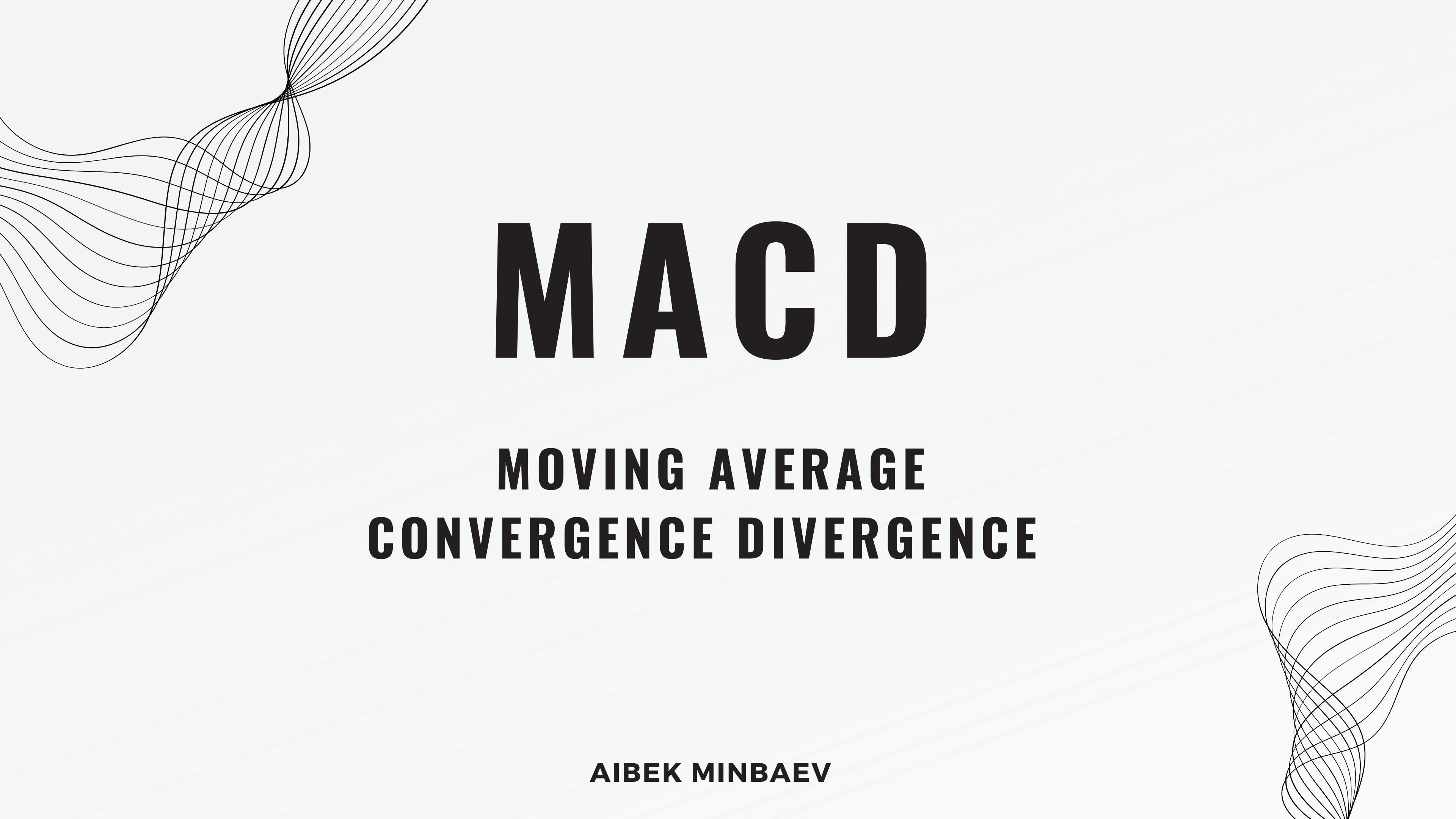


LET'S RECALL MY STRATEGY

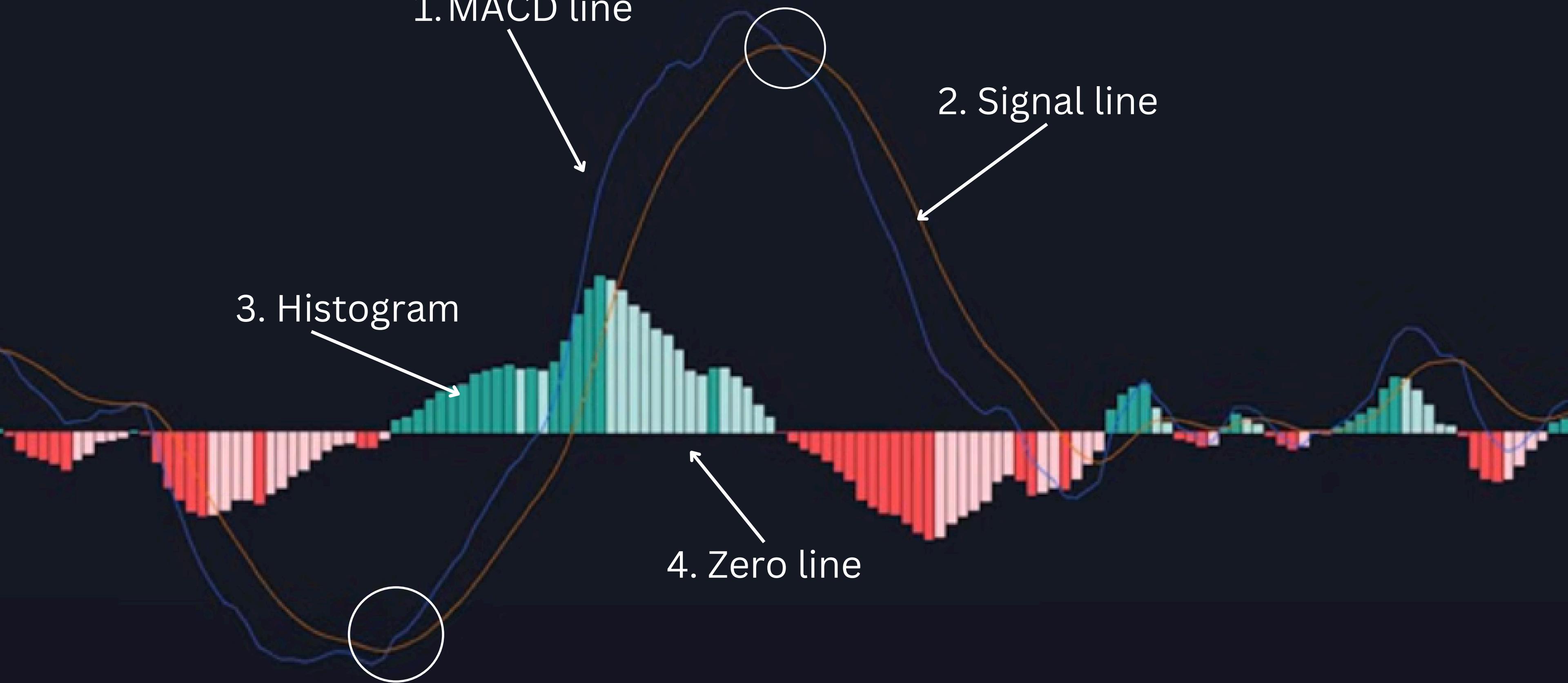
AIBEK MINBAEV



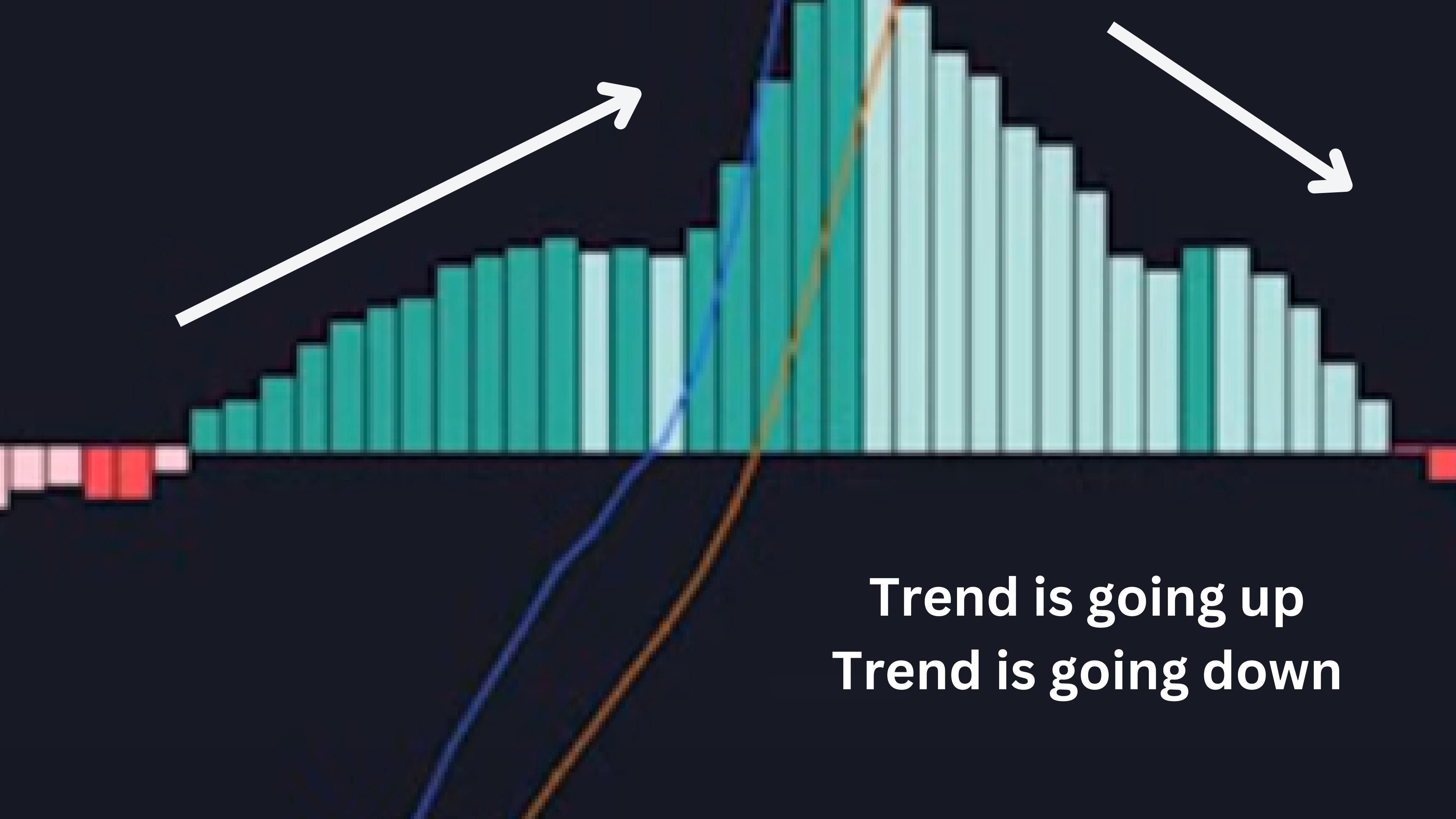
MACD

MOVING AVERAGE CONVERGENCE DIVERGENCE

