



ADSP32019 Winter2024



Real-Time Penny Stock Pump & Dump Trading Strategy

Group2
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Project Objective

Manipulate retail investors' preferences to profit from penny stock hype

Background: Investors often make decisions based on subjective judgments

Hypothesis: Fake news can influence retail investors' attitudes and their decisions

Objective: Profit by manipulating expectations to influence stock prices



Methodology

01.

Stock Market Scanning: Utilize the `pyfinviz` library for real-time scanning of target penny stocks in a user-friendly class format

02.

Fake News Generation: Leverage the OpenAI API to create fake insider news on hypothetical scenarios like medical or technological advancements

03.

Fake News Release: Disseminate news stories via social media platforms

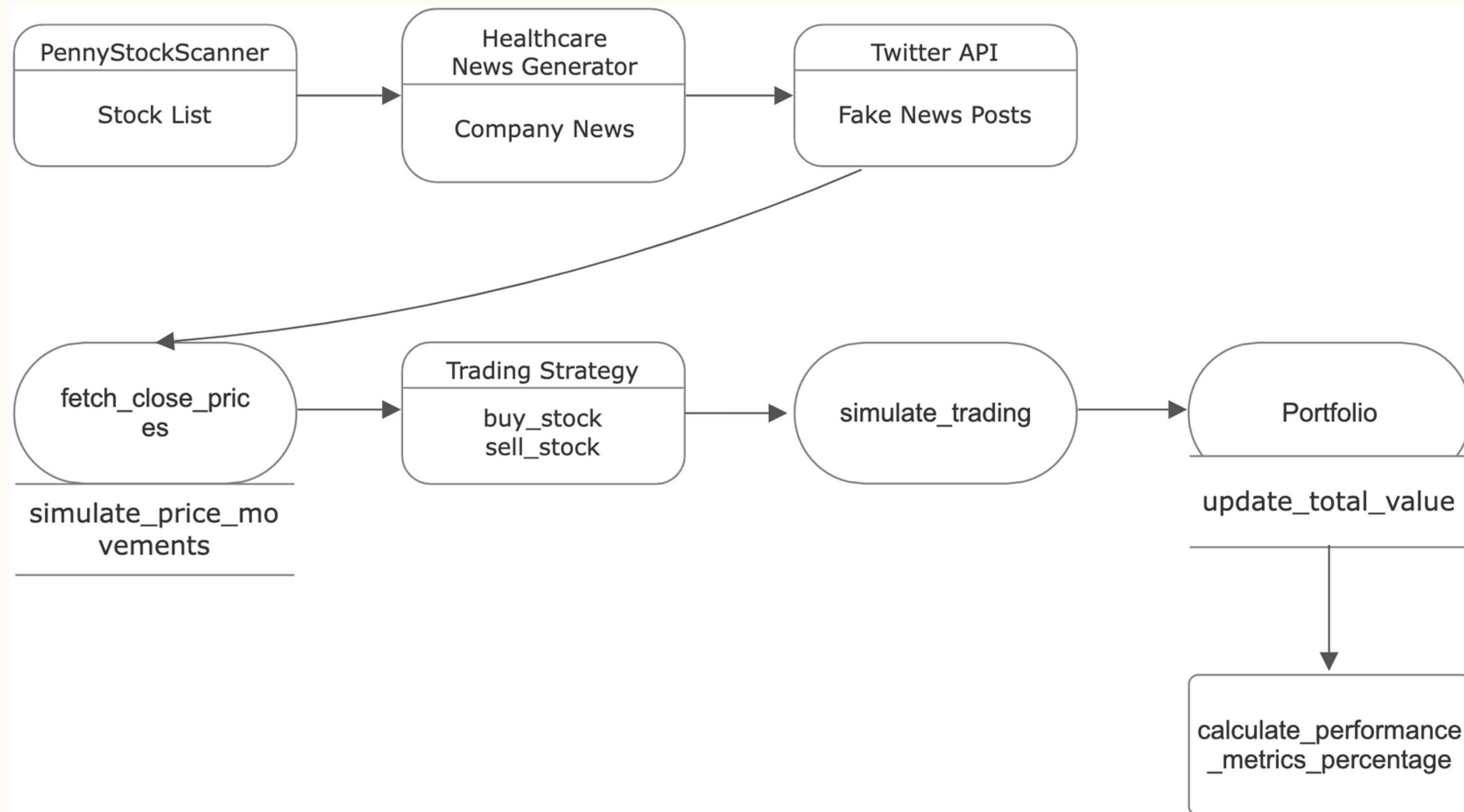
04.

