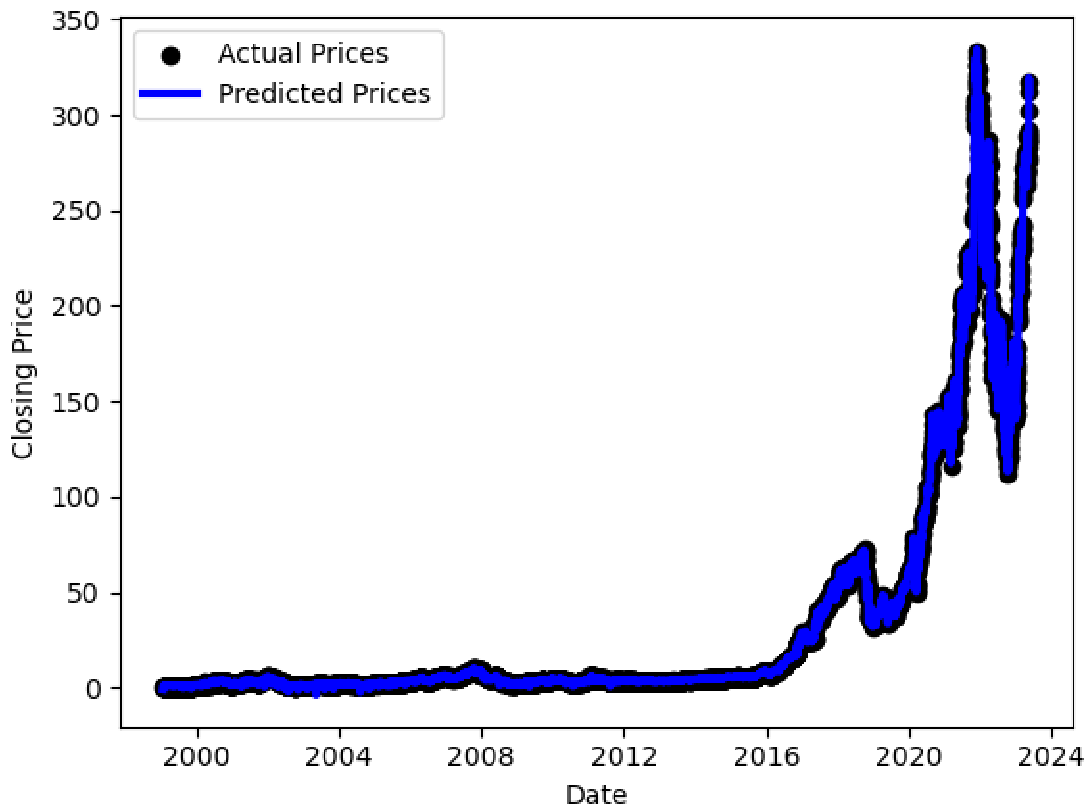
info450finalproject-2

November 26, 2023

[27]:
```
#Library that need to be imported
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import PolynomialFeatures
from sklearn.pipeline import make_pipeline
from sklearn.metrics import mean_squared_error
import matplotlib.pyplot as plt

# Load your dataset
# Assuming you have a CSV file with columns 'Date', 'Open', 'High', 'Low',␣
↪'Close', 'Adj Close', 'Volume'
df = pd.read_csv('NVDA.csv')

# Convert 'Date' column to datetime format
df['Date'] = pd.to_datetime(df['Date'])

# Sort the DataFrame by date
df = df.sort_values(by='Date')

# Define features (X) and target variable (y)
features = ['Open', 'High', 'Low', 'Adj Close', 'Volume']
target = 'Close'

X = df[features]
y = df[target]

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
↪random_state=42)

# Create a polynomial regression model
degree = 2  # You can adjust the degree of the polynomial
model = make_pipeline(PolynomialFeatures(degree), LinearRegression())

# Train the model
model.fit(X_train, y_train)
```