AIBEK MINBAEV







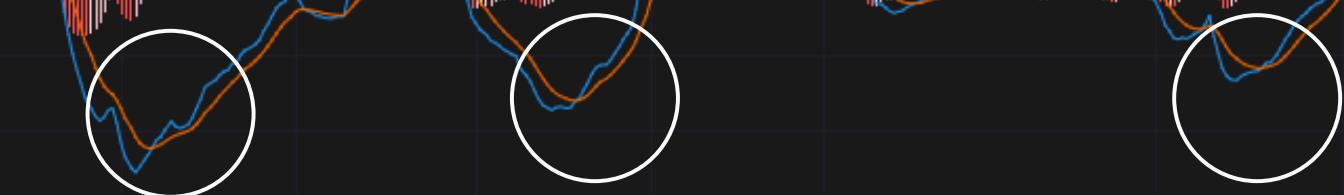
30m | Indicators

TESLA INC · 30 · SMART 193.71
EMA 200 close 0 SMA 9 193.79

200 day moving average

False buy signals from MACD

MACD 12 26 close 9 -0.31 -0.02 0.28



9 14 17 24 Feb '24 02:30 Mar 6 9 14 17 22 26 Apr 5 10 13 18 23 26 May 4

LA INC · 30 · SMART 185.26

200 close 0 SMA 9 175.96



What if the chart loses momentum ? (price doesn't change a lot)