Investor Decision Monitoring: Utilize the `yfinance` library for real-time monitoring of stock prices

05.

Trading Strategy: Implement a pump and dump strategy based on market dynamics, including mass buying on >3% increase, selling at a 50% return, with a -10% stop loss

Software Architecture Design



00.Foundation/Preparation

- **Installed OpenAI API to generate false insider information & hypothetical news**
- **Used pyfinviz, pandas, numpy, openai, os, yfinance, matplotlib.pyplot, and seaborn for data analysis, visualization, and interaction with the OpenAI API**

```
[ ] pip install openai==0.28

Collecting openai==0.28
  Downloading openai-0.28.0-py3-none-any.whl (76 kB)
    76.5/76.5 kB 2.2 MB/s eta 0:00:00
Requirement already satisfied: requests>=2.20 in /usr/local/lib/python3.10/dist-packages (from openai==0.28) (2.31.0)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-packages (from openai==0.28) (4.66.2)
Requirement already satisfied: aiohttp in /usr/local/lib/python3.10/dist-packages (from openai==0.28) (3.9.3)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests>=2.20->openai==0.28) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.20->openai==0.28) (3.6)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.20->openai==0.28) (2.0.7)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.20->openai==0.28) (2024.2.2)
Requirement already satisfied: aiosignal>=1.1.2 in /usr/local/lib/python3.10/dist-packages (from aiohttp->openai==0.28) (1.3.1)
Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.10/dist-packages (from aiohttp->openai==0.28) (23.2.0)
Requirement already satisfied: frozenlist>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from aiohttp->openai==0.28) (1.4.1)
Requirement already satisfied: multidict<7.0,>=4.5 in /usr/local/lib/python3.10/dist-packages (from aiohttp->openai==0.28) (6.0.5)
Requirement already satisfied: yarl<2.0,>=1.0 in /usr/local/lib/python3.10/dist-packages (from aiohttp->openai==0.28) (1.9.4)
Requirement already satisfied: asyncio-timeout<5.0,>=4.0 in /usr/local/lib/python3.10/dist-packages (from aiohttp->openai==0.28) (4.0.3)
Installing collected packages: openai
Successfully installed openai-0.28.0
```

```
▶ from pyfinviz.screener import Screener
  from pyfinviz.quote import Quote
  from pyfinviz.insider import Insider
  import pandas as pd
  import numpy as np
  import openai
  import os
  import yfinance as yf
  import matplotlib.pyplot as plt
  import seaborn as sns
  sns.set()
```

01. Real time PennyStockScanner

- Created **PennyStockScanner class for scanning target penny stocks**
- Utilize **finviz API with custom class for real-time stock scanning, fetching prices & company names**

The screenshot shows the finviz website interface. At the top, there is a search bar with the placeholder "Search ticker, company or profile" and a magnifying glass icon. Below the search bar is a navigation menu with links: Home, News, Screener, Maps, Groups, Portfolio, Insider, Futures, Forex, Crypto, Backtests, Elite. The "Screener" link is highlighted. To the right of the menu, it says "Tue FEB 27 2024 11:16 AM ET" and has links for Theme, Help, Login, and Register.

Below the menu is a search form with dropdowns for "Order by" (set to "EPS growth next year"), "Signal" (set to "None (all stocks)"), and "Tickers". There are also "Filters" and "Reset (9)" buttons. The filters section is expanded, showing various criteria: Exchange (Any), Index (Any), Sector (Healthcare), Industry (Any), Country (Any), Market Cap (-Micro (under \$300m)), Dividend Yield (Any), Float Short (Under 5%), Analyst Recom. (Any), Option/Short (Any), Earnings Date (Any), Average Volume (Over 100K), Relative Volume (Any), Current Volume (Over 100K), Trades (Elite only), Price (Under \$5), Target Price (Any), IPO Date (Any), Shares Outstanding (Any), and Float (Any). A "Reset (9)" button is located at the bottom right of the filters area.

