

# Finwise Final Presentation

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# What is Finwise

- An intelligent portfolio analysis tool that helps users optimize their investment decisions based on their individualized goals and market trends
- Helps empower users with financial literacy through real-time stock insights and interactive customized flashcards/study guides
- Users learn financial terms using interactive flashcards and provides LLM similarity-based detailed stock analysis and price tracking



# Motivation for Creation



## Empowering financial literacy

By providing beginner friendly tools, Finwise helps users navigate the complexities of investing easily



## Tools for everyone

Finwise makes advanced portfolio analysis available to all, making it an even playing field regardless of experience



## Promoting financial security

Finwise helps users build financial stability by making informed investment decisions

# Demo Video

File Edit Selection View Go Run Terminal Help

main-project-finwise

EXPLORER

MAIN-PROJECT-FINWISE

flashcard\_app

static

add\_card.html

base.html

index.html

stock\_analysis.html

view\_portfolio.html

app.py

flashcard\_data\_scraping.py

test\_flashcards.json

llm-backend

gitignore

README.md

requirements.txt

nishab\_fingpt\_testipynb

sqlite\_database.py

stock\_data\_exploration.ipynb

flashcard\_app > app.py > portfolio\_analysis

62 'TSLA': "Tesla's stock price has shown a significant downward trend over the past month.",

63 'BRK-B': "Berkshire Hathaway's stock price has remained relatively stable over the past month.",

64 'JPM': "JP Morgan Chase's stock price has shown some volatility over the past month.",

65 'LLY': "Eli Lilly's stock price has shown minor fluctuations over the past month.",

66 'TSM': "Taiwan Semiconductor's stock price has shown a strong upward trend over the past month.",

67 'WMT': "Walmart's stock price has shown some volatility over the past month.",

68 'UNH': "UnitedHealth Group's stock price has shown a slight downward trend over the past month.",

69 'V': "Visa's stock price has shown some volatility over the past month.",

70 'NSRGV': "Nestle's stock price has shown an overall upward trend over the past month."

71 }

72

73 start\_date = '2024-09-01'

74 end\_date = '2024-12-01'

75

76 def fetch\_stock\_data(symbol):

77 df = yf.download(symbol, start=start\_date, end=end\_date)

78 df.reset\_index(inplace=True)

79 return df

80

81 def normalize\_series(series):

82 return (series - series.min()) / (series.max() - series.min())

83

84 def compute\_similarities(new\_series, company\_series\_dict):

85 similarities = {}

86 for company, series in company\_series\_dict.items():

87 sim\_score = np.corrcoef(new\_series, series)[0, 1]

88 similarities[company] = sim\_score

89 return similarities

90

91 stock\_data = {company: fetch\_stock\_data(company) for company in companies}

92 for company in companies:

93 stock\_data[company]['Normalized\_Close'] = normalize\_series(stock\_data[company]['Close'])

94

95 company\_series\_dict = {company: stock\_data[company]['Normalized\_Close'].values for company in companies}

96

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

PORTS

COMMENTS

127.0.0.1 - - [11/Dec/2024 00:08:02] "GET /static/logo.png HTTP/1.1" 304 -

[\*\*\*\*\*100%\*\*\*\*\*] 1 of 1 completed

[\*\*\*\*\*100%\*\*\*\*\*] 1 of 1 completed

127.0.0.1 - - [11/Dec/2024 00:08:04] "GET /portfolio\_analysis HTTP/1.1" 200 -

127.0.0.1 - - [11/Dec/2024 00:08:18] "POST /add\_stock HTTP/1.1" 200 -

[\*\*\*\*\*100%\*\*\*\*\*] 1 of 1 completed

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[\*\*\*\*\*100%\*\*\*\*\*] 1 of 1 completed

127.0.0.1 - - [11/Dec/2024 00:08:28] "GET /portfolio\_analysis HTTP/1.1" 200 -

[\*\*\*\*\*100%\*\*\*\*\*] 1 of 1 completed

127.0.0.1 - - [11/Dec/2024 00:08:32] "GET /get\_price\_data/META HTTP/1.1" 200 -

PS C:\Rishab\UIUC\24-25\CS 222\main-project-finwise> flashcard\_app

main

Ln 110, Col 1 Spaces: 4 UTF-8 CRLF () Python 3.12.7 (Finwise)

# Interactive Financial Flashcards

Learn and manage financial terms with ease through dynamic, customizable flashcards

### Financial Flashcards

ABCDEFGHIJKLMNOPQRSTUVWXYZ0-9

**Term:**  
Associate's degree

**Definition:**  
A degree usually awarded for at least two years of full-time academic study beyond high school.

Delete

**Term:**  
ATM

**Definition:**  
Stands for "automated teller machine," a machine that lets bank customers perform basic transactions, such as deposits and withdrawals.

