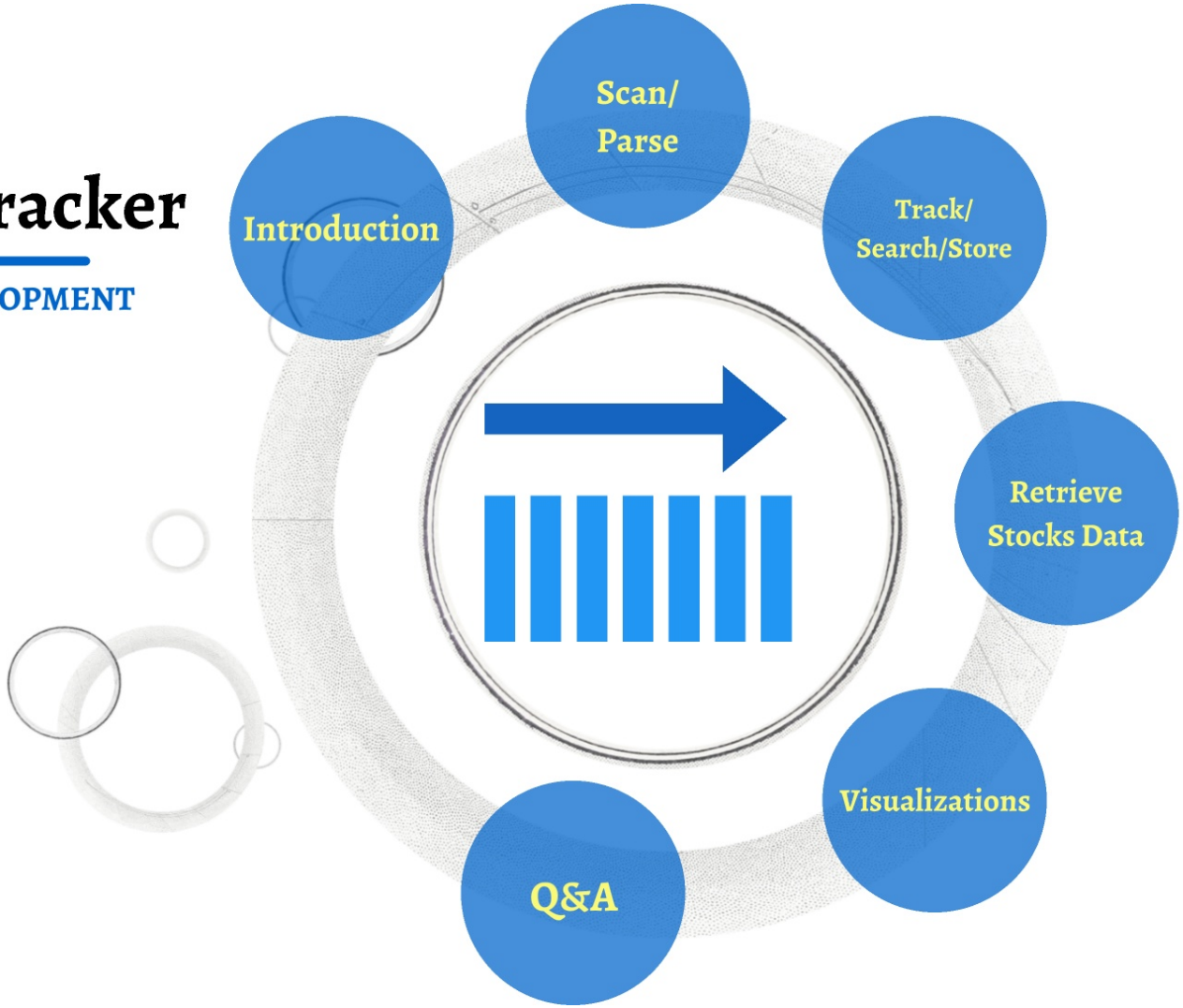
Simple Stocks Tracker

INTRODUCTION TO AI DEVELOPMENT

AIDI-1100-02

Group 7- Fall/2021



Introduction

Goal

Track performance of stocks mentioned in the news recently.

Our Team

Solution Breakdown

Additional Features

Our Team

Project POC:
Raj Dholakia

Project Architect :
Nikolai Melnikov
Praharsh Bhatt

Project Specialist:
Mervat Mustafa
Komal Sodera

Project BA:
Priyankkumar Prakashbhai Patel

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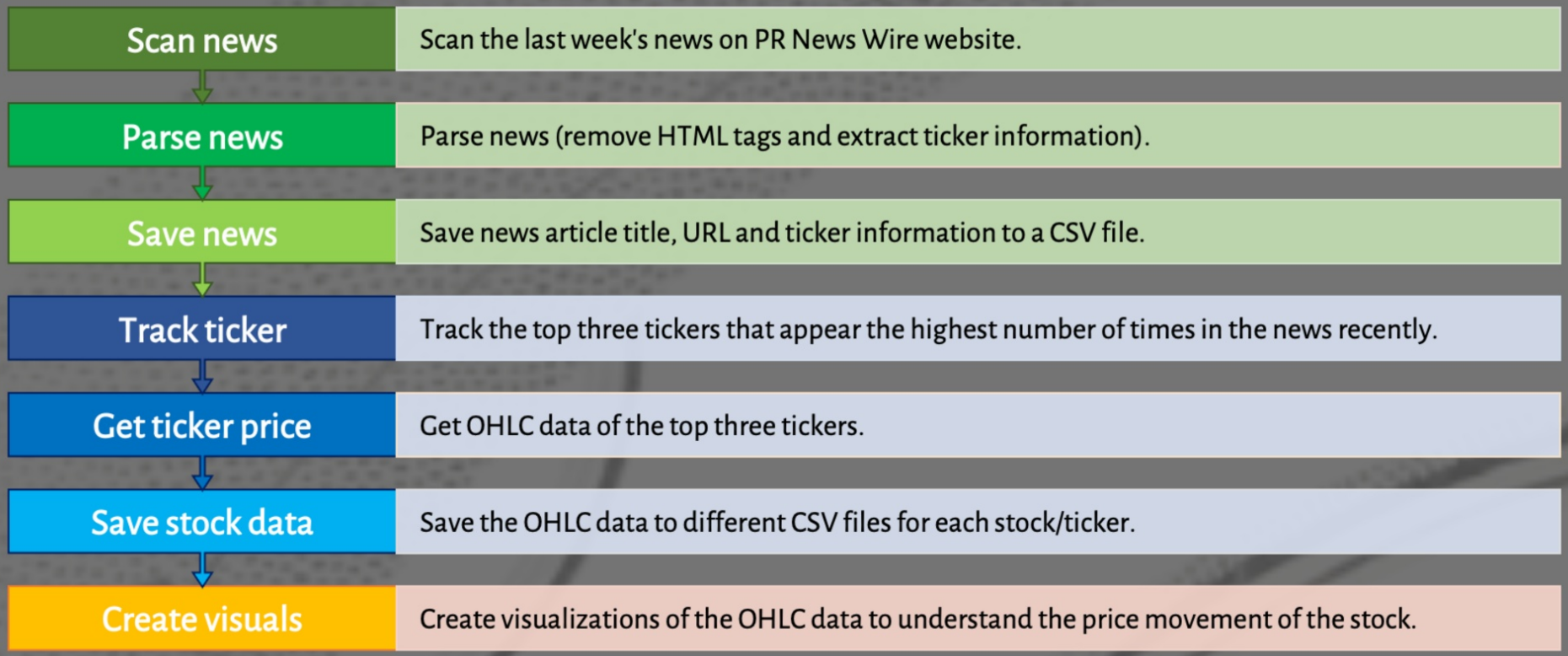

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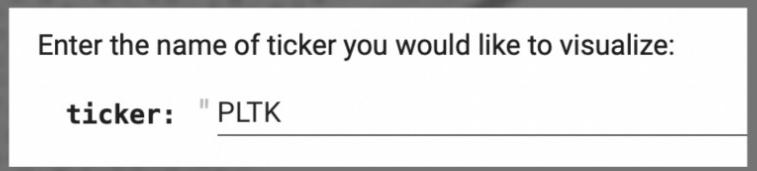

Note:

- All code is written in Python.
- We collaborated on GitHub.
- Google Colab notebook environment used.

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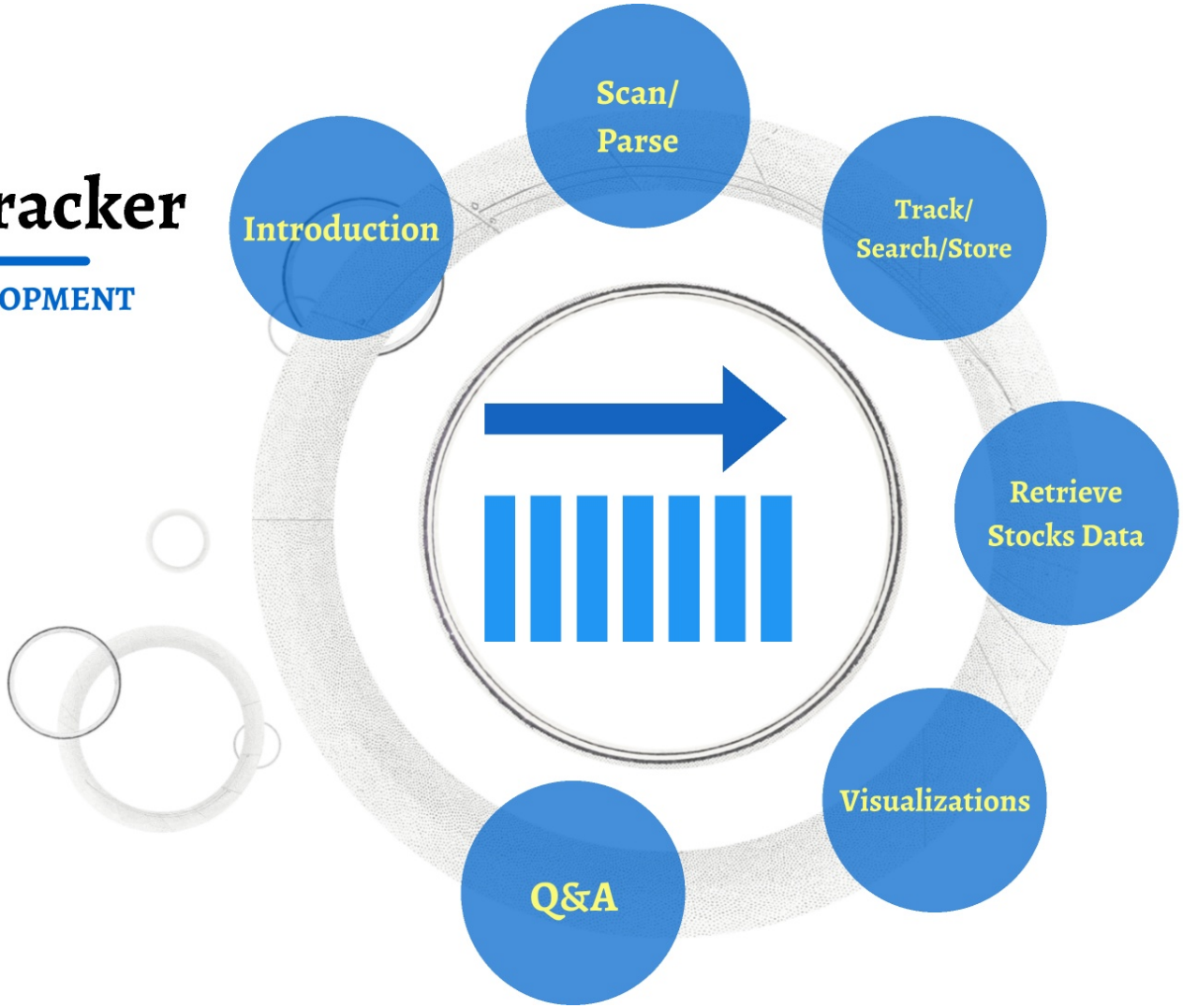

Result

PR Newswire
a CISION company

Function **page_parse()** scans PRNewsWire.com and returns URLs of scanned articles.