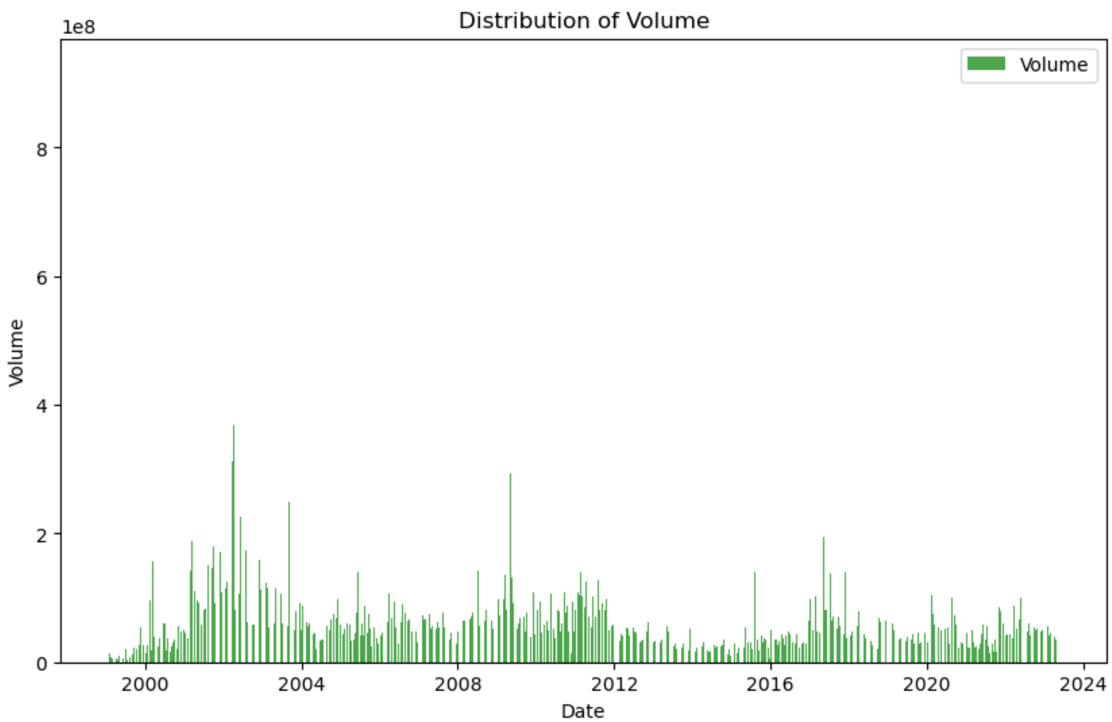
```python
# Make predictions on the test set
y_pred = model.predict(X_test)

# Evaluate the model
mse = mean_squared_error(y_test, y_pred)
print(f'Mean Squared Error: {mse}')

# Visualize the predictions
plt.scatter(df['Date'], df['Close'], color='black', label='Actual Prices')
plt.plot(df['Date'], model.predict(df[features]), color='blue', linewidth=3,␣
 ↪label='Predicted Prices')
plt.xlabel('Date')
plt.ylabel('Closing Price')
plt.legend()
plt.show()
```

```
Mean Squared Error: 0.1938476435789566
```



[7]:

```python
# Import necessary libraries
import pandas as pd
import matplotlib.pyplot as plt

# Load your dataset
# Assuming you have a CSV file with columns 'Date', 'Open', 'High', 'Low',␣
↪'Close', 'Adj Close', 'Volume'
df = pd.read_csv('NVDA.csv')

# Convert 'Date' column to datetime format
df['Date'] = pd.to_datetime(df['Date'])

# Sort the DataFrame by date
df = df.sort_values(by='Date')

# Analyze and visualize categorical variable ('Volume') using a bar chart
plt.figure(figsize=(10, 6))
plt.bar(df['Date'], df['Volume'], color='green', alpha=0.7, label='Volume')
plt.xlabel('Date')
plt.ylabel('Volume')
plt.title('Distribution of Volume')
plt.legend()
plt.show()
```

