d6o2ixdfp

January 20, 2025

[1]:
```
# Import necessary libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from pymongo import MongoClient
import requests
from datetime import datetime
import json

# Configure MongoDB connection
mongo_client = MongoClient("mongodb+srv://ismini6:9LogpPCZJUJEZyjl@cluster0.
 ↪8xihe.mongodb.net/")
db = mongo_client['Crypto']
collection = db['Cryptocurrency']

# Data Ingestion
def load_data(file_path):
    df = pd.read_csv(file_path)
    return df

# Load all datasets from the 'archive' folder
import os

data_folder = 'C:/Users/Nantia/Downloads/archive/'
crypto_files = [f for f in os.listdir(data_folder) if f.endswith('.csv')]
crypto_data = pd.DataFrame()

for file in crypto_files:
    file_path = os.path.join(data_folder, file)
    data = load_data(file_path)
    crypto_data = pd.concat([crypto_data, data], ignore_index=True)

print(crypto_data.head())

# Data Cleaning and Transformation
crypto_data['Date'] = pd.to_datetime(crypto_data['Date'])
```

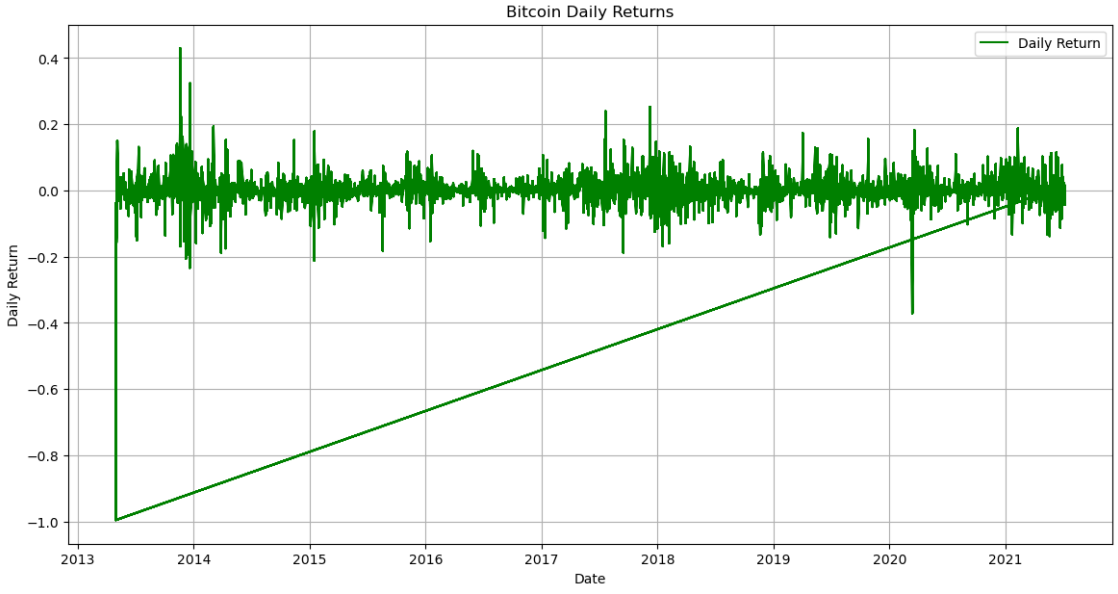
```
# Drop duplicates and handle missing values
crypto_data.drop_duplicates(inplace=True)
crypto_data.fillna(method='ffill', inplace=True)

# Store cleaned data to MongoDB
collection.insert_many(crypto_data.to_dict('records'))

# Relevant Queries for Data Extraction
# Example query: Get all data for Bitcoin
bitcoin_data = list(collection.find({"Symbol": "BTC"}))
bitcoin_df = pd.DataFrame(bitcoin_data)

# Convert 'Date' back to datetime for plotting
bitcoin_df['Date'] = pd.to_datetime(bitcoin_df['Date'])

# Analyzing Price Movements
plt.figure(figsize=(14, 7))
plt.plot(bitcoin_df['Date'], bitcoin_df['Close'], label='Close Price',␣
 ↪color='blue')
plt.title('Bitcoin Price Movements Over Time')
plt.xlabel('Date')
plt.ylabel('Price in USD')
plt.legend()
plt.grid()
plt.show()

# Big Data Processing Solution (Batch Analysis)

bitcoin_df['Daily Return'] = bitcoin_df['Close'].pct_change()

# Visualize Daily Returns
plt.figure(figsize=(14, 7))
plt.plot(bitcoin_df['Date'], bitcoin_df['Daily Return'], label='Daily Return',␣
 ↪color='green')
plt.title('Bitcoin Daily Returns')
plt.xlabel('Date')
plt.ylabel('Daily Return')
plt.legend()
plt.grid()
plt.show()
```

```
C:\Users\Nantia\anaconda3\Lib\site-packages\cryptography\x509\base.py:594:
CryptographyDeprecationWarning: Parsed a negative serial number, which is
disallowed by RFC 5280.
  return rust_x509.load_der_x509_certificate(data)
```