- Function **url_parse()** parses each article and detects any tickers mentioned in the article.
- Function **run_scanner()** uses the above functions and returns a pandas dataframe containing:
  - Article Date
  - Article Title
  - Ticker
  - Article URL.

```
# Function to parse a particular page for all the news to later parse them for tickers.
# Takes 2 parameters: a number of pages and initial dataset of already saved news.
def page_parse(x, page_session, data=[]):
    page_url = f'https://www.prnewswire.com/news-releases/english-releases/?page={x}&pagesize=100'
    page_request = page_session.get(page_url)
    content = page_request.html.find('div.row.arabiclistingcards')
    for item in tqdm(content, desc='Parsing page...\t', leave=False):
        date = item.find('h3', first=True).text.split('ET')[-2]
        title = item.find('h3', first=True).text.split('ET')[-1]
        article_url = 'https://www.prnewswire.com' + item.find('a.newsreleaseconsolidatelink',
first=True).attrs['href']
        ticker = url_parse(article_url, page_session)
        try:
            dic = {
              'Date': pd.to_datetime(date),
              'Title': title,
              'Ticker': ticker,
              'Article URL': article_url
            }
            data.append(dic)
        except Exception:
            pass

    return data
```

Result

SAN FRANCISCO, Nov. 23, 2021 /PRNewswire/ -- Autodesk, Inc. (NASDAQ: ADSK) today reported financial results for the third quarter of fiscal 2022.

```
<a class="ticket-symbol" data-toggle="modal" href="https://www.prnewswire.com/news-releases/autodesk-inc-announces-fiscal-2022-third-quarter-results-301431093.html#financial-modal">
ADSK</a> == $0
") today reported financial results for the third quarter of fiscal 2022. "
```

Algorithm's performance

```
Loading Pages...        :   0%|          | 0/10 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Parsing page... :   0%|          | 0/100 [00:00<?, ?it/s]
Time Taken:  170.1s
```

Results dataframe

Date	Title	Ticker	Article URL
2021-11-09 19:48:00	Intercorp Financial Services announces virtua...	IFS	https://www.prnewswire.com/news-releases/inter...
2021-11-09 19:46:00	ICC Holdings, Inc. Reports 2021 Third Quarter...	ICCH	https://www.prnewswire.com/news-releases/icc-h...
2021-11-09 19:00:00	Smith+Nephew establishes its first Medical Ed...	SNN	https://www.prnewswire.com/news-releases/smith...
2021-11-09 18:56:00	Cambridge Bancorp Announces Expansion of Weal...	CATC	https://www.prnewswire.com/news-releases/cambr...
2021-11-09 18:35:00	EQT Ventures and EQT Growth to exit its holdi...	DASH	https://www.prnewswire.com/news-releases/eqt-v...

PR Newswire
a CISION company

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        article_url = 'https://www.prnewswire.com' + item.find('a.newsreleaseconsolidatelink',
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```

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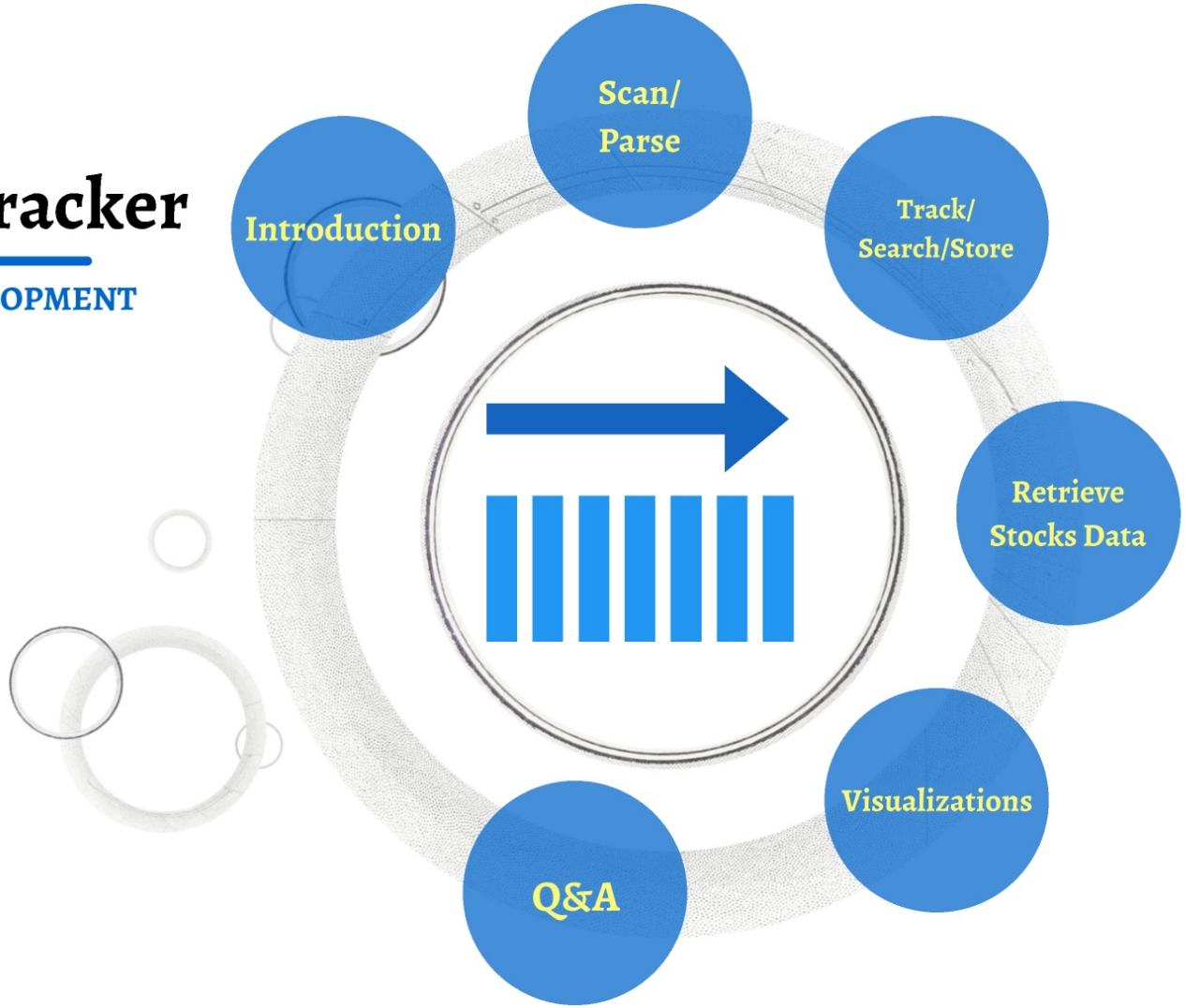

Track/Search/Store

- Get stock data for a ticker
- Iterate through stocks and save stock data in a CSV file.

1

2

Get stock data for a ticker

```
# create filename using the first and last dates.
sorted_df = df.sort_values('Date')

start_date = sorted_df.index[0].date()
end_date = sorted_df.sort_values('Date').index[-1].date()

# concate dates to create name for the CSV file.
filename = start_date.strftime('%d%b%y') + '-to-' + end_date.strftime('%d%b%y') + '.csv'
print(filename)
```

Track/Search/Store

- Get stock data for a ticker
- Iterate through stocks and save stock data in a CSV file.

1

2

Iterate through stocks and save stock data in a CSV file.

```
data_dir = pathlib.Path('/content/datasets/')

if not data_dir.exists():
    os.mkdir(data_dir)

# Save dataframe as a csv for further analysis
df.to_csv(data_dir / filename)
print(f'CSV file saved to: {data_dir / filename}')


#CSV file saved to: /content/datasets/26Nov21-to-30Nov21.csv
```

Track/Search/Store

- Get stock data for a ticker
- Iterate through stocks and save stock data in a CSV file.