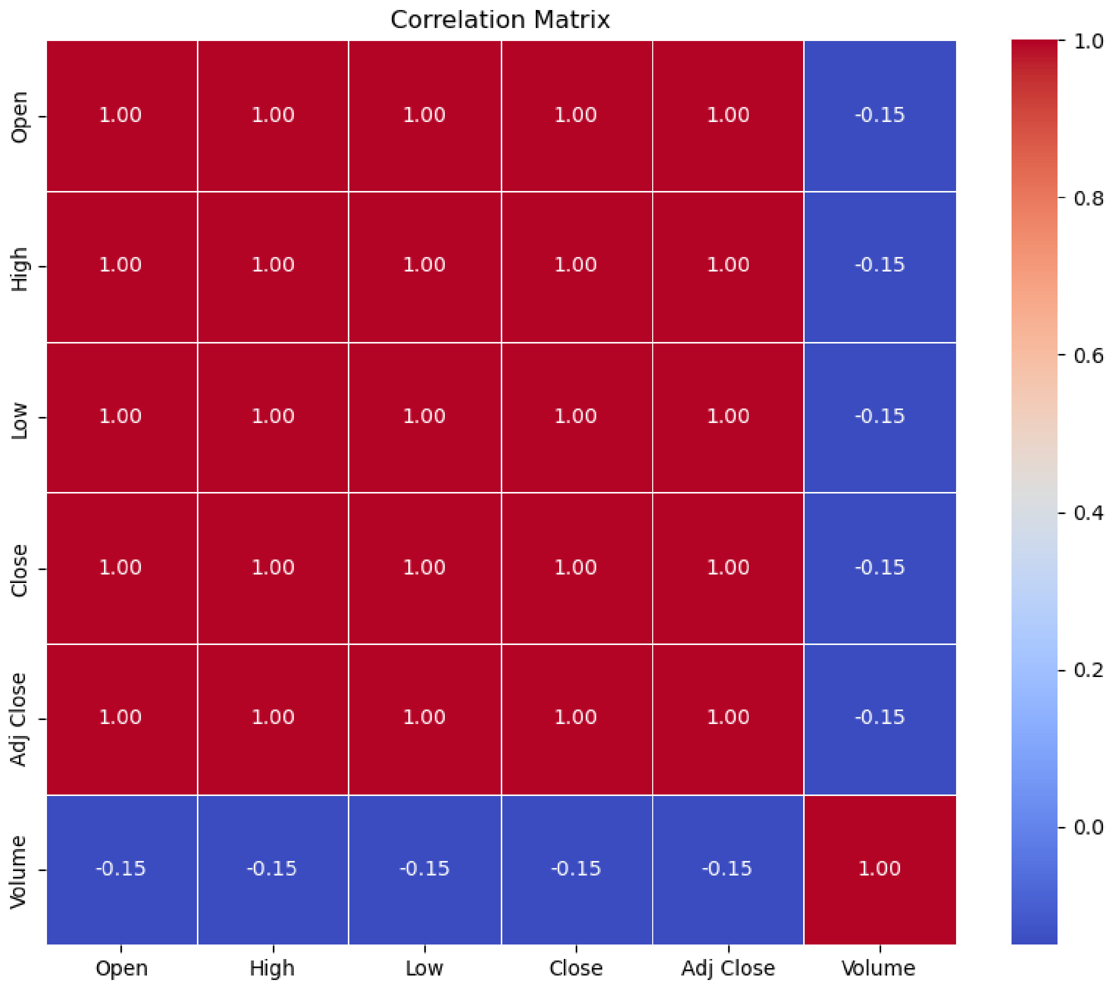


[9]:
```python
# Import necessary libraries
import pandas as pd

# Load your dataset
# Assuming you have a CSV file with columns 'Date', 'Open', 'High', 'Low',␣
↪'Close', 'Adj Close', 'Volume'
df = pd.read_csv('NVDA.csv')

# Display basic statistics
basic_stats = df.describe()

# Print the summary
print("Summary of Basic Statistics:")
print(basic_stats)
```

```
Summary of Basic Statistics:
              Open         High          Low        Close    Adj Close  \
count  6122.000000  6122.000000  6122.000000  6122.000000  6122.000000
mean     32.083172    32.698178    31.452291    32.105539    31.846044
std      61.979191    63.229129    60.681098    62.022923    62.028533
min       0.348958     0.355469     0.333333     0.341146     0.313034
25%       2.677500     2.758750     2.603333     2.677500     2.456865
50%       4.320000     4.412500     4.245000     4.335000     3.981222
75%      27.708750    27.966875    27.088750    27.643750    27.279851
max     335.170013   346.470001   320.359985   333.760010   333.350800

             Volume
count  6.122000e+03
mean   6.128430e+07
std    4.400809e+07
min    1.968000e+06
25%    3.438680e+07
50%    5.138220e+07
75%    7.457340e+07
max    9.230856e+08
```