Below the filters is a table header with columns: No., Ticker, Company, Sector, Industry, Country, Market Cap, P/E, Price, Change, and Volume. The table lists 20 companies, each with its ticker, name, sector, industry, country, market cap, P/E ratio, price, percentage change, and volume. The companies listed are:

No.	Ticker	Company	Sector	Industry	Country	Market Cap	P/E	Price	Change	Volume
1	KPRX	Kiora Pharmaceuticals Inc	Healthcare	Biotechnology	USA	5.55M	-	0.72	3.95%	192,744
2	CGEN	Compugen Ltd	Healthcare	Biotechnology	Israel	247.77M	-	2.81	9.57%	724,020
3	ACHL	Achilles Therapeutics Plc ADR	Healthcare	Biotechnology	United Kingdom	57.09M	-	1.40	2.94%	851,898
4	THAR	Tharimmune Inc	Healthcare	Biotechnology	USA	4.41M	-	0.38	-0.45%	180,394
5	FIXX	Homology Medicines Inc	Healthcare	Biotechnology	USA	52.90M	-	0.91	2.03%	123,638
6	GLMD	Galmed Pharmaceuticals Ltd	Healthcare	Biotechnology	Israel	1.41M	-	0.37	0.46%	135,528
7	VINC	Vincerx Pharma Inc	Healthcare	Biotechnology	USA	80.39M	-	3.76	-2.08%	145,106
8	NKTR	Nektar Therapeutics	Healthcare	Biotechnology	USA	135.97M	-	0.71	6.38%	356,286
9	KNTE	Kinnate Biopharma Inc	Healthcare	Biotechnology	USA	116.51M	-	2.47	1.03%	538,900
10	FEMY	Femasys Inc	Healthcare	Medical Instruments & Supplies	USA	29.66M	-	1.37	-3.52%	136,662
11	PHIO	Phio Pharmaceuticals Corp	Healthcare	Biotechnology	USA	2.27M	-	0.93	0.76%	141,156
12	CDXS	Codexis Inc.	Healthcare	Biotechnology	USA	284.87M	-	4.08	27.48%	977,340
13	IMAB	I-Mab ADR	Healthcare	Biotechnology	China	150.75M	-	1.84	5.79%	255,332
14	MYO	Myomo Inc	Healthcare	Medical Devices	USA	77.97M	-	2.94	6.91%	155,940
15	ATHA	Athira Pharma Inc	Healthcare	Biotechnology	USA	148.34M	-	3.87	-1.02%	191,064
16	NGM	Ngm Biopharmaceuticals Inc	Healthcare	Biotechnology	USA	126.56M	-	1.53	0.33%	1,894,454
17	CYBN	Cybin Inc	Healthcare	Biotechnology	Canada	142.35M	-	0.34	-2.30%	1,022,415
18	CLNN	Clene Inc	Healthcare	Biotechnology	USA	54.58M	-	0.43	-0.38%	278,585
19	AKLI	Akili Inc	Healthcare	Health Information Services	USA	32.12M	-	0.41	-9.33%	4,382,946
20	ALGS	Aligos Therapeutics Inc	Healthcare	Biotechnology	USA	72.72M	-	0.93	2.20%	296,728

At the bottom of the table, there is a note: "Filters: cap:microunder fa_curratio:o2 fa_epsyoy1:o10 fa_quickratio:o2 sec:healthcare sh_avg...".

```
scanner = PennyStockScanner()
scanner.scan_stocks()

company_names_dict = scanner.get_company_names()

for ticker, name in company_names_dict.items():
    print(f"{ticker}: {name}")

ABUS: Arbutus Biopharma Corp
ACIU: AC Immune SA
ADAP: Adaptimmune Therapeutics Plc ADR
ADVM: Adverum Biotechnologies Inc
AMRN: Amarin Corp ADR
AMWL: American Well Corporation
ATAI: ATAI Life Sciences N.V.
BVS: Bioventus Inc
CATX: Perspective Therapeutics Inc
CERS: Cerus Corp.
CRON: Cronos Group Inc
CVAC: CureVac N.V.
CYH: Community Health Systems, Inc.
IVVD: Invivid Inc
LAB: Standard BioTools Inc
LIAN: LianBio ADR
MPLN: MultiPlan Corp
MREO: Mereo Biopharma Group Plc ADR
MXCT: MaxCyte Inc
NUVB: Nuvation Bio Inc
```

02. HealthcareNewsGenerator

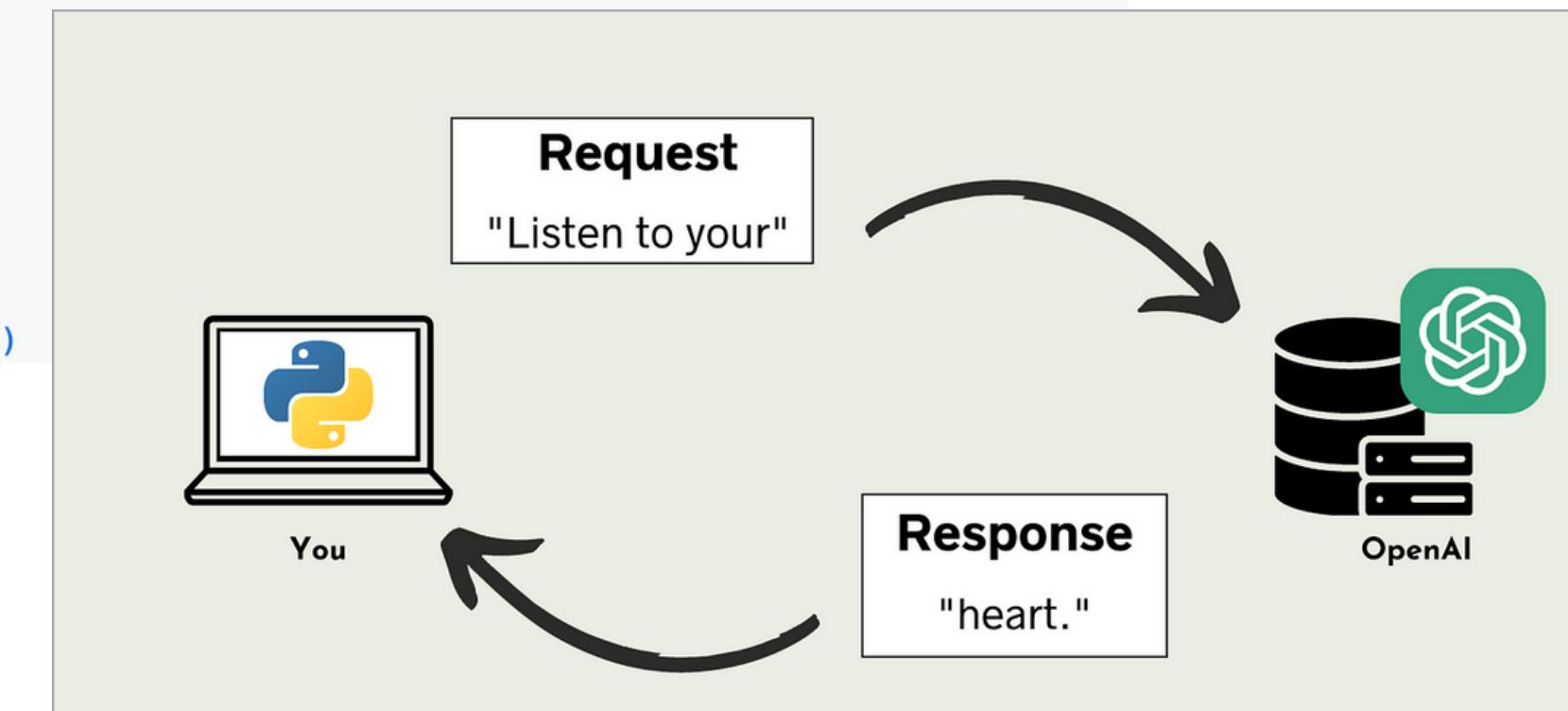
- **Utilizing OpenAI's GPT-3.5-turbo model for generating hypothetical news in real time**

```
def HealthcareNewsGenerator(companys):
    openai.api_key = ""

    for company_name in company_names:
        messages = [
            {"role": "system", "content": "You are a news reporter that can generate exciting news in the health care industry as an insider."},
            {"role": "user", "content": f"Write a short hypothesis Twitter post or insider news involving the following company: {company_name}. Which is a healthcare company, for example, the story can contain new discovery of drugs that cure cancer, or discover new technology that detects diabetes etc. These stories are for educational purposes only, not real news."}
        ]

        completion = openai.ChatCompletion.create(
            model="gpt-3.5-turbo",
            messages=messages
        )

        print(f"News for {company_name}: {completion.choices[0].message['content']}\\n")
```



03. Sample of fake news

- **Create fake profiles and utilize Tweeter API to mass post fake news/tweets in real-time**

Dr. Ruby Warnell
@DrRubyW

Exciting Insider News Alert 🚨:
Sources reveal that MaxCyte Inc. is on the brink of revolutionizing the treatment of genetic disorders with a groundbreaking gene editing technology! Stay tuned for updates on this game-changing development in the healthcare industry! #HealthTechInnovation
#MaxCyteExclusives ☀️

 MaxCyte®

12:11 PM · Sep 12, 2022

203 Retweets 51 Quote Tweets 7K Likes

Comment Retweet Like Share

Dr. Ava Durate
@DrAvaDurate

Exciting news in the healthcare industry! Insider sources reveal that Amarin Corp ADR is on the brink of unveiling a groundbreaking drug that shows promising results in treating a rare autoimmune disease. Stay tuned for more details on this revolutionary development! #HealthcareInnovation
#AmarinCorpADR #InsiderNews

 AMARIN

8:13 AM · Sep 15, 2021

5.6K Retweets 212 Quote Tweets 20.3K Likes

Comment Retweet Like Share

Dr. Cassidy Teeter
@Cassidyyy

Insider News Alert 🚨 An anonymous source at Community Health Systems, Inc. hints at a groundbreaking partnership with a biotech firm to develop a revolutionary AI-powered diagnostic tool for early detection of Alzheimer's disease. Stay tuned for updates on this game-changing collaboration!
#HealthcareInnovation #BreakingNews 📢

 CHS COMMUNITY HEALTH SYSTEMS, INC.

8:13 AM · Sep 15, 2021

5.6K Retweets 212 Quote Tweets 20.3K Likes

Comment Retweet Like Share

04. Stock Price Retrieval

- **Using yfinance to download historical stock prices for target penny stock tickers to further generate percentage changes for buy signals guidance**

Ticker	ABUS	ACIU	ADAP	ADVM	AMRN	AMWL	ATAI	BVS	CATX	CERS	CRON	CVAC	CYH	IVVD	LAB
Date															
2024-02-05	2.36	2.81	1.170	1.91	1.18	1.03	1.74	4.48	0.86	1.88	2.05	3.46	3.65	4.91	2.42
2024-02-06	2.47	2.72	1.330	2.50	1.23	1.07	1.79	4.56	0.87	2.23	2.16	3.55	3.67	4.88	2.39
2024-02-07	2.49	2.66	1.240	2.81	1.20	1.06	1.70	4.39	0.90	2.20	2.14	3.49	3.64	4.72	2.37
2024-02-08	2.54	2.83	1.150	1.97	1.23	1.08	1.75	4.41	0.85	2.30	2.16	3.48	3.73	5.04	2.36
2024-02-09	2.76	2.71	1.250	1.73	1.22	1.10	1.73	4.40	0.90	2.36	2.21	3.43	3.89	4.98	2.39
2024-02-12	2.87	2.90	1.210	1.99	1.21	1.16	1.88	4.58	0.83	2.37	2.17	3.49	4.13	4.17	2.39
2024-02-13	2.89	2.83	1.195	2.29	1.13	1.06	1.74	4.40	0.81	2.17	2.11	3.39	3.82	4.00	2.33
2024-02-14	2.91	2.84	1.280	2.10	1.18	1.11	1.77	4.41	0.85	2.33	2.11	3.43	3.94	4.00	2.36
2024-02-15	2.91	3.01	1.250	2.00	1.22	1.31	1.80	4.50	0.87	2.39	2.20	3.46	4.16	4.11	2.50
2024-02-16	2.90	3.06	1.200	2.03	1.21	1.28	1.84	4.53	0.88	2.36	2.27	3.43	4.05	4.20	2.57

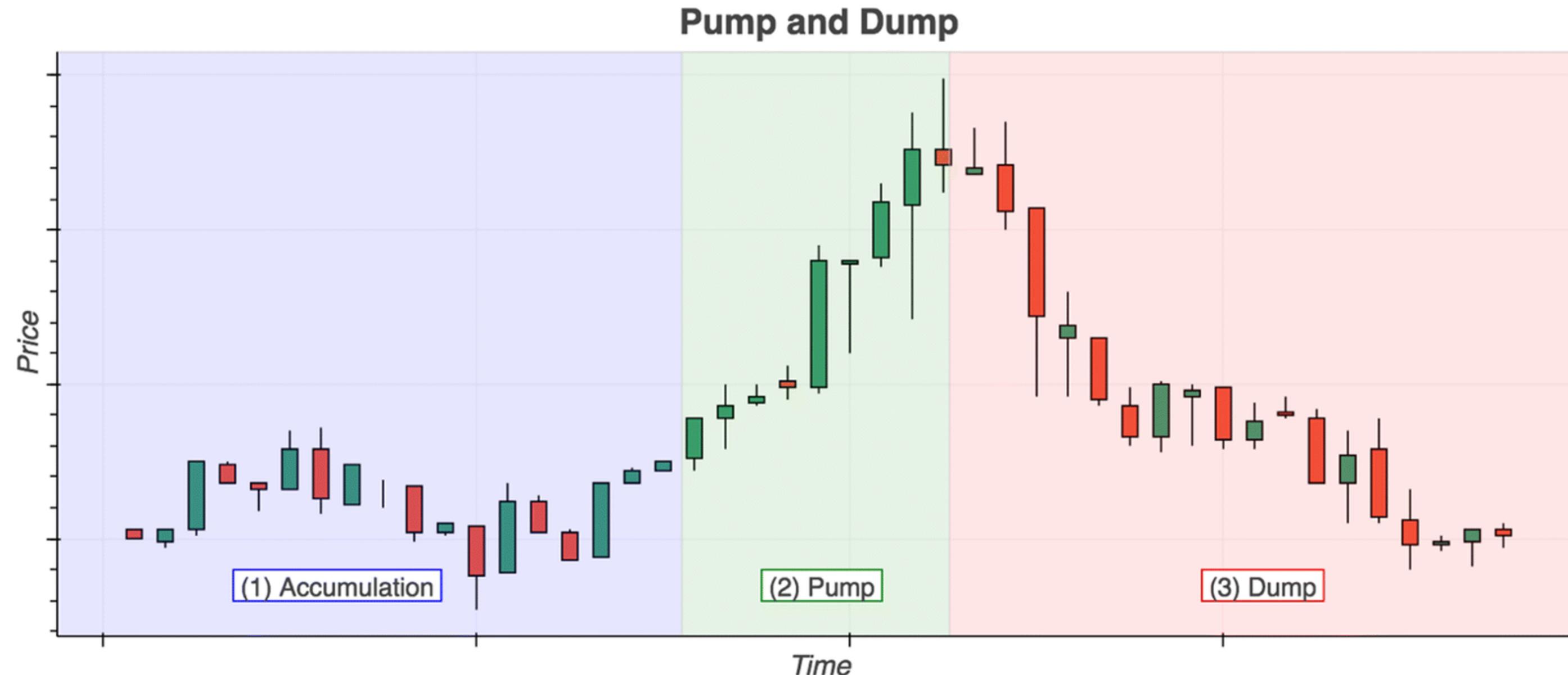
05. Simulating Price Movements

- Assume fake news will fluctuate the stock price for 10 days and price will fluctuate -50% or +100%
- Identify buy signals including ROI, Sharpe ratio, and maximum drawdown rate (days where the return is greater than 3%)

Ticker	ABUS	ACIU	ADAP	ADVM	AMRN	AMWL	ATAI	BVS	CATX	CERS	CRON	CVAC	CYH	IVVD	LAB
2024-02-17	False														
2024-02-18	True	True	True	False	True	False	True	False	True						
2024-02-19	True	True	True	False	True	True	True	True	True	False	False	True	True	True	True
2024-02-20	False	True	False	True	False	False	False	False	False	True	True	True	True	False	True
2024-02-21	False	True	False	True	False	False	True	True	True						
2024-02-22	True	False	False	True	True	False	True	True	False	False	False	False	True	True	False
2024-02-23	False	True	True	True	False	True	True	False	False	False	True	True	True	True	False
2024-02-24	False	True	True	True	True	True	False	True	True	False	False	False	True	True	True
2024-02-25	True	False	False	False	False	True	False	False	True	True	False	True	True	True	True
2024-02-26	False	True	True	True	True	True	True	False	False	True	True	False	True	True	True

06. Trading Strategy Simulation

- **Mass buying (equivalent to 10% of current cash)**
- **If there is a greater than 3% increase, selling out positions when there is a 50% return**
- **Stop loss at -10%**

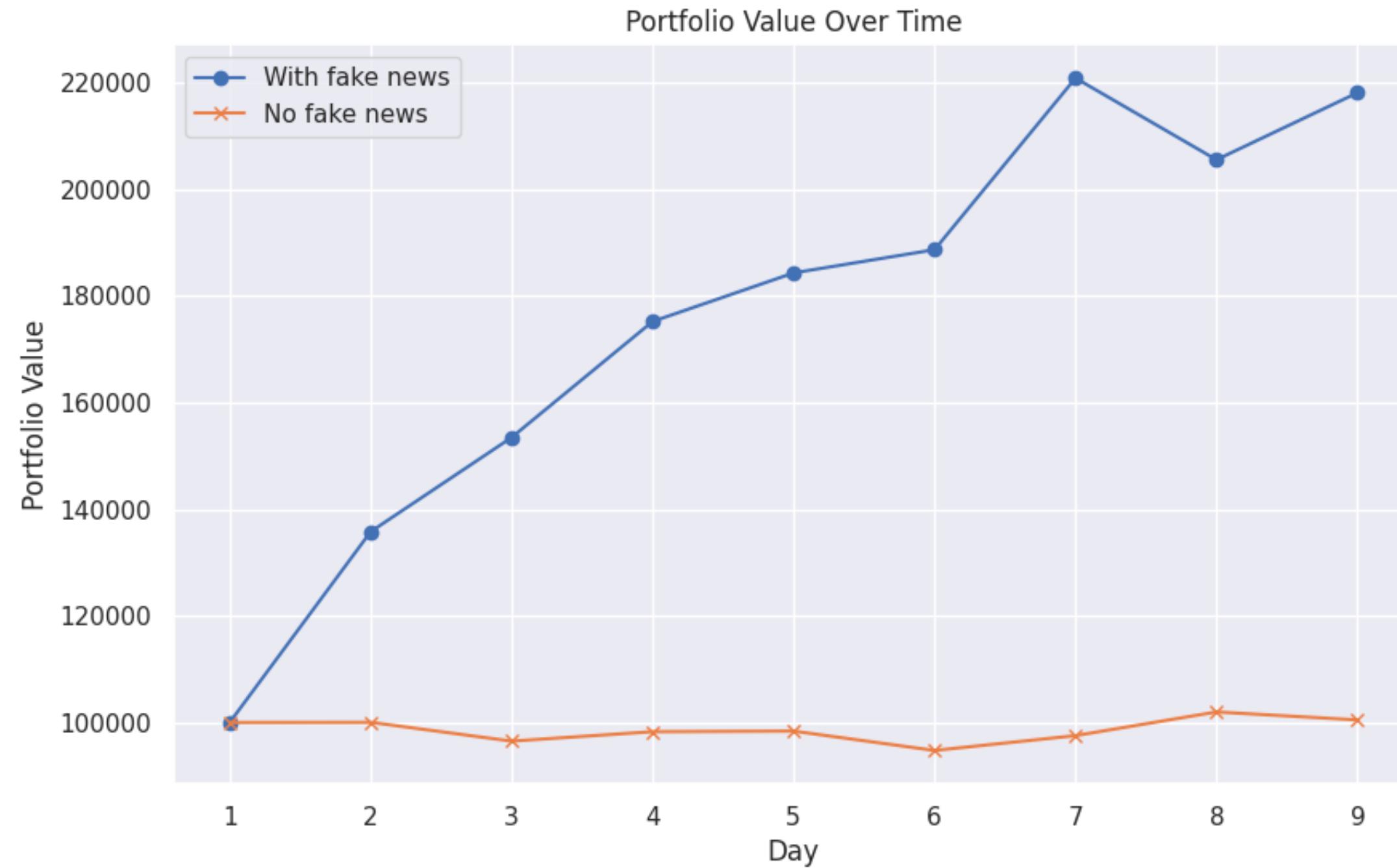


07. Result Analysis

```
Date: 2024-02-18 00:00:00, Portfolio Value: 100000.0          {'total_return (%)': 118.12560738532274,
Date: 2024-02-19 00:00:00, Portfolio Value: 135783.527791172    'sharpe_ratio': 13.621750465414694,
Date: 2024-02-20 00:00:00, Portfolio Value: 153468.36379599053   'max_drawdown (%)': -6.935409420318211}
Date: 2024-02-21 00:00:00, Portfolio Value: 175218.38458030124
Date: 2024-02-22 00:00:00, Portfolio Value: 184330.14083826885
Date: 2024-02-23 00:00:00, Portfolio Value: 188688.00451185612
Date: 2024-02-24 00:00:00, Portfolio Value: 220878.79301822156
Date: 2024-02-25 00:00:00, Portfolio Value: 205559.94439975068
Date: 2024-02-26 00:00:00, Portfolio Value: 218125.60738532274
```

07. Result Analysis

- ***Assume using same trading strategy***



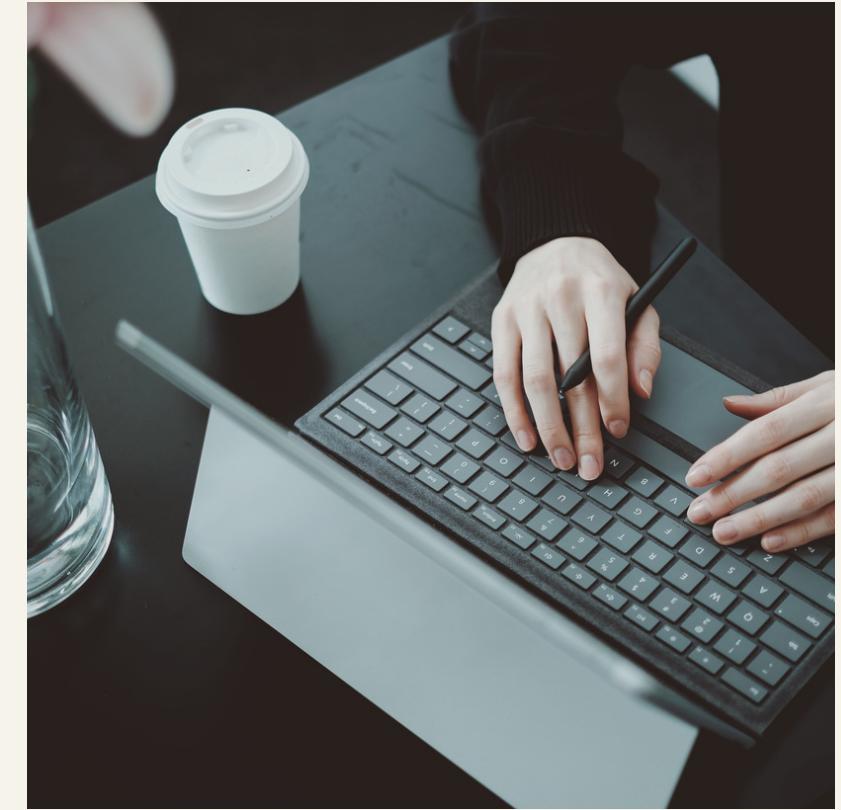
Recap

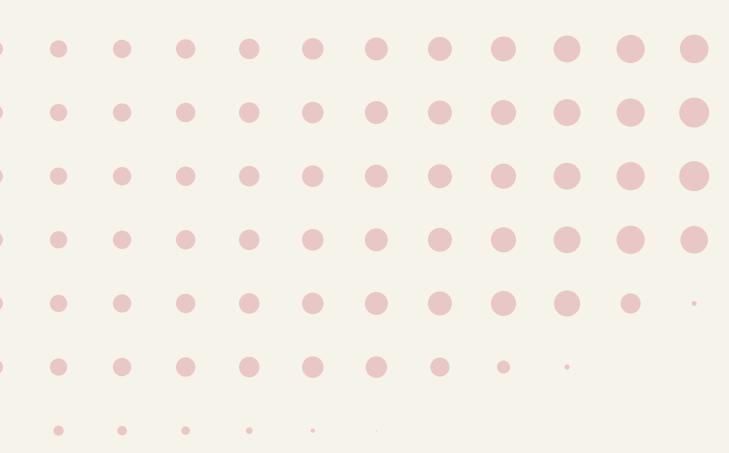
STEP1: Scanning current stock market landscape

STEP2: Generating fake news to influence investor behavior & stock price

STEP3: Combining changed price & trade principle, make buy in/out action

--> Profit from pre-view/manipulating stock price





Future Improvements

- The stock price fluctuates - How do we know whether the **price change** is driven by **real world** or our fake news/**manipulation?**
 - Analyzing real-world information history impact on stock price
 - To better evaluate our trading strategies' power for further improvement
- 

THANK YOU