1

2

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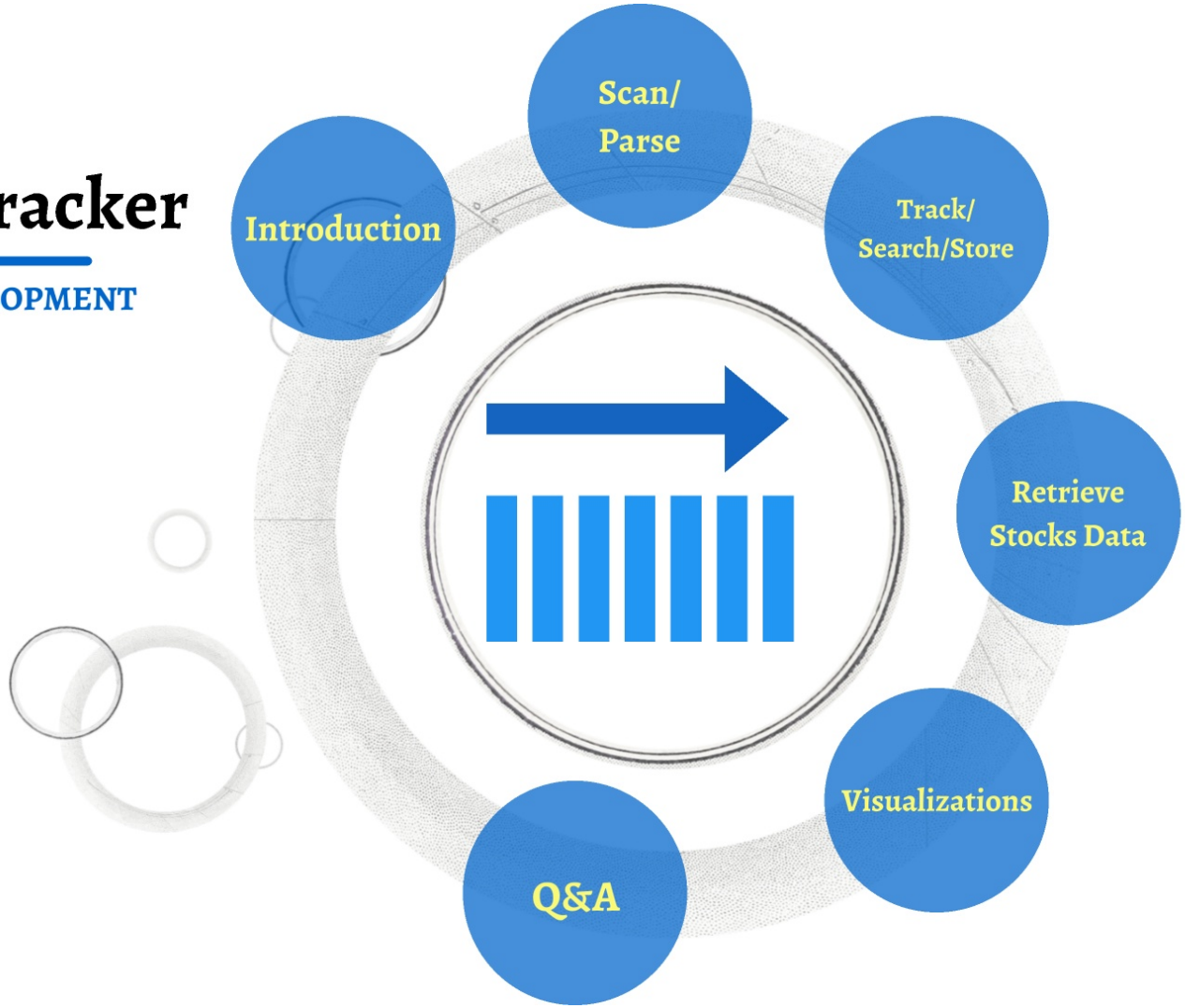
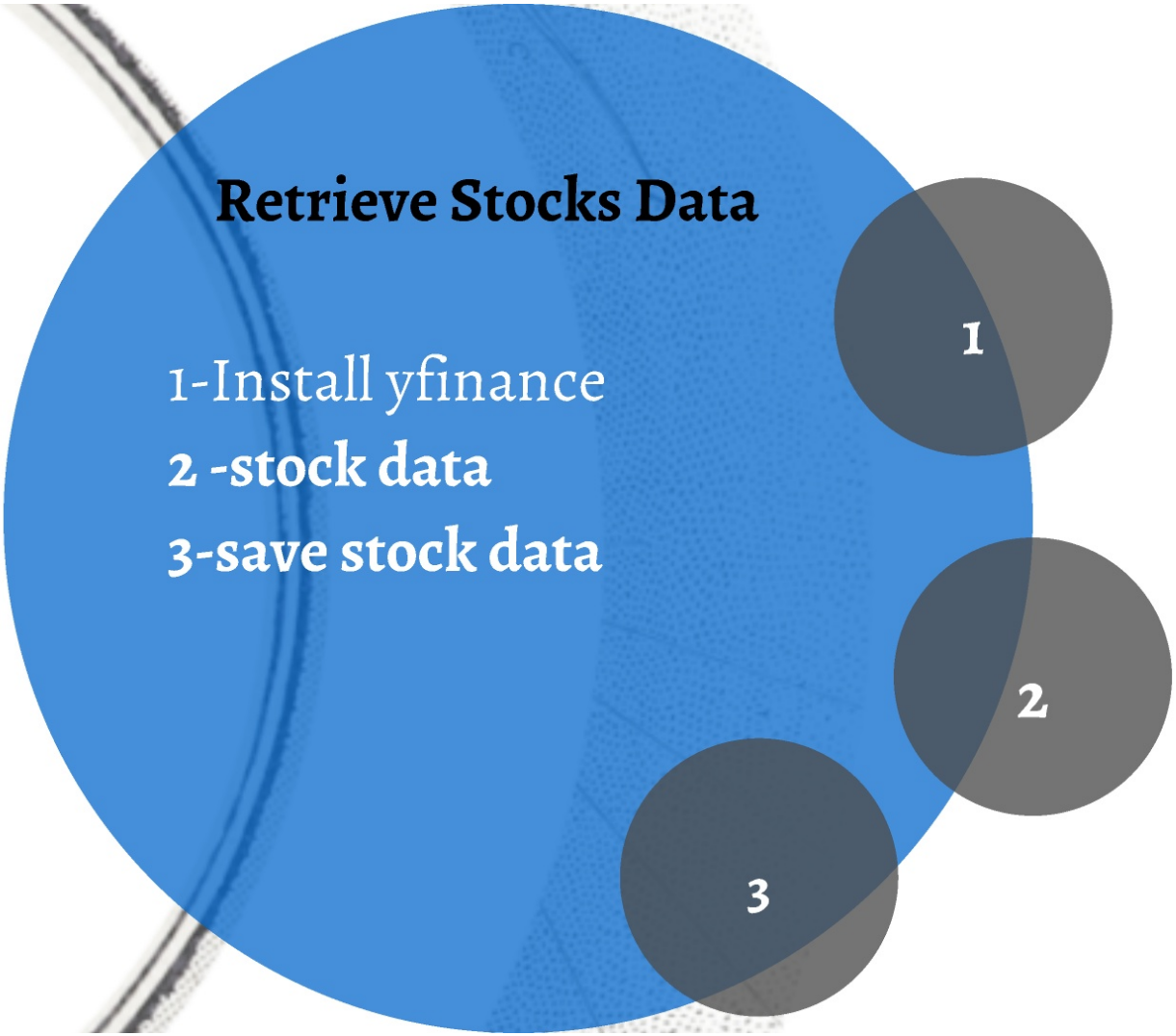
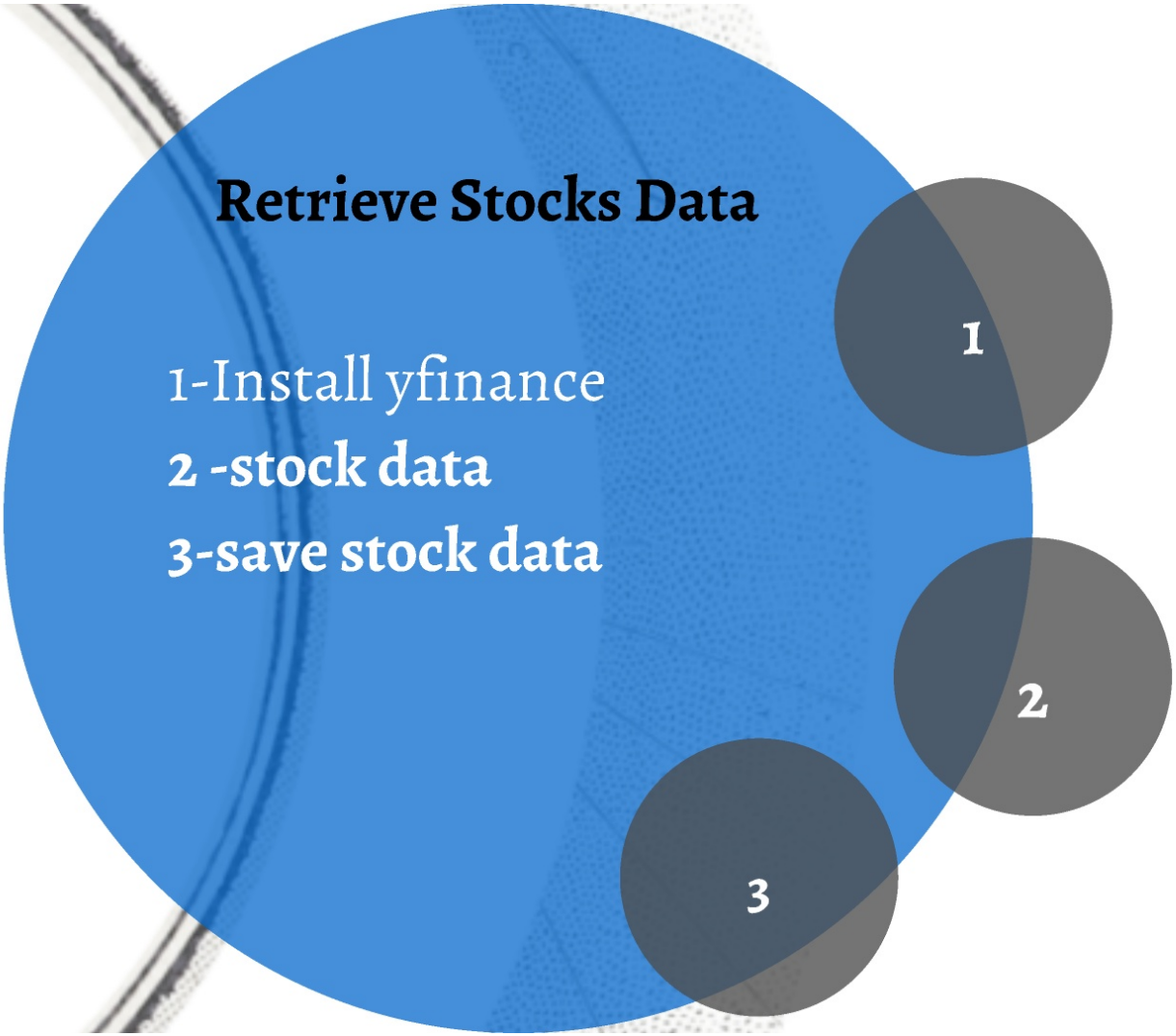



