Project 3 - Cryptocurrency Dashboard

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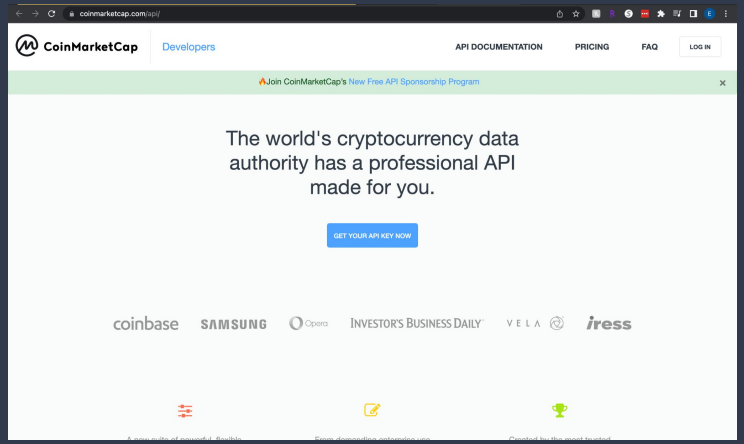
Project Summary

1. API call
2. ETL
3. Store on MongoDB
4. Render Flask
5. HTML script
6. Visualizations through JavaScript
7. Add user-driven interactions through HTML
8. Populate dashboard

Dataset Used



- API
- Link: https://coinmarketcap.com/api/
  - Contains data for 1000 different cryptocurrencies
- Main Columns Used:
  - Name
  - Price
  - Volume Change: 24h
  - Market Cap Dominance
  - Percent Change: 1h, 24h, 7d, 30d, 60d, 90d

Analysis Focus

- Given the size of the dataset, we chose to focus most graphs on the top 10 cryptocurrencies
- Top 10 ranked off of market cap dominance

1. Bitcoin
2. Ethereum
3. Tether
4. BNB
5. USD Coin
6. XRP
7. Solana
8. Terra
9. Cardano
10. Avalanche

Extraction

```
%load_ext nb_black
from requests import Request, Session
from requests.exceptions import ConnectionError, Timeout, TooManyRedirects
import json
import pandas as pd
import pprint
from config import app_key
import pymongo
from time import time, sleep

url = "https://pro-api.coinmarketcap.com/v1/cryptocurrency/listings/latest"
parameters = {"start": 1, "limit": 1000, "convert": "USD"}
headers = {
    "Accept": "application/json",
    "X-CMC_PRO_API_KEY": app_key,
}
```

```
session = Session()
session.headers.update(headers)
data_retrieved = []
pp = pprint.PrettyPrinter(width=10, compact=True)

try:
    response = session.get(url, params=parameters)
    data = json.loads(response.text)
    pp.pprint(data)
    data_retrieved.append(data)

except (ConnectionError, Timeout, TooManyRedirects) as error:
    data_retrieved(error)
```

Transformation

```
docs = pd.DataFrame(columns=[])
items = db.items.find()
for num, doc in enumerate(items):
    doc["_id"] = str(doc["_id"])
    doc_id = doc["_id"]
    series_obj = pd.Series(doc, name=doc_id)
    docs = docs.append(series_obj)
```

```
final_df = pd.concat([data_df, df], axis=1)
final_df = final_df.drop(columns="quote")
final_df
```

```
data_df = pd.DataFrame(docs["data"][0])
data_df["date_added"] = pd.to_datetime(data_df["date_added"])
data_df["year"] = pd.DatetimeIndex(data_df["date_added"]).year
data_df.head(2)
```

Load

- Stored on MongoDB

```
conn = "mongodb://localhost:27017"
client = pymongo.MongoClient(conn)
db = client.cryptoCurrency_db
collection = db.items
```

Flask

```python
from flask import Flask, render_template, redirect
from flask_pymongo import PyMongo
import json
from bson import ObjectId
import flask
from flask_cors import CORS, cross_origin

class JSONEncoder(json.JSONEncoder):
    def default(self, o):
        if isinstance(o, ObjectId):
            return str(o)
        return json.JSONEncoder.default(self, o)

app = Flask(__name__)
CORS(app, support_credentials=True)
```

```python
app.config["MONGO_URI"] = "mongodb://localhost:27017/cryptoCurrency_db"
mongo = PyMongo(app)

# create my own API from the data stored in Mongo database
@app.route('/get_data')
def index():
    listings = mongo.db.items.find_one()
    return JSONEncoder().encode(listings)

@app.route('/')
def home():
    return render_template('index.html')
```