	SNo	Name	Symbol	Date	High	Low	Open	\
0	1	Aave	AAVE	2020-10-05 23:59:59	55.112358	49.787900	52.675035	

1	2	Aave	AAVE	2020-10-06 23:59:59	53.402270	40.734578	53.291969
2	3	Aave	AAVE	2020-10-07 23:59:59	42.408314	35.970690	42.399947
3	4	Aave	AAVE	2020-10-08 23:59:59	44.902511	36.696057	39.885262
4	5	Aave	AAVE	2020-10-09 23:59:59	47.569533	43.291776	43.764463

	Close	Volume	Marketcap
0	53.219243	0.000000e+00	8.912813e+07
1	42.401599	5.830915e+05	7.101144e+07
2	40.083976	6.828342e+05	6.713004e+07
3	43.764463	1.658817e+06	2.202651e+08
4	46.817744	8.155377e+05	2.356322e+08



[3]:
```
# Import necessary libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import glob
import os
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
import nltk
from nltk.sentiment.vader import SentimentIntensityAnalyzer

# Download VADER sentiment analysis model from nltk
nltk.download('vader_lexicon')

# Define the path to your dataset folder
data_folder = 'C:/Users/Nantia/Downloads/archive/'

# Load all CSV files into a single DataFrame
all_files = glob.glob(os.path.join(data_folder, "*.csv"))
dfs = []

for filename in all_files:
    df = pd.read_csv(filename)
    dfs.append(df)

# Concatenate all DataFrames into one
data = pd.concat(dfs, ignore_index=True)

# Display the first few rows
data.head()
```

```
[nltk_data] Downloading package vader_lexicon to
[nltk_data]     C:\Users\Nantia\AppData\Roaming\nltk_data…
[nltk_data]   Package vader_lexicon is already up-to-date!
```

[3]:

	SNo	Name	Symbol	Date	High	Low	Open	Close	Volume	Marketcap
0	1	Aave	AAVE	2020-10-05 23:59:59	55.112358	49.787900	52.675035			
1	2	Aave	AAVE	2020-10-06 23:59:59	53.402270	40.734578	53.291969			
2	3	Aave	AAVE	2020-10-07 23:59:59	42.408314	35.970690	42.399947			
3	4	Aave	AAVE	2020-10-08 23:59:59	44.902511	36.696057	39.885262			
4	5	Aave	AAVE	2020-10-09 23:59:59	47.569533	43.291776	43.764463			

```
0  53.219243  0.000000e+00  8.912813e+07
1  42.401599  5.830915e+05  7.101144e+07
2  40.083976  6.828342e+05  6.713004e+07
3  43.764463  1.658817e+06  2.202651e+08
4  46.817744  8.155377e+05  2.356322e+08
```