Retrieve Stocks Data
1-Install yfinance
2 -stock data
3-save stock data
1
2
3

Install yfinance

```
# install and/or load yfinance module
try:
    success_msg = '\n\nYahoo! Finance module loaded.'
    import yfinance as yf
    print(success_msg)
except ModuleNotFoundError as e:
    print('Installing Yahoo! Finance python module...')
    !pip install yfinance
    import yfinance as yf
    print(success_msg)
```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1-Install yfinance
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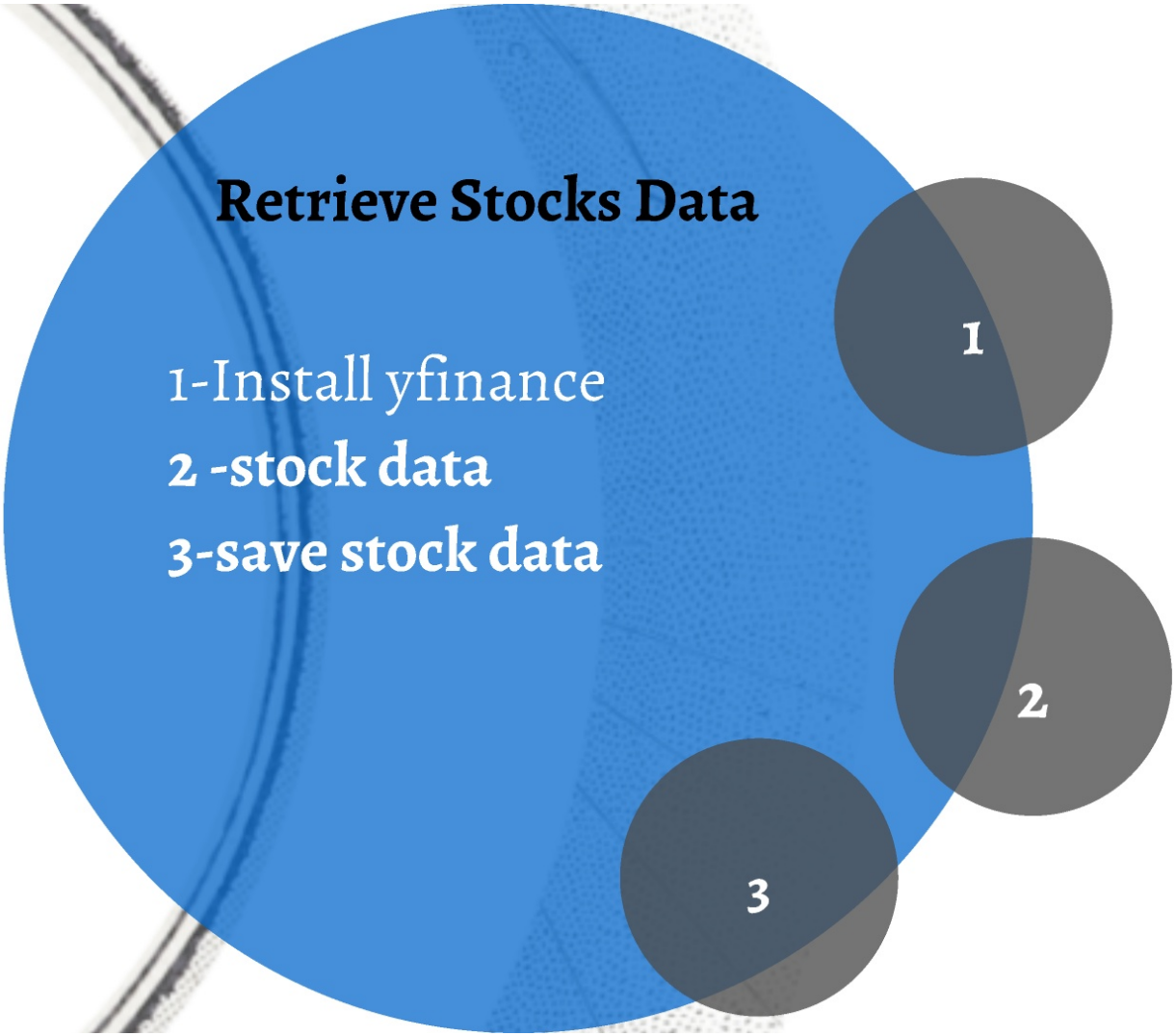
2. Get stock data for a ticker

```python
def get_stock_quotes(ticker: str, period: str = "30d"):

    if type(ticker) is not str:
        return

    # Get the stock data of this ticker
    stock_data = yf.Ticker(ticker)

    # get historical market data of the past 30 days
    return stock_data.history(period=period)
```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1-Install yfinance
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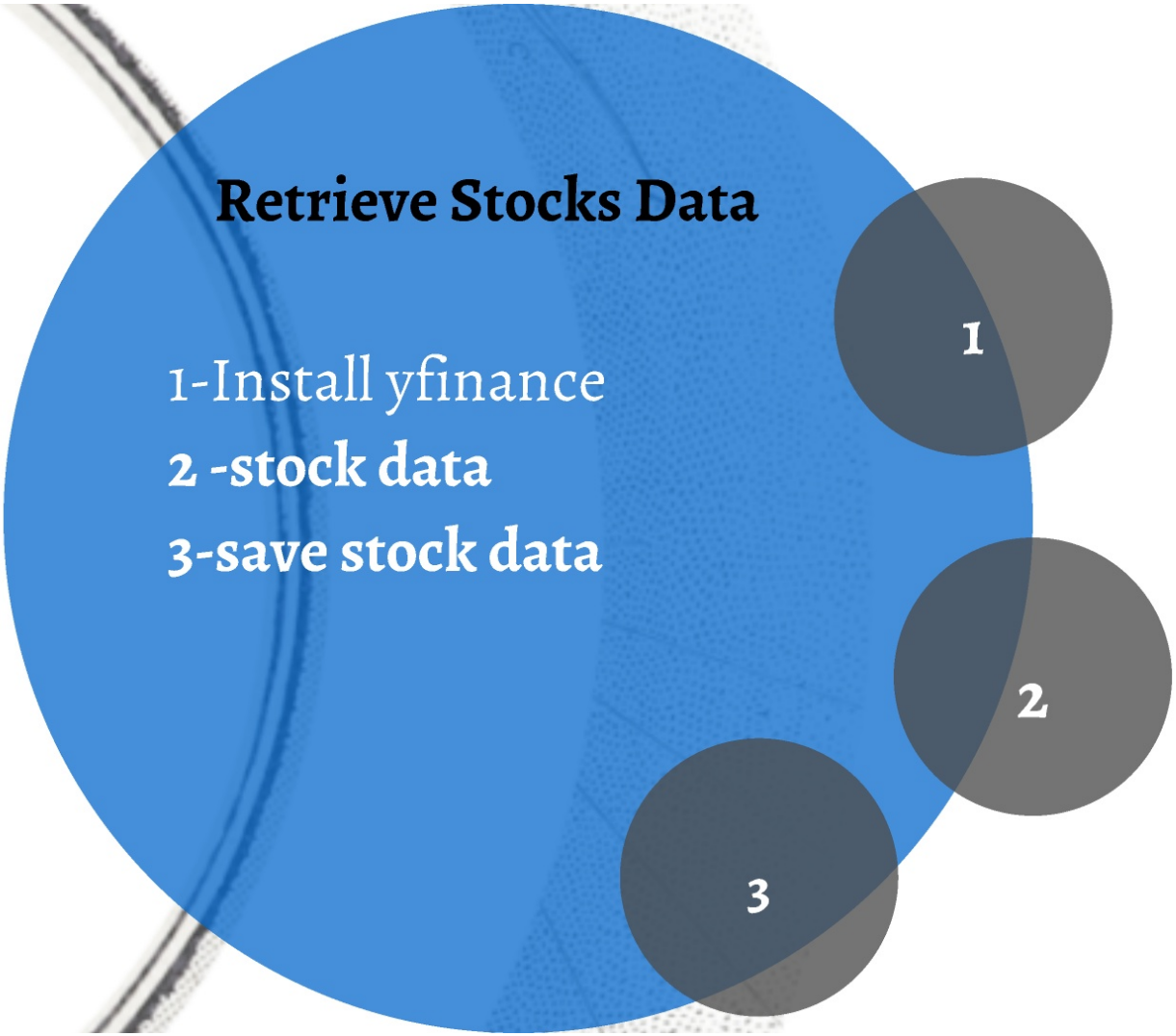
3. Iterate through stocks and save stock data in CSVs

```
# Create an empty folder
if not output_stock_dump_path.exists():
    os.mkdir(output_stock_dump_path)

stock_names = []

for ticker in tqdm(df.Ticker, desc='Getting Stocks data... \t'):
    # Get the stock performance data for the past 30 days of this stock
    if not ticker in top_tickers2:
        continue

    stock_data = get_stock_quotes(ticker, period)

    if stock_data is None:
        continue

    stock_df = pd.DataFrame(
        {
            'Date': stock_data.Volume.keys(),
            'Open': stock_data.Open.values,
            'Close': stock_data.Close.values,
            'Low': stock_data.Low.values,
            'High': stock_data.High.values,
            'Volume': stock_data.Volume.values,
        }
    )
    stock_names += ticker
    stock_df.to_csv(output_stock_dump_path / (ticker+'.csv'), index=False)

print(f'The data of the following stocks was saved to {output_stock_dump_path}:')
print(f'{top_tickers2}')
```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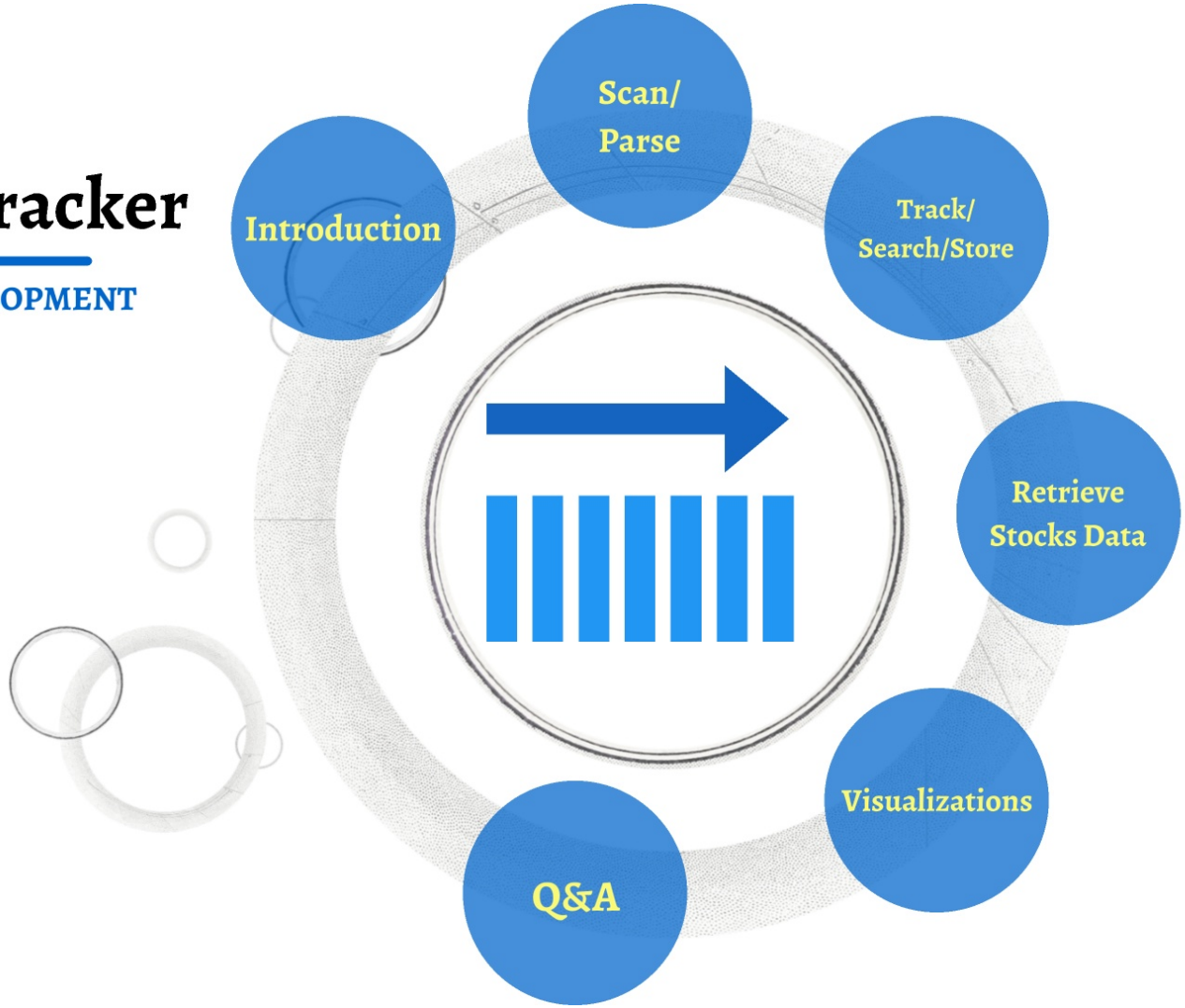