[11]:
```python
# Import necessary libraries
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# Load your dataset
# Assuming you have a CSV file with columns 'Date', 'Open', 'High', 'Low',␣
↪'Close', 'Adj Close', 'Volume'
df = pd.read_csv('NVDA.csv')

# Calculate the correlation matrix
```

```python
correlation_matrix = df[['Open', 'High', 'Low', 'Close', 'Adj Close',␣
↪'Volume']].corr()

# Visualize the correlation matrix using a heatmap
plt.figure(figsize=(10, 8))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt=".2f",␣
↪linewidths=.5)
plt.title('Correlation Matrix')
plt.show()
```



[20]:
```python
# Import necessary libraries
import seaborn as sns
import matplotlib.pyplot as plt
from pandas.api.types import CategoricalDtype

# Load your dataset
```

```python
# Assuming you have a CSV file with columns 'Date', 'Open', 'High', 'Low',␣
↪'Close', 'Adj Close', 'Volume'
df = pd.read_csv('NVDA.csv')

# Create a pair plot
sns.pairplot(df[['Open', 'High', 'Low', 'Close', 'Adj Close', 'Volume']])
plt.suptitle('Pair Plot of Numerical Variables')
plt.show()
```

```
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is
deprecated and will be removed in a future version. Convert inf values to NaN
```

```
before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is
deprecated and will be removed in a future version. Convert inf values to NaN
before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is
deprecated and will be removed in a future version. Convert inf values to NaN
before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is
deprecated and will be removed in a future version. Convert inf values to NaN
before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is
deprecated and will be removed in a future version. Convert inf values to NaN
before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
```

```
packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is
deprecated and will be removed in a future version. Convert inf values to NaN
before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
```

```
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
```

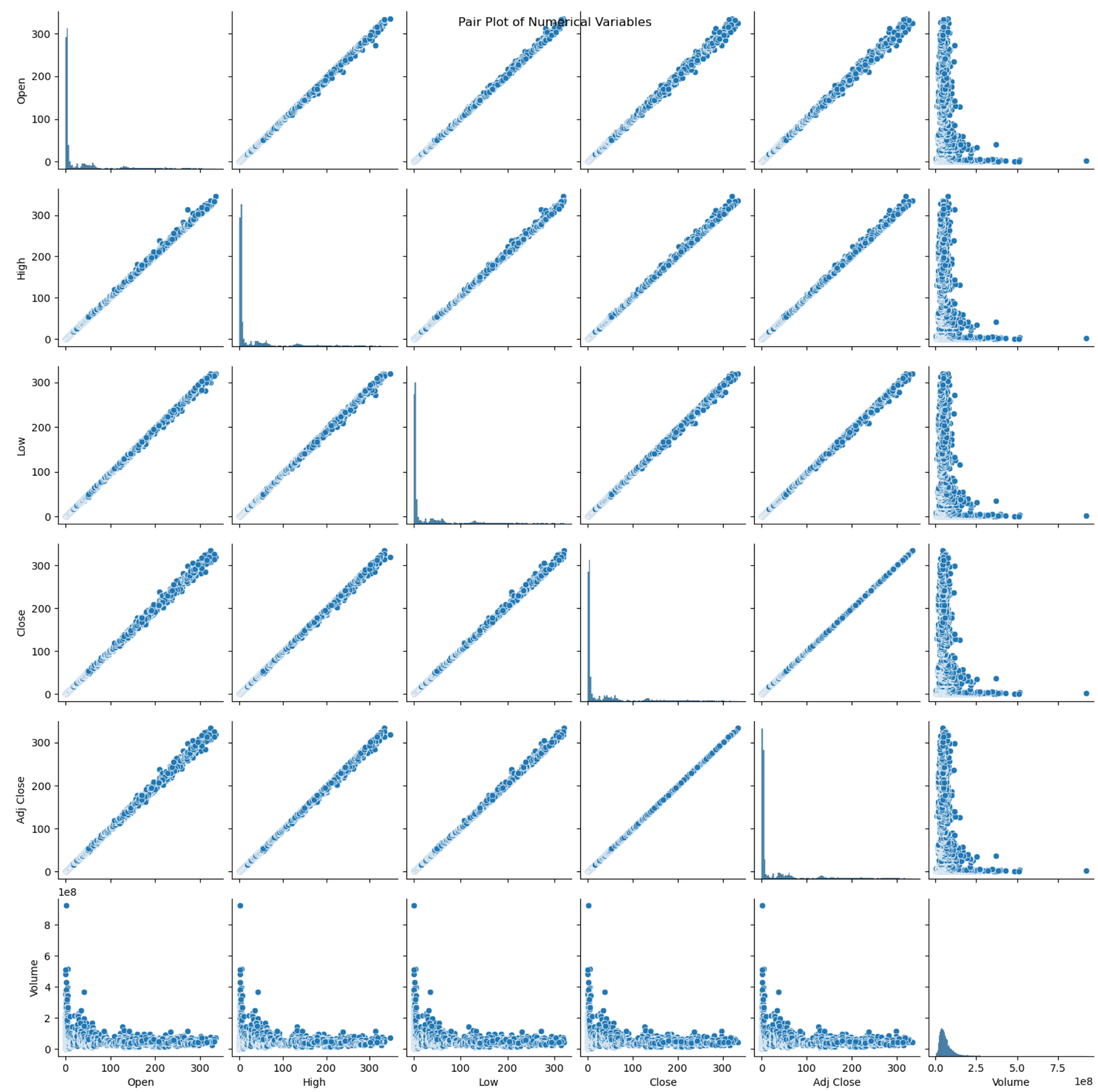
```
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```

```
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
```

```
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
```

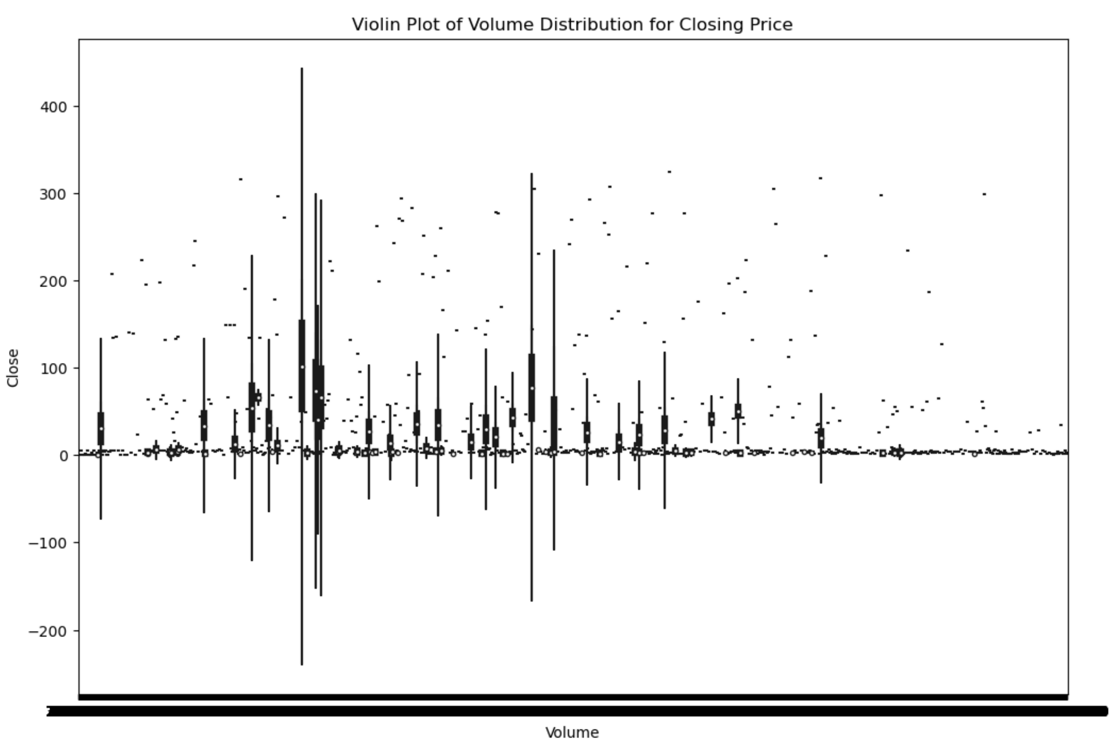
```
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
```