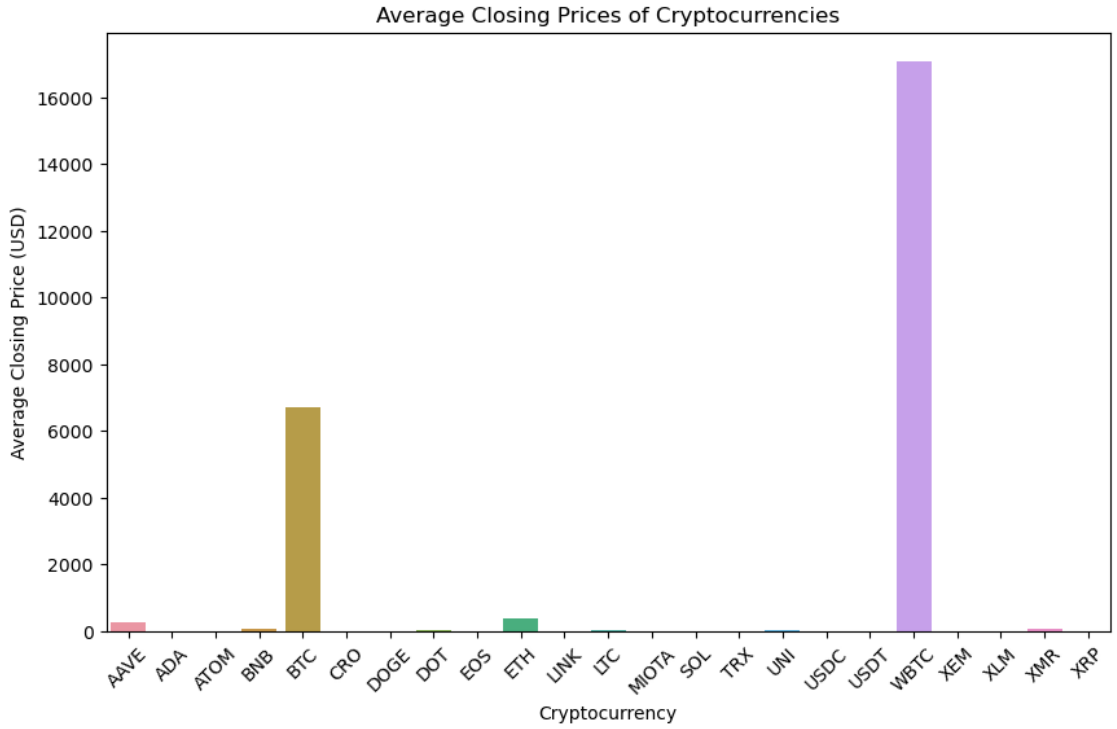
[4]:
```
# Check for missing values
print(data.isnull().sum())

# Fill or drop missing values
data.dropna(inplace=True)

# Convert 'Date' column to datetime type
data['Date'] = pd.to_datetime(data['Date'])

# Reset index
data.reset_index(drop=True, inplace=True)

# Display cleaned data info
data.info()
```

```
SNo          0
Name         0
Symbol       0
Date         0
High         0
Low          0
Open         0
Close        0
Volume       0
Marketcap    0
dtype: int64
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 37082 entries, 0 to 37081
Data columns (total 10 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   SNo        37082 non-null  int64
 1   Name       37082 non-null  object
 2   Symbol     37082 non-null  object
 3   Date       37082 non-null  datetime64[ns]
 4   High       37082 non-null  float64
 5   Low        37082 non-null  float64
 6   Open       37082 non-null  float64
 7   Close      37082 non-null  float64
 8   Volume     37082 non-null  float64
 9   Marketcap  37082 non-null  float64
```