Visualizations

Date	Date	Open	Close	Low	High	Volume
2021-10-15	2021-10-15	76.809998	77.339996	75.870003	78.735001	20404200
2021-10-18	2021-10-18	78.599998	75.800003	72.610001	79.300003	33053900
2021-10-19	2021-10-19	75.120003	76.430000	73.900002	78.180000	18720700
2021-10-20	2021-10-20	76.570000	75.650002	74.669998	77.519997	15739300
2021-10-21	2021-10-21	74.809998	75.110001	73.889999	75.949997	44450900
2021-10-22	2021-10-22	58.750000	55.139999	55.029999	60.779999	153827500
2021-10-25	2021-10-25	55.959999	54.500000	53.770000	56.150002	62506800
2021-10-26	2021-10-26	55.240002	55.389999	54.880001	57.180000	52905700
2021-10-27	2021-10-27	55.049999	52.020000	51.660000	55.230000	52581300
2021-10-28	2021-10-28	52.680000	54.389999	51.990002	54.959999	34748800
2021-10-29	2021-10-29	53.970001	52.580002	52.209999	53.990002	32465500
2021-11-01	2021-11-01	52.990002	53.980000	52.250000	54.110001	22666700
2021-11-02	2021-11-02	53.570000	52.200001	51.865002	53.660000	24120400
2021-11-03	2021-11-03	51.950001	52.939999	51.470001	52.970001	16319300
2021-11-04	2021-11-04	53.080002	52.259998	51.759998	53.380001	16371700
2021-11-05	2021-11-05	52.150002	53.169998	52.070000	53.570000	17447500
2021-11-08	2021-11-08	53.360001	54.900002	52.849998	55.130001	20154600
2021-11-09	2021-11-09	55.294998	54.820000	54.200001	55.650002	12489000
2021-11-10	2021-11-10	53.910000	52.880001	52.020000	54.169998	14812400
2021-11-11	2021-11-11	53.459999	53.290001	53.200001	54.590000	13322000

Load Data & Select Ticker

Basic Analysis

Visualizations

Load Data & Select Ticker

```
stocks_df = {ticker: pd.read_csv(output_stock_dump_path / (ticker+'.csv'))
             for ticker in top_tickers2}
print("\n".join(list(stocks_df.keys())))
```

```
EBET
CAJ
STWD
```

```
#@markdown Enter the name of ticker you would like to visualize:
ticker = "CAJ" #@param {type:"string"}
#@markdown > **Note**: Choose from one of the tickers listed above this cell.

ticker = ticker.strip().upper()

# check if input is valid
if stocks_df.get(ticker) is None:
    raise ValueError('Please enter a valid Ticker value.')
```

Enter the name of ticker you would like to visualize:

ticker: "CAJ"

> **Note**: Choose from one of the tickers listed above this cell.

Visualizations

Date	Date	Open	Close	Low	High	Volume
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2021-10-18	2021-10-18	78.599998	75.800003	72.610001	79.300003	33053900
2021-10-19	2021-10-19	75.120003	76.430000	73.900002	78.180000	18720700
2021-10-20	2021-10-20	76.570000	75.650002	74.669998	77.519997	15739300
2021-10-21	2021-10-21	74.809998	75.110001	73.889999	75.949997	44450900
2021-10-22	2021-10-22	58.750000	55.139999	55.029999	60.779999	153827500
2021-10-25	2021-10-25	55.959999	54.500000	53.770000	56.150002	62506800
2021-10-26	2021-10-26	55.240002	55.389999	54.880001	57.180000	52905700
2021-10-27	2021-10-27	55.049999	52.020000	51.660000	55.230000	52581300
2021-10-28	2021-10-28	52.680000	54.389999	51.990002	54.959999	34748800
2021-10-29	2021-10-29	53.970001	52.580002	52.209999	53.990002	32465500
2021-11-01	2021-11-01	52.990002	53.980000	52.250000	54.110001	22666700
2021-11-02	2021-11-02	53.570000	52.200001	51.865002	53.660000	24120400
2021-11-03	2021-11-03	51.950001	52.939999	51.470001	52.970001	16319300
2021-11-04	2021-11-04	53.080002	52.259998	51.759998	53.380001	16371700
2021-11-05	2021-11-05	52.150002	53.169998	52.070000	53.570000	17447500
2021-11-08	2021-11-08	53.360001	54.900002	52.849998	55.130001	20154600
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2021-11-10	2021-11-10	53.910000	52.880001	52.020000	54.169998	14812400
2021-11-11	2021-11-11	53.459999	53.290001	53.200001	54.590000	13322000

Load Data & Select Ticker

Basic Analysis

Visualizations

Basic Analysis

```
# view top 5 rows of the ticker
print(f'Top 5 rows of {ticker}.\n')
df_to_visual=stocks_df.get(ticker)
df_to_visual.head(5)
```

Top 5 rows of SNAP.

	Date	Open	Close	Low	High	Volume
0	2021-10-15	76.809998	77.339996	75.870003	78.735001	20404200
1	2021-10-18	78.599998	75.800003	72.610001	79.300003	33053900
2	2021-10-19	75.120003	76.430000	73.900002	78.180000	18720700
3	2021-10-20	76.570000	75.650002	74.669998	77.519997	15739300
4	2021-10-21	74.809998	75.110001	73.889999	75.949997	44450900

```
df_to_visual.describe()
```

	Open	Close	Low	High	Volume
count	30.000000	30.000000	30.000000	30.000000	3.000000e+01
mean	75.869467	75.217333	73.629500	77.578334	1.101363e+07
std	16.336616	16.759297	16.028230	16.858242	1.443744e+07
min	53.099998	53.250000	52.570000	55.680000	1.406700e+06
25%	63.460001	62.985000	62.335000	63.809251	4.643800e+06
50%	68.405003	66.940002	65.520000	69.524998	6.680300e+06
75%	91.837502	92.164999	90.162498	95.193750	9.144125e+06
max	102.834999	103.629997	97.650002	104.050003	7.843390e+07

```
# Is there any missing vaue ?
df_to_visual.isnull().sum()
```

```
Date      0
Open      0
Close     0
Low       0
High      0
Volume    0
dtype: int64
```

```
# View data types
df_to_visual.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 30 entries, 0 to 29
Data columns (total 6 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   Date    30 non-null     object
 1   Open    30 non-null     float64
 2   Close   30 non-null     float64
 3   Low     30 non-null     float64
 4   High    30 non-null     float64
 5   Volume  30 non-null     int64
dtypes: float64(4), int64(1), object(1)
```

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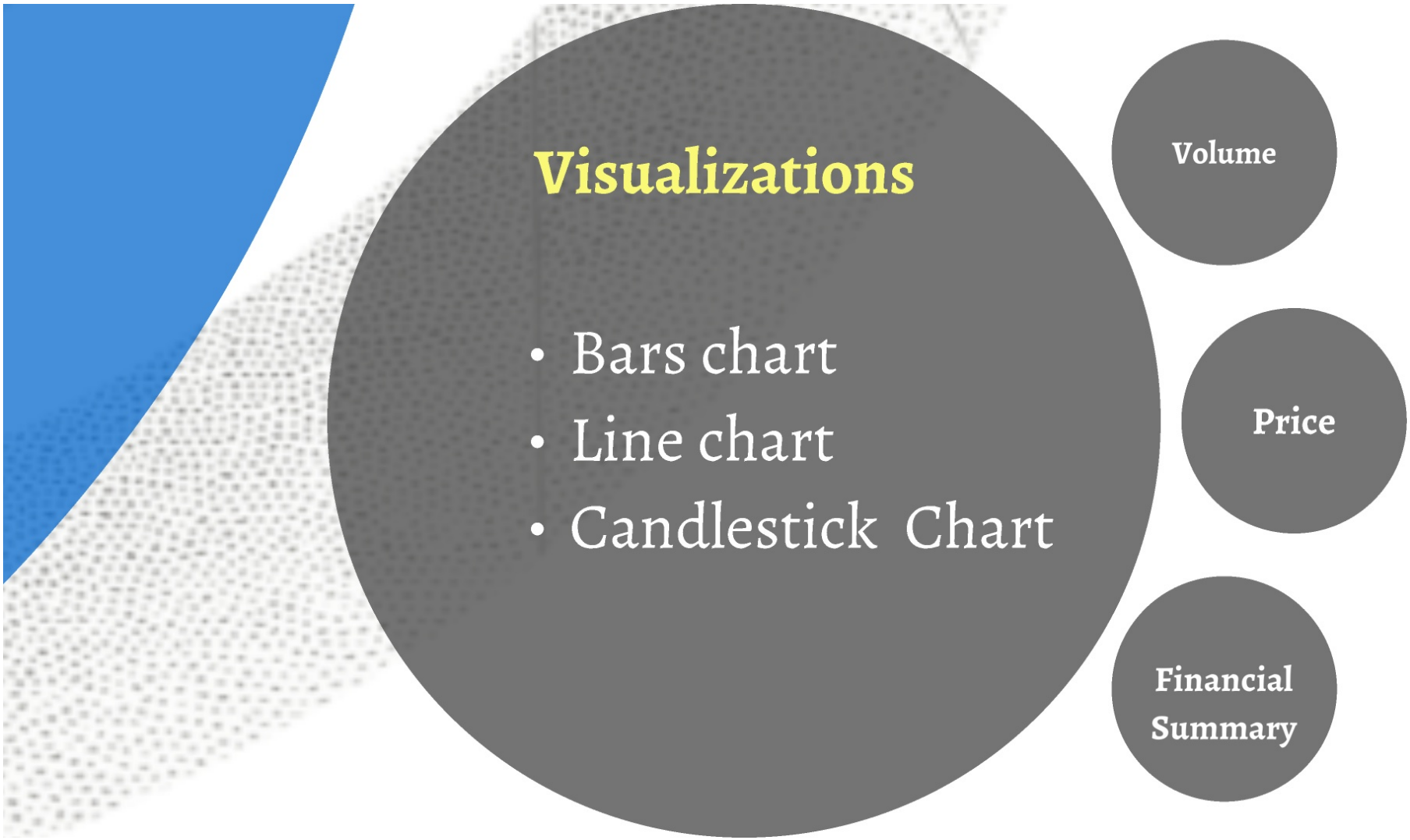
2021-11-02	2021-11-02	53.570000	52.200001	51.865002	53.660000	24120400
2021-11-03	2021-11-03	51.950001	52.939999	51.470001	52.970001	16319300
2021-11-04	2021-11-04	53.080002	52.259998	51.759998	53.380001	16371700
2021-11-05	2021-11-05	52.150002	53.169998	52.070000	53.570000	17447500
2021-11-08	2021-11-08	53.360001	54.900002	52.849998	55.130001	20154600
2021-11-09	2021-11-09	55.294998	54.820000	54.200001	55.650002	12489000
2021-11-10	2021-11-10	53.910000	52.880001	52.020000	54.169998	14812400
2021-11-11	2021-11-11	53.459999	53.290001	53.200001	54.590000	13322000

Load Data & Select Ticker

Basic Analysis

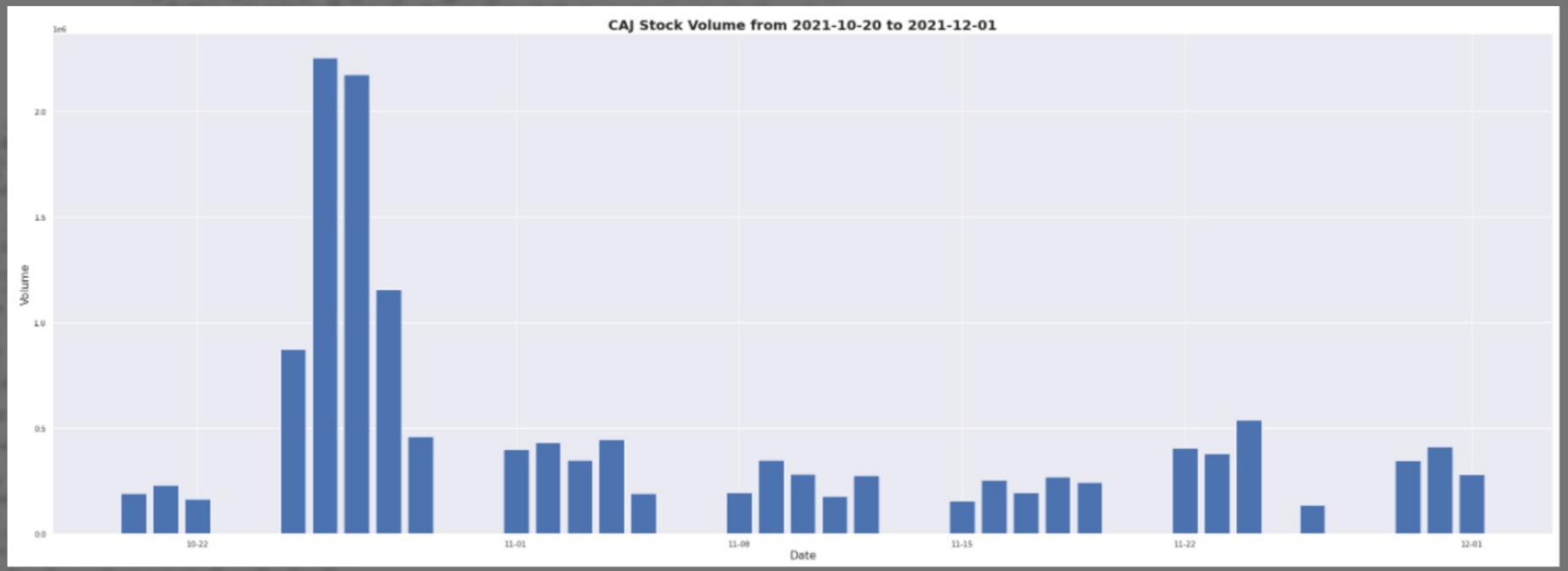
Visualizations

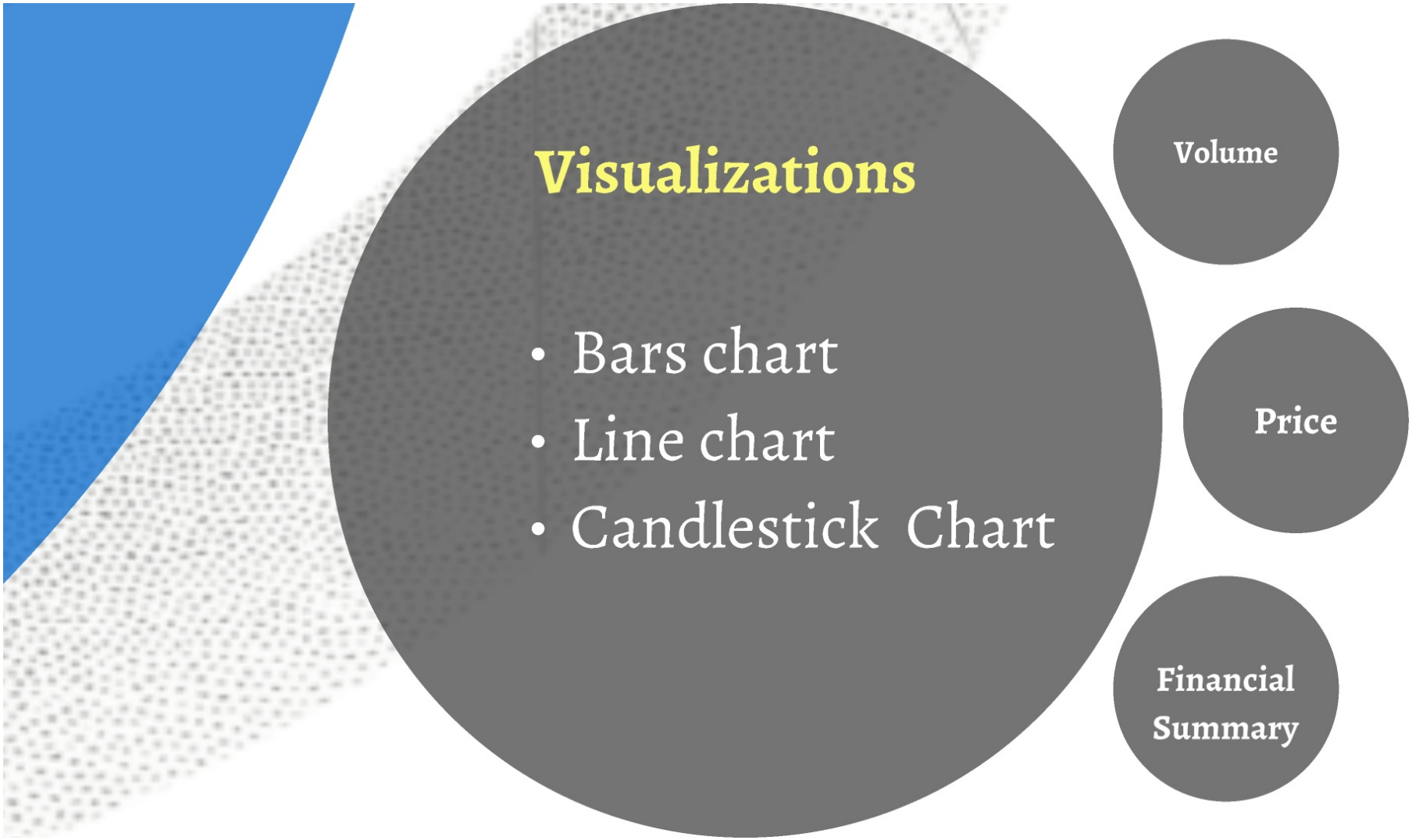

Visualizations
• Bars chart
• Line chart
• Candlestick Chart
Volume
Price
Financial Summary

Volume Vs Time

```
# Update date format
import matplotlib.dates as mdates
myFmt = mdates.DateFormatter('%m-%d')
#X axis --> Date
#Y axis --> Volume traded that day
#plt --> imported matplotlib.pyplot as plt
#when we plot a graph using plt, we implicitly create a Figure instance (metaphorically, like a paper
on which we can draw)
#and an Axes inside a Figure object
#add_axes - A parameter of Axes class that has a 4-length sequence of [left, bottom, width, height]
quantities.
#ax.bar() - The bar() function makes a bar plot with the bound rectangle of a particular size w.r.t (x,
height, width, bottom, align)
#plt.xlabel/ylabel - Provides labels to the x and y axes
#plt.title - Provides the title to the figure
#plt.show() - The Plot viewer window is invoked by the this function

current_date = str(df_to_visual['Date'].max().date())
days_before = str(df_to_visual['Date'].min().date())
fig = plt.figure(figsize=(30,10))
ax = fig.add_axes([0,0,1,1])
volum = df_to_visual['Volume']
days = df_to_visual['Date']
ax.bar(days,volum)
ax.xaxis.set_major_formatter(myFmt)
plt.xlabel("Date", fontdict=axis_dict)
plt.ylabel("Volume", fontdict=axis_dict)
plt.title(f"{ticker} Stock Volume from "+ days_before +" to " + current_date,
          fontdict=title_dict)
plt.show()
```


CAJ Stock Volume from 2021-10-20 to 2021-12-01
1e6
2.0
1.5
1.0
0.5
0.0
Volume
10-22
11-01
11-08
11-15
11-22
12-01
Date


Visualizations
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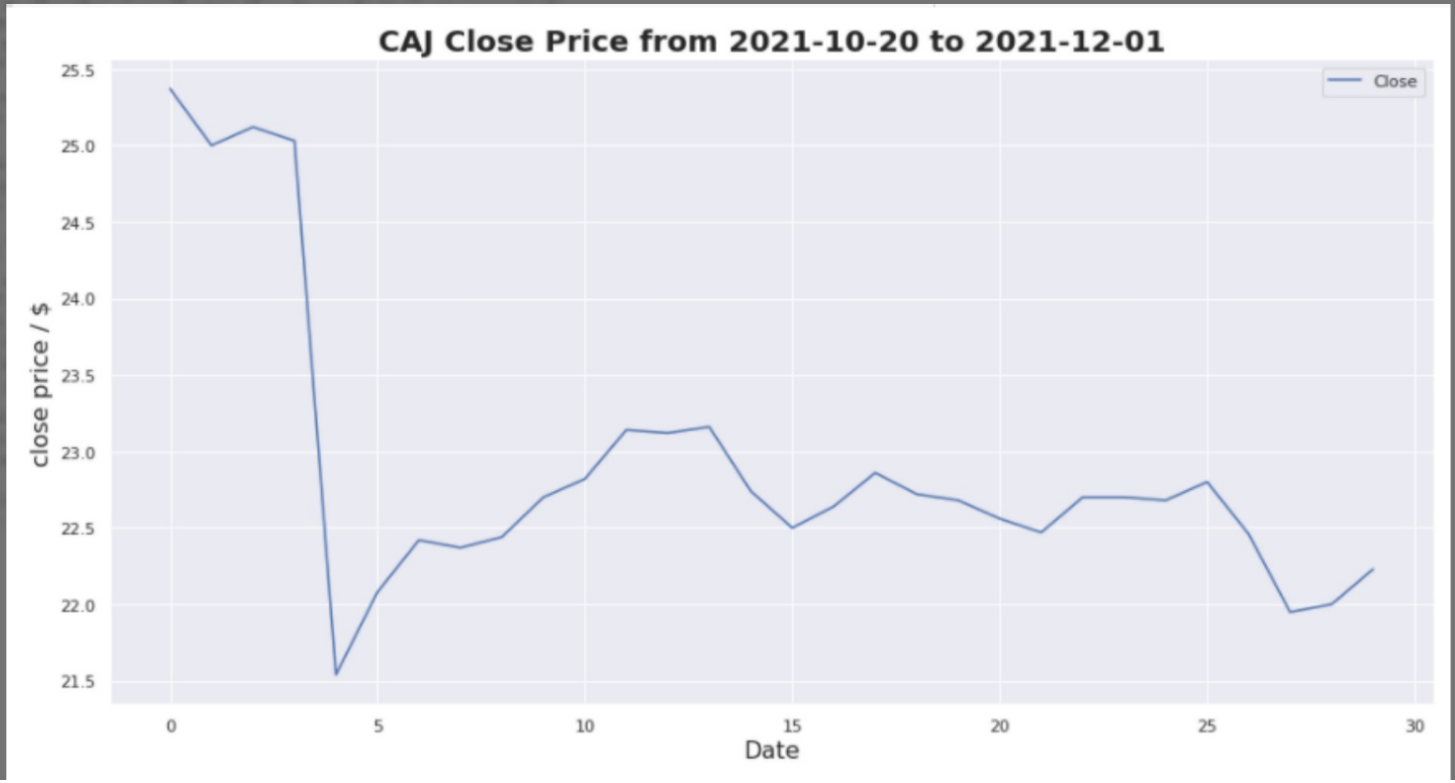
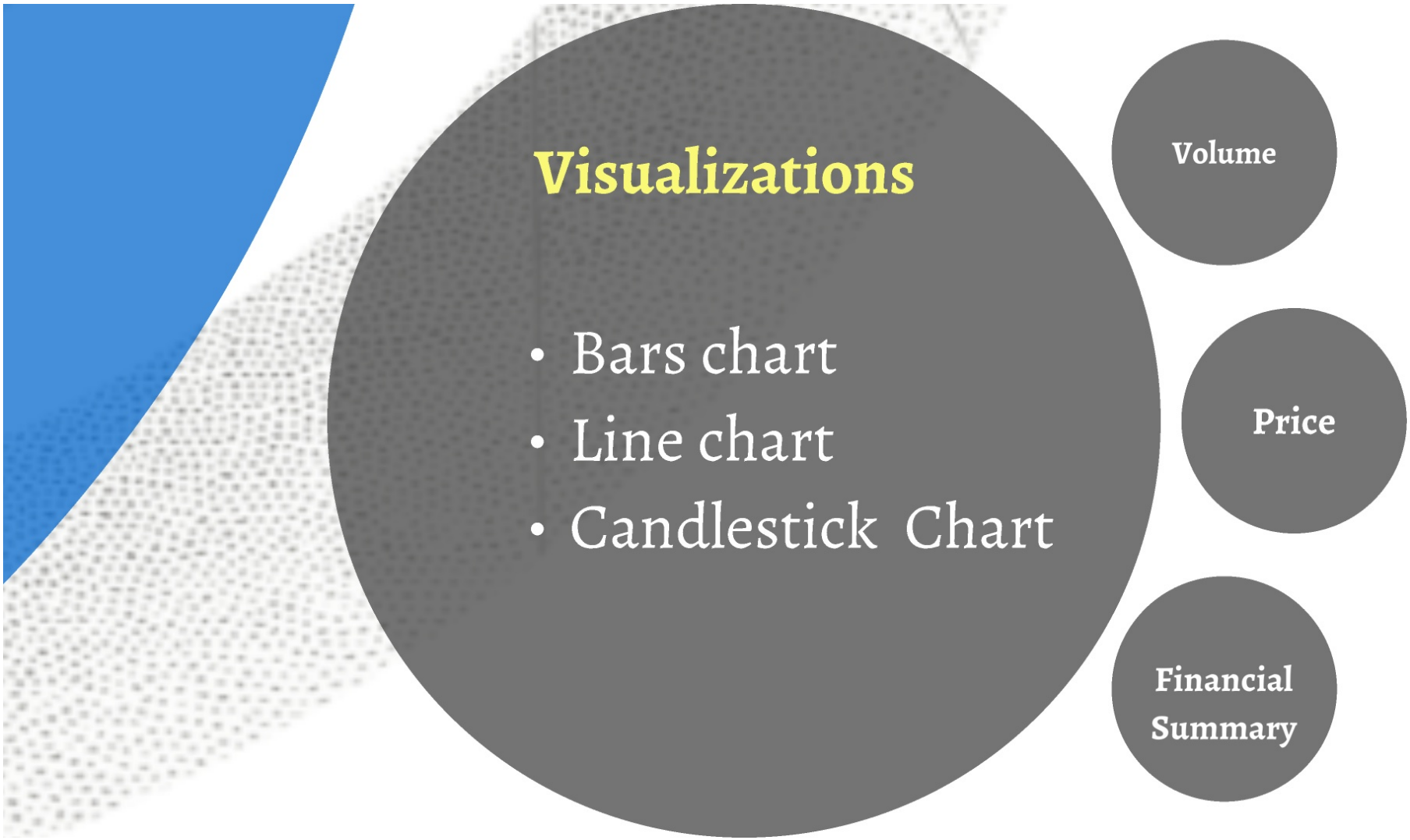
Price Vs Time

```
df_to_visual[['Close']].plot(label=ticker,figsize=(16,8),title='ClosePrice')
plt.xlabel("Date", fontdict={'size': 16})
plt.ylabel("close price / $", fontdict={'size': 16})
plt.title(f"{ticker} Close Price from "+ days_before +" to " + current_date,
          fontdict={'size': 20, 'weight': 'bold'})
plt.show()
```