Support & Resistance can be a solution



```

import yfinance as yf
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from scipy.signal import argrelextrema

ticker = 'AAPL'
data = yf.download(ticker, start='2010-01-01', end='2024-01-01')

data['12d_EMA'] = data['Close'].ewm(span=12, adjust=False).mean()
data['26d_EMA'] = data['Close'].ewm(span=26, adjust=False).mean()
data['MACD'] = data['12d_EMA'] - data['26d_EMA']
data['Signal'] = data['MACD'].ewm(span=9, adjust=False).mean()

data['200d_SMA'] = data['Close'].rolling(window=200).mean()

data['Min'] = data.iloc[argrelextrema(data['Close'].values, np.less_equal, order=5)[0]]['Close']
data['Max'] = data.iloc[argrelextrema(data['Close'].values, np.greater_equal, order=5)[0]]['Close']
data['Support'] = data['Min'].fillna(method='bfill')
data['Resistance'] = data['Max'].fillna(method='bfill')

data['Buy_Signal'] = np.where((data['MACD'] > data['Signal']) &
                             (data['Close'] > data['200d_SMA']) &
                             (data['Close'] <= data['Support']*1.01), 1, 0)
data['Sell_Signal'] = np.where((data['MACD'] < data['Signal']) &
                             (data['Close'] < data['200d_SMA']) &
                             (data['Close'] >= data['Resistance']*0.99), -1, 0)

data['Signal'] = data['Buy_Signal'] + data['Sell_Signal']

strategy = pd.DataFrame(index=data.index)
strategy['Close'] = data['Close']
strategy['Signal'] = data['Signal']

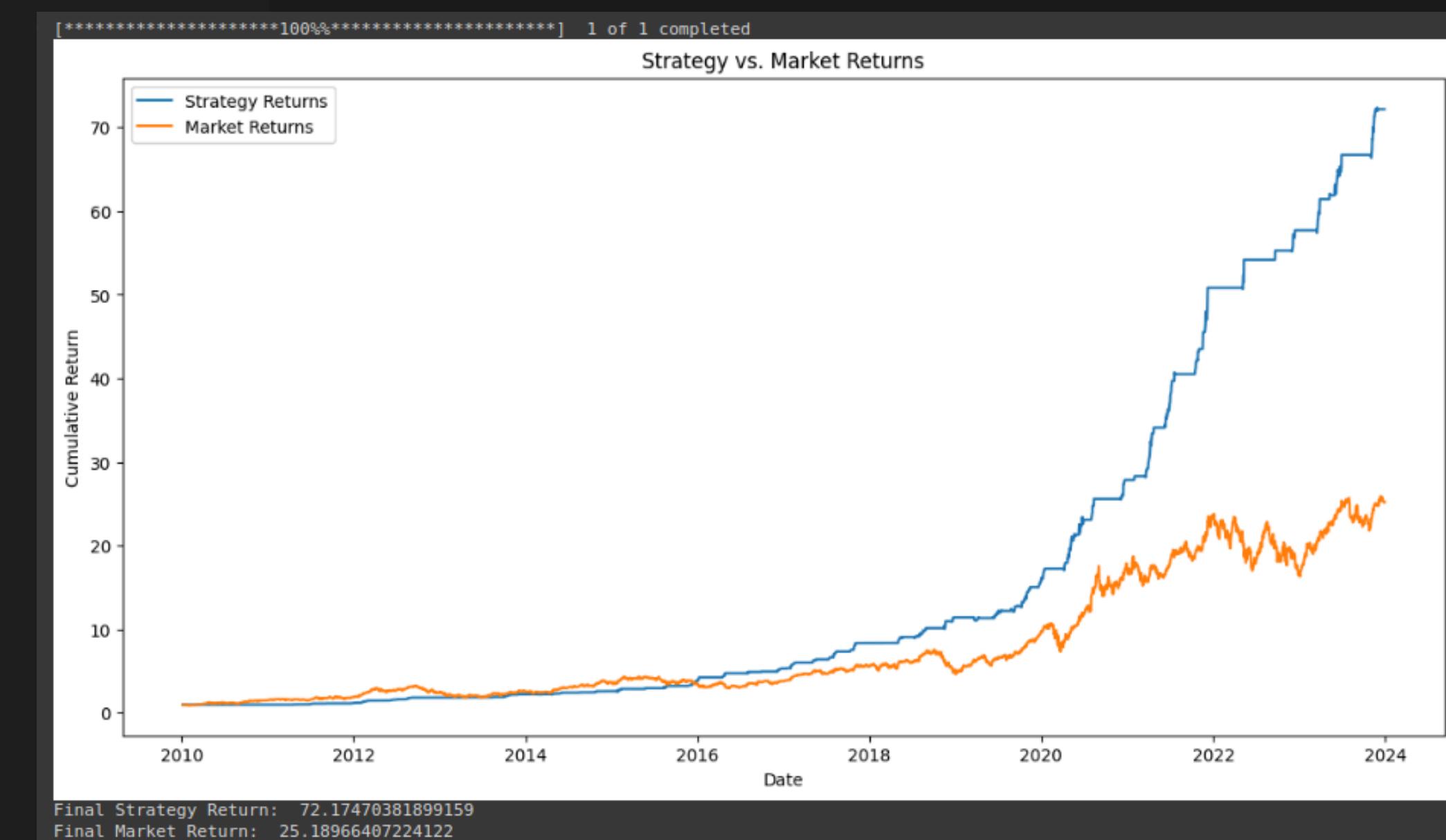
strategy['Daily_Return'] = strategy['Close'].pct_change()