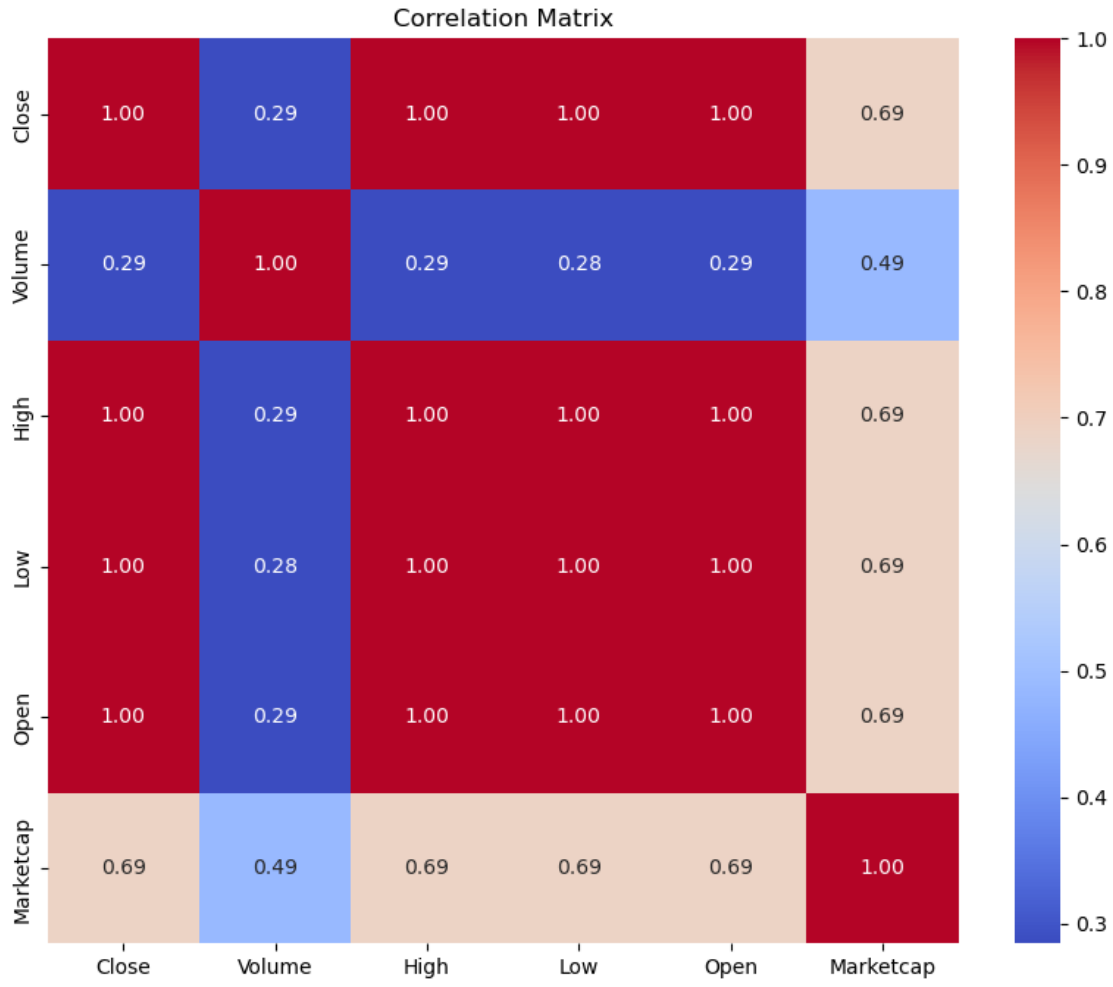
```
dtypes: datetime64[ns](1), float64(6), int64(1), object(2)
memory usage: 2.8+ MB
```

[5]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Assuming 'data' is your DataFrame containing the cryptocurrency data
avg_close = data.groupby('Symbol')['Close'].mean().reset_index()
print(avg_close)

# Visualizing average closing prices
plt.figure(figsize=(10, 6))
sns.barplot(data=avg_close, x='Symbol', y='Close')
plt.title('Average Closing Prices of Cryptocurrencies')
plt.xlabel('Cryptocurrency')
plt.ylabel('Average Closing Price (USD)')
plt.xticks(rotation=45)
plt.show()
```

```
   Symbol         Close
0    AAVE    255.525845
1     ADA      0.256313
2    ATOM      6.768099
3     BNB     52.250308
4     BTC   6711.290443
5     CRO      0.081912
6    DOGE      0.013763
7     DOT     18.143080
8     EOS      4.624088
9     ETH    383.910691
10   LINK      6.308583
11    LTC     49.279008
12  MIOTA      0.729370
13    SOL     10.471388
14    TRX      0.032585
15    UNI     17.077256
16   USDC      1.003791
17   USDT      1.000696
18   WBTC  17086.573875
19    XEM      0.124662
20    XLM      0.101509
21    XMR     74.134773
22    XRP      0.234790
```



[6]:
```
# Correlation Matrix
correlation = data[['Close', 'Volume', 'High', 'Low', 'Open', 'Marketcap']].
 ↪corr()
plt.figure(figsize=(10, 8))
sns.heatmap(correlation, annot=True, cmap='coolwarm', fmt='.2f')
plt.title('Correlation Matrix')
plt.show()
```



[7]:
```python
# Import necessary libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error