```
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```



[21]:
```
# Create a violin plot
plt.figure(figsize=(12, 8))
sns.violinplot(x='Volume', y='Close', data=df, palette='viridis')
plt.title('Violin Plot of Volume Distribution for Closing Price')
plt.show()
```

```
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-
packages/seaborn/_oldcore.py:1498: FutureWarning: is_categorical_dtype is
deprecated and will be removed in a future version. Use isinstance(dtype,
CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```



[22]:

```
#KEY FINDINGS
# If you bought NVDA stock one year ago, Oct 14, 2022, for the price of $115␣
↪you would have successfully tripled your investment.
# What is more atonishing is Pre-COVID NVDA was only selling at $33 June 3,␣
↪2019. This means if you had bought one share
# you would have 10X your investment.
# To put that into scale you had invested your weekly paycheck of $500 your␣
↪return would be roughly $4500.
# Based on the interactive chart NVDA is at a all time high. In comparison with␣
↪volume, many people are choosing to hold their shares.
# With the recent advancements within AI computers need better processing power␣
↪for research and development.

#HYPOTHESIS
# We see that the price dropped drastically a year ago due to speculation of a␣
↪recession.
# I predict that there will be another drop similar to Oct 14, 2022. Because,␣
↪the NVDA stock is at a all time high.
# We see from historical data that after a rise in price, the stock tends to␣
↪lower in price, than quickly escalate.

#CHALLENGES
# Some difficulties arised when creating a pair plot using the seaborn library,␣
↪the graph shows, but
# there are many lines of errors codes before scrolling to the graph. Unsure␣
↪how to get rid of them.
# Another challenge was the violin plot. Similary, it outputs a few lines of␣
↪errors codes before showing the graph.
```

```
Requirement already satisfied: plotly in
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-packages (5.9.0)
Requirement already satisfied: tenacity>=6.2.0 in
/Users/tuvshindashtseren/anaconda3/lib/python3.11/site-packages (from plotly)
(8.2.2)
Note: you may need to restart the kernel to use updated packages.
```

[24]:

```
# Import necessary libraries
import pandas as pd
import plotly.express as px

# Load your dataset
# Assuming you have a CSV file with columns 'Date', 'Open', 'High', 'Low',␣
↪'Close', 'Adj Close', 'Volume'
df = pd.read_csv('NVDA.csv')

# Create an interactive line plot with hover tooltips
```

```python
fig = px.line(df, x='Date', y='Close', title='Interactive Line Plot of Closing␣
↪Prices',
              labels={'Close': 'Closing Price', 'Date': 'Date'},
              hover_data={'Close': ':.2f', 'Date': '|%B %d, %Y'})

# Add a zoom functionality
fig.update_xaxes(rangeslider_visible=True)

# Show the plot
fig.show()
```

[28]:
```python
df. head(5)
```

[28]:
```
         Date      Open      High       Low     Close  Adj Close     Volume
0  1999-01-22  0.437500  0.488281  0.388021  0.410156   0.376358  271468800
1  1999-01-25  0.442708  0.458333  0.410156  0.453125   0.415786   51048000
2  1999-01-26  0.458333  0.467448  0.411458  0.417969   0.383527   34320000
3  1999-01-27  0.419271  0.429688  0.395833  0.416667   0.382332   24436800
4  1999-01-28  0.416667  0.419271  0.412760  0.415365   0.381137   22752000
```

[ ]:
```python

```