HTML - Head

- Used bootstrap, plotly and d3
- Worked on style to make the dashboard prettier

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <title>Cryptocurrency Dashboard</title>
    <link rel="stylesheet" href="/static/style.css">
    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css">
    <script src="https://cdn.plot.ly/plotly-latest.min.js"></script>
    <script src="https://d3js.org/d3.v5.min.js"></script>

    <style>
    body {
    background-color: #ff8811;
    };

    h1 {
        color: #FFF8F0;
    }

    h5 {
        color: #FFF8F0;
    }
    select option {

        background-color: #FFF8F0;

    }
    .shadow {

box-shadow: 8px 7px 5px 0px rgba(244,208,111,0.54);
    }

    </style>
```

HTML - Body

```
<div class="container">
    <div class="row">
        <div class="col-md-12 text-center my-4">
            <h1></h1>
        </div>
```

- Created a drop down menu, added options manually, bar graph changes according to cryptocurrency chosen

```
<select class="shadow" id="selDataset">
    <option value="Bitcoin"> Bitcoin </option>
    <option value="Ethereum"> Ethereum </option>
    <option value="Tether"> Tether </option>
    <option value="BNB"> BNB </option>
    <option value="USD Coin"> USD Coin </option>
    <option value="Solana"> Solana </option>
    <option value="XRP"> XRP </option>
    <option value="Terra"> Terra </option>
    <option value="Cardano"> Cardano </option>
    <option value="Dogecoin"> Dogecoin </option>
</select>
```

HTML - Body (cont.)

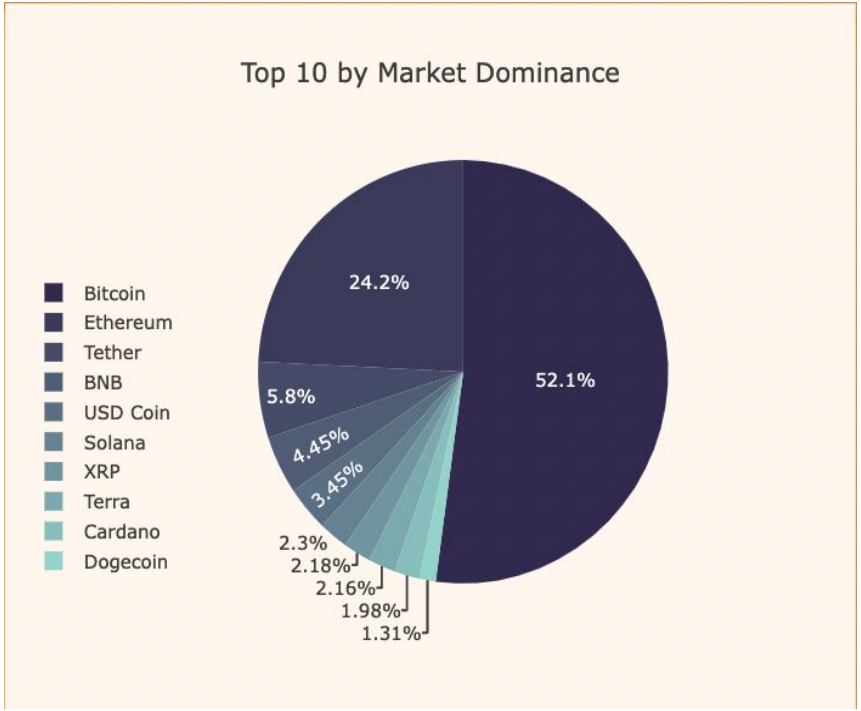
```
<div class="col-md-6">
    <div class = "shadow" id="BarChart2"></div>
</div>
<div class="col-md-6">
    <br>
    <br>
    <h1 style="color: #FFF8F0; font-size:75px; text-align: center;">Cryptocurrency Dashboard</h1>
</div>
```

- Created divs for each graph

```
<div class="row">
    <div class="col-md-6">
        <div class = "shadow", id="PieChart"></div>
    </div>
    <div class="col-md-6">
        <div class = "shadow", id="BarChart"></div>
    </div>
```

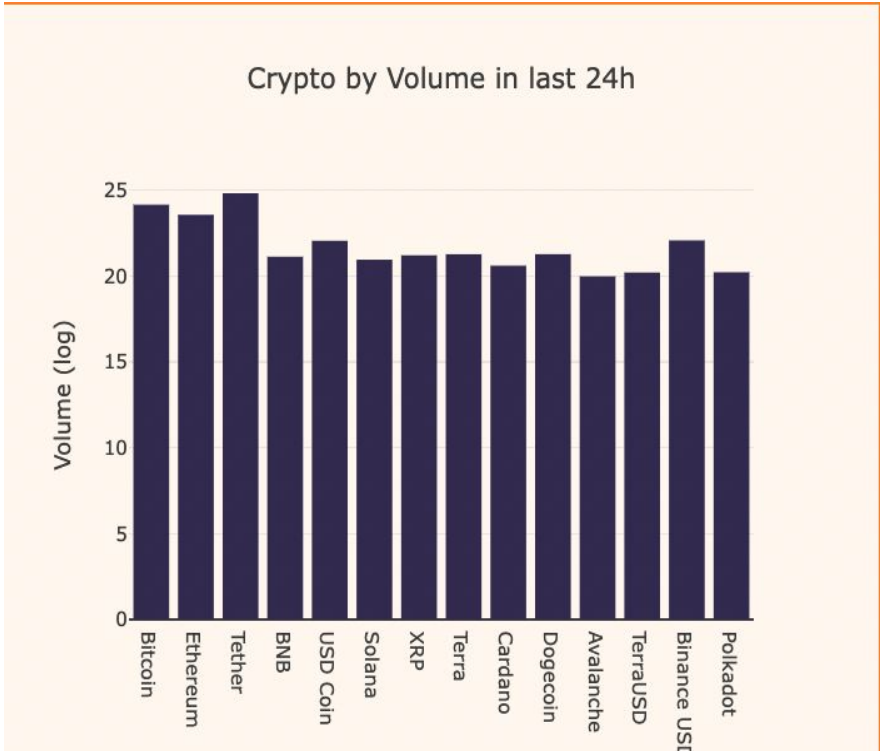
Pie Chart

- Top 10 Cryptos
- Market Cap Dominance (% of total MC) at time of API call



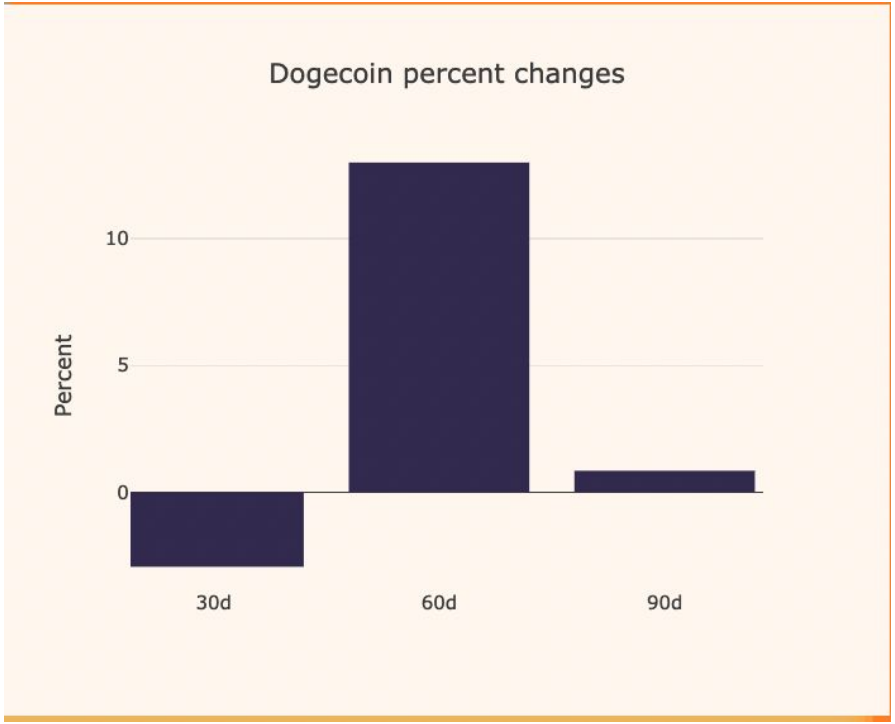
Bar Chart

- Top 10 Cryptos
- 24-Hour Volume Change at time of API call



2nd Bar Chart

- Percent price changes over a certain time period for a specified crypto
- 1hr, 24hr, 7d, 30d, 60d, 90d intervals



Limitations

- Only able to to get the current data at the time of the API call
  - Limited our time trend visualization capabilities
- Bitcoin data heavily skewed many columns, so it had to be separated from the rest of the cryptocurrencies
- Mac security troubleshooting
- Different operating system within group

Finalized Dashboard Showcase

Thank You