# Prepare data for regression model
X = data[['Volume', 'High', 'Low', 'Open']]
y = data['Close']

# 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 and fit the model
model = LinearRegression()
```

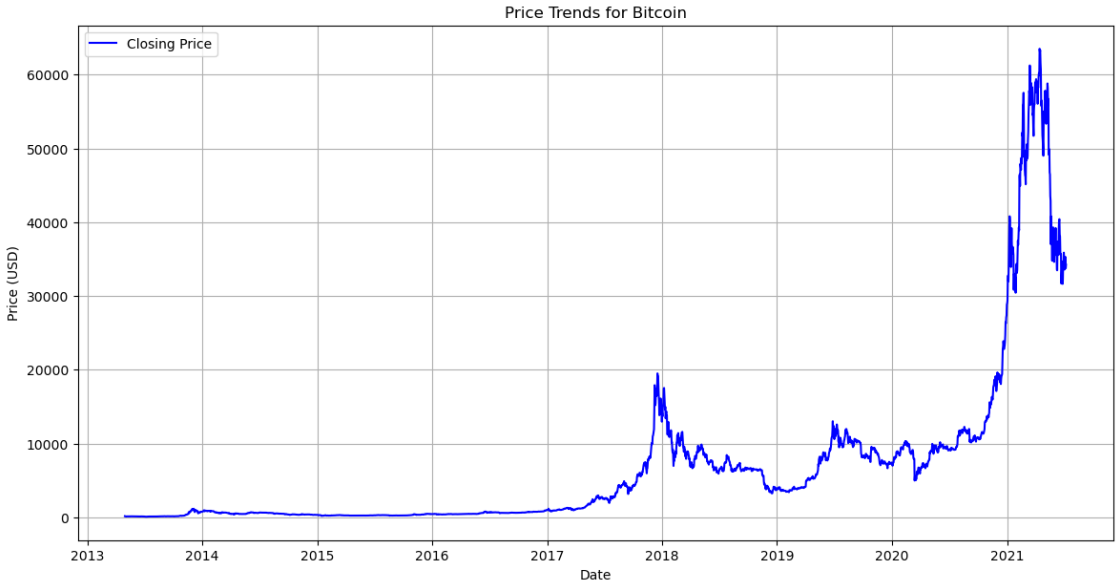
```
model.fit(X_train, y_train)

# Make predictions
y_pred = model.predict(X_test)

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

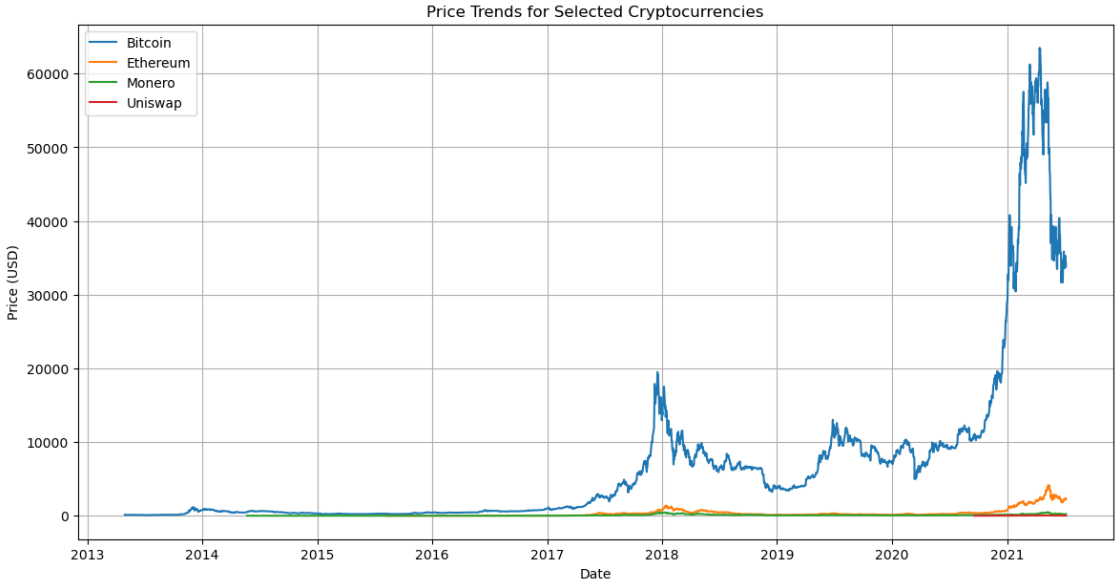
```
Mean Squared Error: 15899.032311721452
```