strategy['Strategy_Return'] = strategy['Daily_Return'] * strategy['Signal'].shift(1)

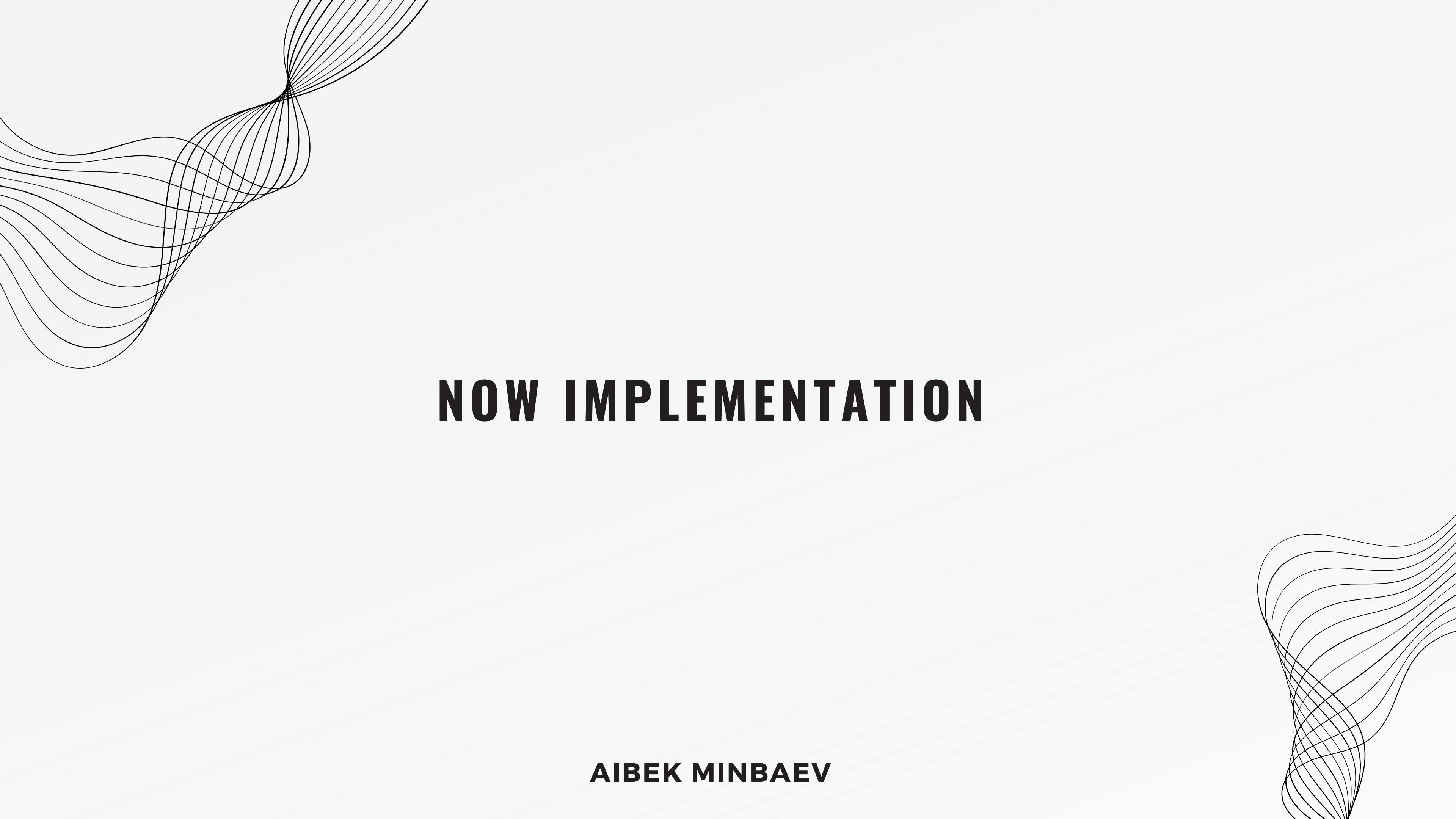
strategy['Cumulative_Strategy_Return'] = (1 + strategy['Strategy_Return']).cumprod()
strategy['Cumulative_Market_Return'] = (1 + strategy['Daily_Return']).cumprod()

plt.figure(figsize=(14, 7))
plt.plot(strategy['Cumulative_Strategy_Return'], label='Strategy Returns')
plt.plot(strategy['Cumulative_Market_Return'], label='Market Returns')
plt.title('Strategy vs. Market Returns')
plt.xlabel('Date')
plt.ylabel('Cumulative Return')
plt.legend()
plt.show()

print('Final Strategy Return: ', strategy['Cumulative_Strategy_Return'][-1])
print('Final Market Return: ', strategy['Cumulative_Market_Return'][-1])

```





NOW IMPLEMENTATION

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