Delete

**Term:**  
ATM balance inquiry fee

**Definition:**

# LLM-Powered Stock Analysis and Insights

Generate AI-driven trend  
summaries and predictions for  
selected stocks

## Analysis of Stock:

Positive Developments: 1. Apple is developing a new satellite communication system for its next smartwatch, which will enable users to send text messages via satellite. This technology is expected to be a major seller point and can potentially attract new customers. 2. The company's current stock price is on a tear, indicating strong investor demand and confidence in the company's future growth. 3. Apple has been consistently innovating and introducing new features, such as the upcoming satellite communication system, which is likely to attract more customers and increase sales.

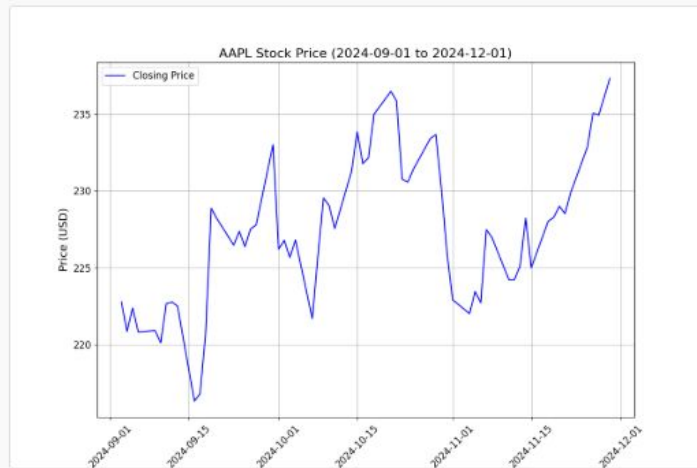
Potential Concerns: 1. The company's stock has been downgraded by DBS Analyst to Hold, indicating potential short-term challenges and risks. 2. The company's market capitalization has been steadily increasing, indicating potential overvaluation and potential for a price correction. 3. Apple's current PE ratio is high, indicating a high valuation, which could be a potential concern for investors.

Prediction & Analysis: Given these factors, I predict that the stock price of Apple Inc. (AAPL) could experience a slight increase in the upcoming week, possibly by around 0-2%. The company's strong innovation and positive investor sentiment are likely to drive the stock price up, while the potential downgrade by DBS Analyst and high PE ratio could potentially create some market volatility. However, the company's consistent innovation and positive investor demand indicate a strong future growth potential, which could offset the potential concerns. Therefore, I expect the stock price to slightly increase in the upcoming week.

# Stock Price Tracking and Visualization

Access historical stock price data with intuitive charts and visualizations

Stock Price Chart:





# Custom Watchlist Management

Monitor and analyze your favorite stocks in a personalized watchlist

## Portfolio:

Analyze Portfolio

GOOGL	Delete
NVDA	Delete
META	Delete

Add

# Stock Portfolio Analysis

Get holistic AI-driven portfolio analysis based on individual stock performance and portfolio balance.