[8]:
```
import pandas as pd
import os

# Function to load CSV files from a directory
def load_crypto_data(folder_path):
    data = {}
    for filename in os.listdir(folder_path):
        if filename.endswith('.csv'):
            filepath = os.path.join(folder_path, filename)
            # Load the data into a DataFrame
            df = pd.read_csv(filepath)
            # Store DataFrame in a dictionary with the cryptocurrency name as␣
 ↪the key
            crypto_name = df['Name'][0]  # Assumes the first entry represents␣
 ↪the crypto
            data[crypto_name] = df
    return data

# Load data from the "archive" folder
data_folder = 'C:/Users/Nantia/Downloads/archive/'
crypto_data = load_crypto_data(data_folder)

# Display the keys of loaded data
crypto_data.keys()

# Function to clean and preprocess the data
def clean_crypto_data(df):
    # Convert 'Date' to datetime format
    df['Date'] = pd.to_datetime(df['Date'])

    # Drop unnecessary columns if needed
    df.drop(columns=['SNo', 'Name', 'Symbol'], inplace=True)

    # Rename columns for consistency
    df.rename(columns={'High': 'high', 'Low': 'low', 'Open': 'open',
```

```
                        'Close': 'close', 'Volume': 'volume', 'Marketcap':␣
 ↪'marketcap'}, inplace=True)

    # Handle missing values
    df.fillna(method='ffill', inplace=True)

    return df

# Clean all loaded data
cleaned_crypto_data = {name: clean_crypto_data(df) for name, df in crypto_data.
 ↪items()}

import matplotlib.pyplot as plt
import seaborn as sns

# Function to visualize price trends
def plot_price_trends(df, crypto_name):
    plt.figure(figsize=(14, 7))
    plt.plot(df['Date'], df['close'], label='Closing Price', color='blue')
    plt.title(f'Price Trends for {crypto_name}')
    plt.xlabel('Date')
    plt.ylabel('Price (USD)')
    plt.legend()
    plt.grid()
    plt.show()

# Plotting price trends for Bitcoin as an example
if 'Bitcoin' in cleaned_crypto_data:
    plot_price_trends(cleaned_crypto_data['Bitcoin'], 'Bitcoin')

# Function to visualize price trends for multiple cryptocurrencies
def plot_multiple_price_trends(cleaned_data, crypto_names):
    plt.figure(figsize=(14, 7))

    for crypto_name in crypto_names:
        if crypto_name in cleaned_data:
            df = cleaned_data[crypto_name]
            plt.plot(df['Date'], df['close'], label=crypto_name)

    plt.title('Price Trends for Selected Cryptocurrencies')
    plt.xlabel('Date')
    plt.ylabel('Price (USD)')
    plt.legend()
    plt.grid()
    plt.show()

# List of cryptocurrencies to plot
```

```
cryptocurrencies_to_plot = ['Bitcoin','Ethereum', 'Monero', 'Uniswap']

# Plotting price trends for selected cryptocurrencies
plot_multiple_price_trends(cleaned_crypto_data, cryptocurrencies_to_plot)
```





Explanation: MongoDB Connection: Connects to your online MongoDB database using the connection string. Data Loading Function: Reads all CSV files from a specified directory and combines them into a single DataFrame. MongoDB Insertion: Converts the DataFrame to a dictionary format

compatible with MongoDB and inserts it into the specified collection.

Explanation: Data Cleaning: Removes rows with null values and converts the Date column into a datetime format. Feature Engineering: Adds a new column for daily returns, which quantifies price changes.

Volume: Handling large datasets may require batch loading and optimized queries. Velocity: To address real-time data influx, consider implementing a streaming solution (e.g., using Apache Kafka). Variety: Different data formats (structured and unstructured) necessitate diverse processing techniques. For instance, you could incorporate sentiment analysis from social media.