Visualizations
• Bars chart
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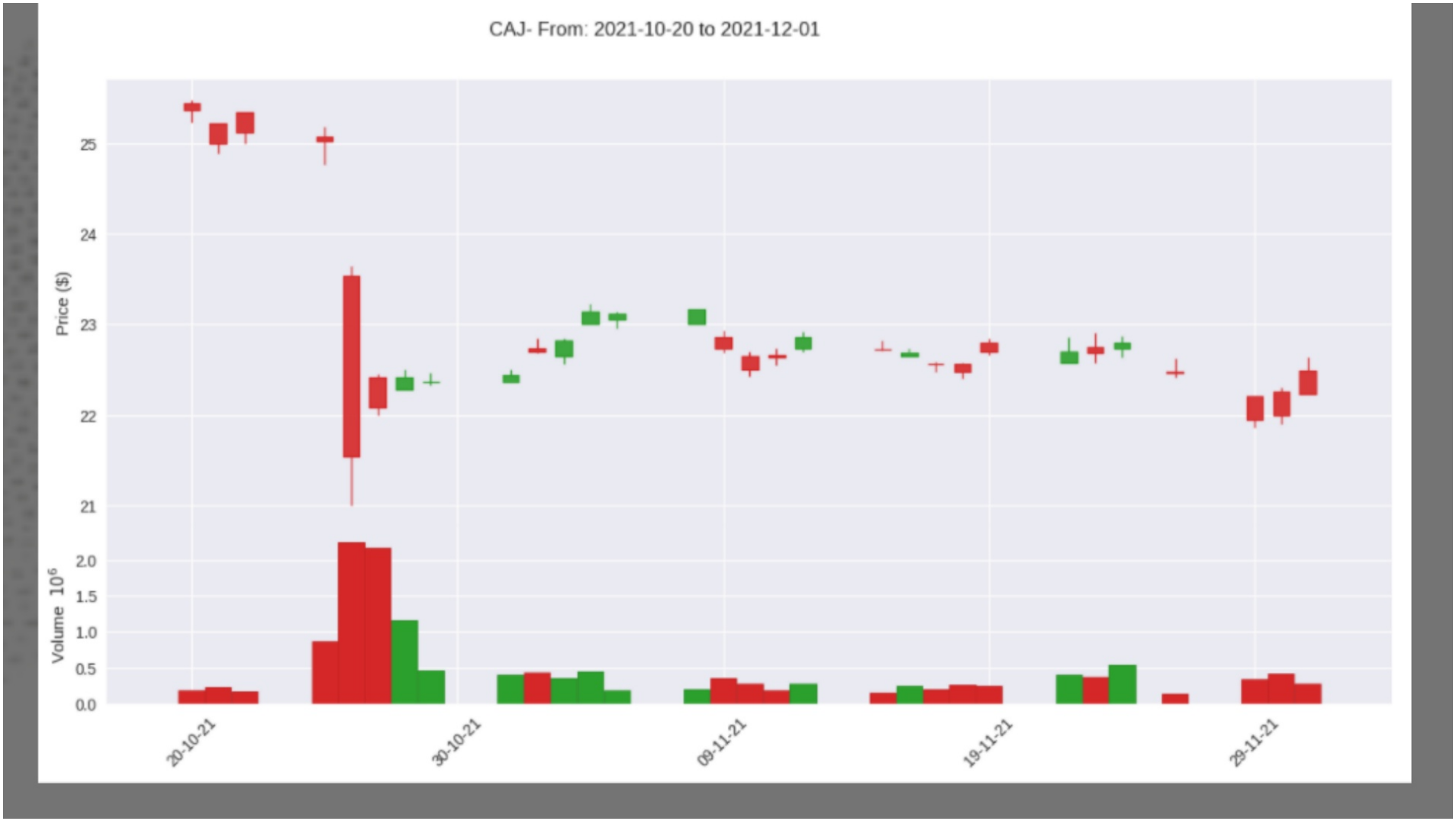
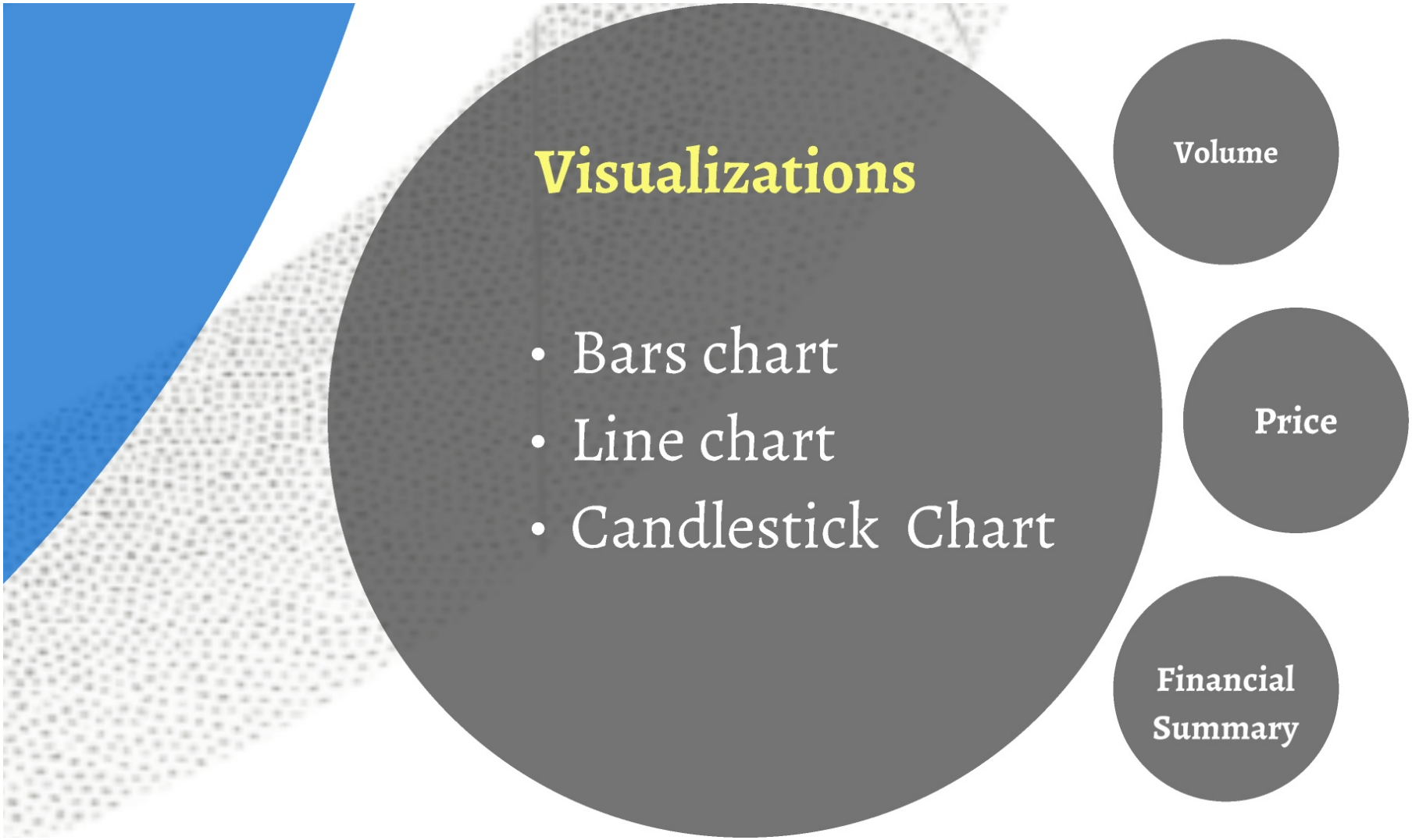
Financial Summary

```
# plotting the data
# mplfinance library -
# Mplfinance is a dedicated data visualization package from matlplotlib for visualizing financial data.
# It enables visualization of financial data in the form of different types of charts
# like - Candlestick chart, Renko Chart, OHLC chart, Point and Figure chart etc. with very few lines of
code.
# mpf.plot - We can create a chart by simply using the plot function. It defaults to create an OHLC
chart
#            we create a candlestick by adding an extra argument (type='candle') to the plot function.
#            volume=True: adds the trading volume
# mpf.make_marketcolors - Controls the up/down colors of candlesticks, and volume.
#                         Each of the keywords edge, wick, ohlc, and volume can have the following
values:
#                         1. Any single matplotlib color
#                         2. A dict specifying separate colors for 'up' and a 'down'
#                         3. The str 'inherit' indicates that the keyword (edge, wick, ohlc, volume)
should use the same colors
#                            as were specified by the keywords up and down.

import mplfinance as mpf
df_to_visual.index = pd.to_datetime(df_to_visual['Date'])
freq = 'D'
logic = {'Open'  : 'first',
         'High'  : 'max',
         'Low'   : 'min',
         'Close' : 'last',
         'Volume': 'sum'}

dayly_data = df_to_visual.resample(freq).apply(logic)
mc = mpf.make_marketcolors(
    up='tab:green',down='tab:red',
    edge='inherit',
    wick='inherit',
    volume='inherit'
)
style = mpf.make_mpf_style(base_mpl_style="seaborn", marketcolors=mc)
mpf.plot(dayly_data,
         type='candle',
         volume=True,
         style=style,
         title=ticker+'- From: '+ days_before +" to " + current_date ,
         ylabel='Price ($)',
         datetime_format='%d-%m-%y',figsize=(16,8))
```


CAJ- From: 2021-10-20 to 2021-12-01
Price ($)
25
24
23
22
21
Volume 10^6
2.0
1.5
1.0
0.5
0.0
20-10-21
30-10-21
09-11-21
19-11-21
29-11-21


Visualizations
• Bars chart
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Volume
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Visualizations

Date	Date	Open	Close	Low	High	Volume
2021-10-15	2021-10-15	76.809998	77.339996	75.870003	78.735001	20404200
2021-10-18	2021-10-18	78.599998	75.800003	72.610001	79.300003	33053900
2021-10-19	2021-10-19	75.120003	76.430000	73.900002	78.180000	18720700
2021-10-20	2021-10-20	76.570000	75.650002	74.669998	77.519997	15739300
2021-10-21	2021-10-21	74.809998	75.110001	73.889999	75.949997	44450900
2021-10-22	2021-10-22	58.750000	55.139999	55.029999	60.779999	153827500
2021-10-25	2021-10-25	55.959999	54.500000	53.770000	56.150002	62506800
2021-10-26	2021-10-26	55.240002	55.389999	54.880001	57.180000	52905700
2021-10-27	2021-10-27	55.049999	52.020000	51.660000	55.230000	52581300
2021-10-28	2021-10-28	52.680000	54.389999	51.990002	54.959999	34748800
2021-10-29	2021-10-29	53.970001	52.580002	52.209999	53.990002	32465500
2021-11-01	2021-11-01	52.990002	53.980000	52.250000	54.110001	22666700
2021-11-02	2021-11-02	53.570000	52.200001	51.865002	53.660000	24120400
2021-11-03	2021-11-03	51.950001	52.939999	51.470001	52.970001	16319300
2021-11-04	2021-11-04	53.080002	52.259998	51.759998	53.380001	16371700
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2021-11-08	2021-11-08	53.360001	54.900002	52.849998	55.130001	20154600
2021-11-09	2021-11-09	55.294998	54.820000	54.200001	55.650002	12489000
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Load Data & Select Ticker

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Simple Stocks Tracker

INTRODUCTION TO AI DEVELOPMENT

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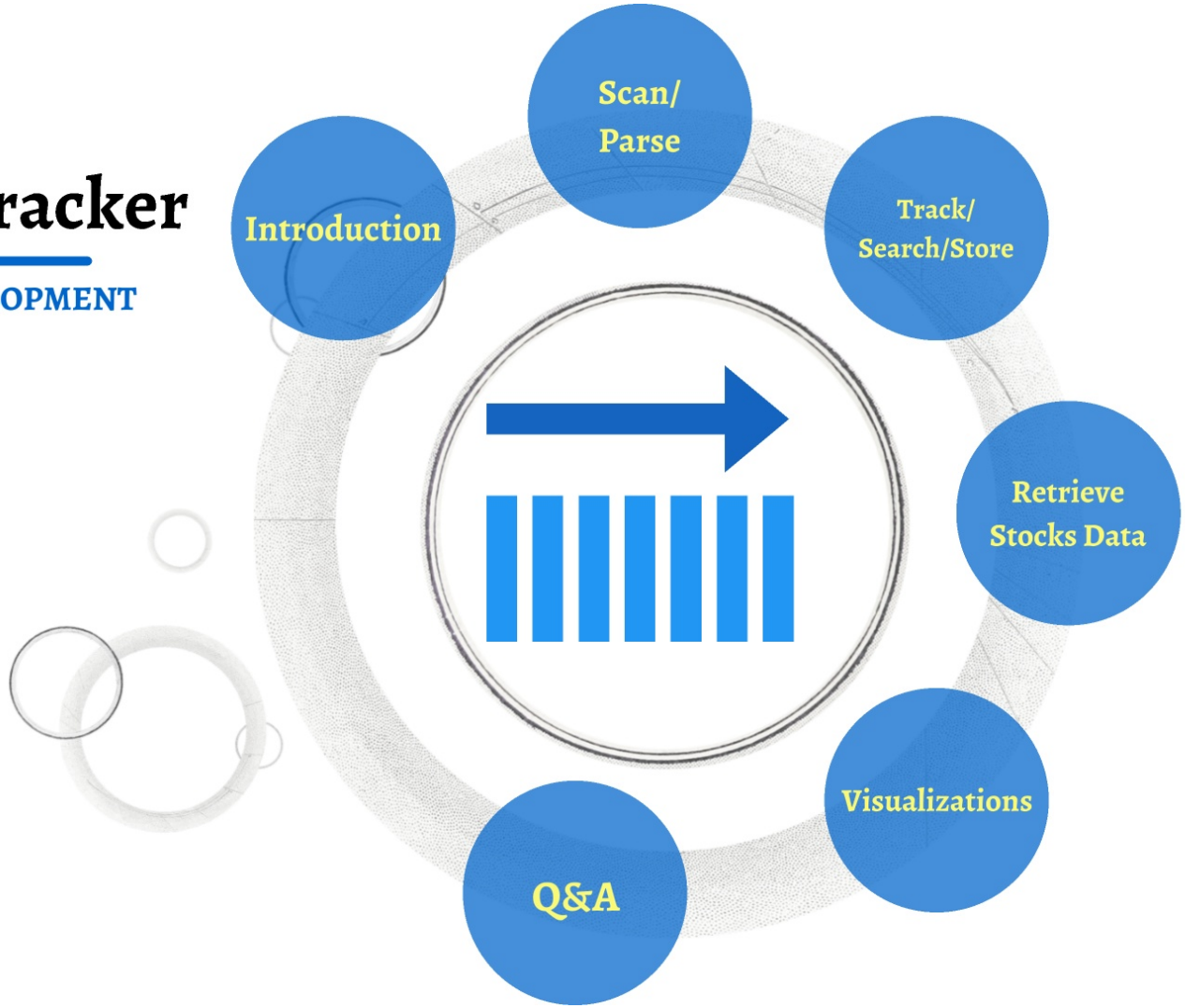

Q & A

Source Code:

https://colab.research.google.com/drive/1SukqnEIWs9oRBLht_tB8ZEzp02QODIt3#scrollTo=qR_UVBUQr3WD

Simple Stocks Tracker

INTRODUCTION TO AI DEVELOPMENT

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