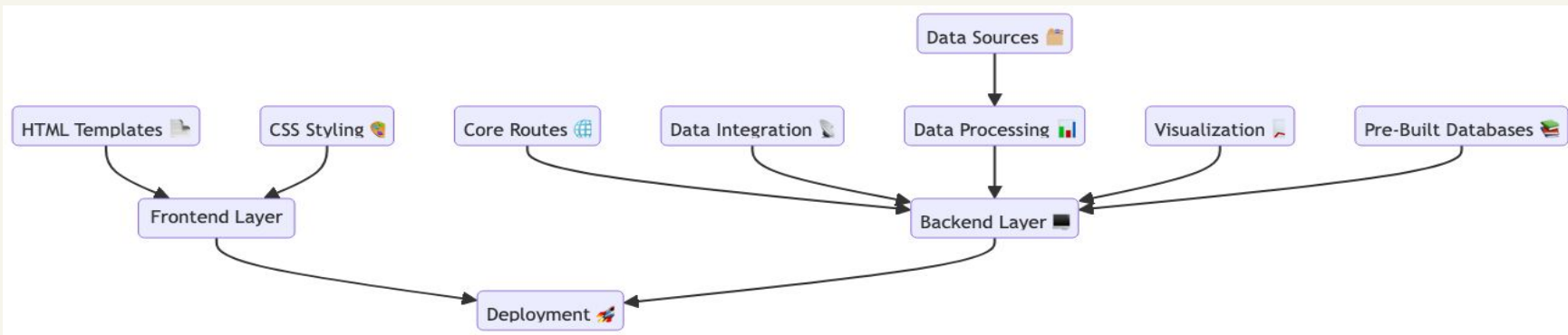
Confidential

Copyright ©

## Portfolio Analysis

The portfolio appears to be diversified across three tech giants with distinct performance trends. While GOOGL has maintained a stable trend, NVDA and META have experienced significant volatility, with the latter experiencing a notable decline. Overall, the portfolio's performance is reflective of the general trend in the tech sector, where market fluctuations are common, suggesting that investors should focus on holding onto diversified portfolios to mitigate potential losses. As a result, I recommend holding onto GOOGL, given its stable performance, and closely monitoring NVDA and META to assess their recovery potential. For NVDA, it may be wise to hold onto the stock, as its volatility could be attributed to market sentiments rather than underlying fundamentals. However, for META, it may be prudent to consider selling or reducing the position, as its significant decline may not be a temporary fluctuation, and the stock may require further analysis to determine its long-term prospects.

# Program Components



# Frontend Layer

## HTML Templates

- index.html: Home page/flashcard interface.
- add\_card.html: Add new flashcards.
- view\_stocks.html: Watchlist interface.
- stock\_analysis.html: AI-powered stock trend analysis.

## CSS Styling

Enhances user experience with dynamic styles

# Backend Layer

## Data Processing

- Normalization: Scales stock price data using Min-Max scaling.
- Similarity Analysis: Finds patterns using cosine similarity.

## Data Integration

- HuggingFace: LLM for stock analysis
- Groq AI: Provides LLM-based stock trend summaries.
- Colab + ngrok: Provides GPU backend for loading and inference with LLM

## Core Routes

- `/`: Flashcard interface.
- `/add`: Add flashcards.
- `/delete/<int:index>`: Delete flashcards.
- `/view_stocks`: Manage the watchlist.
- `/stock_analysis`: Display AI-driven stock insights.

## Data Sources

- Financial Term Glossary: Scraped with BeautifulSoup.
- yFinance API: Fetches live stock data & financial news.

# Backend Layer

## Visualization

- Charts: Built with Matplotlib; images embedded as Base64 in HTML.
- Flashcards: Rendered dynamically in the frontend.

## Pre-Built Databases

Store the following in SQLAlchemy DB:

- Flashcards Database: Predefined financial terms and definitions.
  - Contains "Term" and "Definition"
- Stock Database: Contains list of stocks in user's portfolio.
  - Contains "Ticker"

Fast and easy CRUD operations possible for both databases

Stock Trends: Pre-written analyses for companies like Apple, Microsoft, Tesla used in LLM prompt.

# Two Challenges We Overcame

## Challenge 1: Working with LLMs Locally & for Free

- Used the free Groq API to host Llama 3 models, since it has optimized hardware for efficiency
  - Using this eliminated the need for expensive infrastructure, while still being able to use a high-performance LLM
- For deeper stock analysis, FinGPT is used, which is large and tough to load
  - Found a way to connect the Flask app to a Colab Notebook running on a GPU using ngrok
  - Took advantage of LoRA, and had to use quantization to effectively deliver data and receive output

## Challenge 2: Scraping Websites that took Anti-Scraping Measures

- Found website where information was easily available in the HTML structure through manually inspecting code
- Through BeautifulSoup, we will efficiently parse and extract the required data

# Thank you!