[9]:
```
from itertools import cycle
import plotly.express as px
Monero = pd.read_csv("C:/Users/Nantia/Downloads/archive/coin_Monero.csv")
Monero
projection_Monero = 5
#creation of a new column with a name prediction
Monero['Prediction'] = Monero[['Close']].shift(-projection_Monero)
Monero
visualize_Monero = cycle(['Open','Close','High','Low','Prediction'])

fig = px.line(Monero, x=Monero.Date, y=[Monero['Open'], Monero['Close'],
                                        Monero['High'], Monero['Low'],␣
 ↪Monero['Prediction']],
              labels={'Date': 'Date','value':'Price'})
fig.update_layout(title_text='Monero', font_size=15,␣
 ↪font_color='black',legend_title_text='Parameters')
fig.for_each_trace(lambda t:  t.update(name = next(visualize_Monero)))
fig.update_xaxes(showgrid=False)
fig.update_yaxes(showgrid=False)

fig.show()
```

[10]:
```
from itertools import cycle
import plotly.express as px
Bitcoin = pd.read_csv("C:/Users/Nantia/Downloads/archive/coin_Bitcoin.csv")
Bitcoin
projection_Bitcoin = 5
#creation of a new column with a name prediction
Bitcoin['Prediction'] = Bitcoin[['Close']].shift(-projection_Bitcoin)
Bitcoin
visualize_Bitcoin = cycle(['Open','Close','High','Low','Prediction'])

fig = px.line(Bitcoin, x=Bitcoin.Date, y=[Bitcoin['Open'], Bitcoin['Close'],
                                        Bitcoin['High'], Bitcoin['Low'],␣
 ↪Bitcoin['Prediction']],
              labels={'Date': 'Date','value':'Price'})
```

```
fig.update_layout(title_text='Bitcoin', font_size=15,␣
 ↪font_color='black',legend_title_text='Parameters')
fig.for_each_trace(lambda t:  t.update(name = next(visualize_Bitcoin)))
fig.update_xaxes(showgrid=False)
fig.update_yaxes(showgrid=False)

fig.show()
```

[11]:
```
from itertools import cycle
import plotly.express as px
Ethereum = pd.read_csv("C:/Users/Nantia/Downloads/archive/coin_Ethereum.csv")
Ethereum
projection_Ethereum = 5
#creation of a new column with a name prediction
Ethereum['Prediction'] = Ethereum[['Close']].shift(-projection_Ethereum)
Ethereum
visualize_Ethereum= cycle(['Open','Close','High','Low','Prediction'])

fig = px.line(Ethereum, x=Ethereum.Date, y=[Ethereum['Open'], Ethereum['Close'],
                                            Ethereum['High'], Ethereum['Low'],␣
 ↪Ethereum['Prediction']],
              labels={'Date': 'Date','value':'Price'})
fig.update_layout(title_text='Bitcoin', font_size=15,␣
 ↪font_color='black',legend_title_text='Parameters')
fig.for_each_trace(lambda t:  t.update(name = next(visualize_Ethereum)))
fig.update_xaxes(showgrid=False)
fig.update_yaxes(showgrid=False)

fig.show()
```

[12]:
```
from itertools import cycle
import plotly.express as px
Uniswap = pd.read_csv("C:/Users/Nantia/Downloads/archive/coin_Uniswap.csv")
Uniswap
projection_Uniswap = 5
#creation of a new column with a name prediction
Uniswap['Prediction'] = Uniswap[['Close']].shift(-projection_Uniswap)
Uniswap
visualize_Uniswap= cycle(['Open','Close','High','Low','Prediction'])

fig = px.line(Uniswap, x=Uniswap.Date, y=[Uniswap['Open'], Uniswap['Close'],
                                            Uniswap['High'], Uniswap['Low'],␣
 ↪Uniswap['Prediction']],
              labels={'Date': 'Date','value':'Price'})
fig.update_layout(title_text='Bitcoin', font_size=15,␣
 ↪font_color='black',legend_title_text='Parameters')
```

```
fig.for_each_trace(lambda t:  t.update(name = next(visualize_Uniswap)))
fig.update_xaxes(showgrid=False)
fig.update_yaxes(showgrid=False)

fig.show()
```

[ ]: