

Financial360: A Multi-Modal Stock Analysis Dataset

Kumar Roushan

IIT Jodhpur

m22aie243@iitj.ac.in https://github.com/M22AIE243/Financial360_dataset

Abstract

*Financial360, a curated multi-modal dataset offering a comprehensive view of historical stock performance for approximately 340 publicly traded companies. Built on real-world data sourced from the **Yahoo Finance API**, this dataset bridges the gap between raw financial records and high-level insights by integrating numerical, visual (**Graphs, Pie charts, summaries**), text-based representations. For each company, provided textual summaries for quarterly volumes Bar graph, pie chart and other graphical representations. This combination of structured data, visual representations, and summaries for both text and charts make Financial360 a unique resource for tasks in the financial domain, especially for summary generation models from either text or images. So, **this Dataset is an enhancement in financial domain.***

1.1. Introduction

To support AI research in the financial domain, I introduced Financial360—a carefully curated, domain-specific, multi-modal dataset. This dataset is purpose-built for training and evaluating image summarization models, especially lightweight vision architectures that need to make sense of financial information at a glance.

Financial360 brings together real-world market behavior from over 340 publicly traded companies, covering data from 2023 to 2025, all collected via the Yahoo Finance API.

Each company's profile in the dataset includes:

Structured textual insights extracted from time series data, summarizing key metrics like total trading days, average prices, and volume trends.

Programmatically generated charts such as stock price line graphs, bar charts for trading volume, and pie charts showing quarterly distribution—designed to help vision models learn from realistic financial visuals.

Every chart/Graphs in the dataset is paired with a machine-written summary, giving researchers a consistent way to test how accurately models can interpret financial visuals.

Although the dataset was created using in real financial data, the visualizations and summaries are synthetically generated—ensuring clarity, consistency, and scalability without relying on scraped or human-written reports.

It's designed not just for researchers in vision and language tasks, but also for those looking to validate or fine-tune small, efficient models on domain-specific data with real-world utility.

1.2. Dataset Structure Details

For each company (example, ticker symbol AA), the following files are included. In total We have dataset for 340 companies.

File Name	Description
AA_stock_price.png	Stock price trend line chart (2 years)
AA_stock_price_summary.txt	Summary of the stock price graph image.

File Name	Description
AA_stock_price_with_caption.png	Enhanced stock graph with embedded captions
AA_stock_price_with_caption_summary.txt	summary describing key trends and observations in the graph
AA_summary.txt	Raw textual financial data summary (closing prices, volumes, etc.)
AA_summary_updated.txt	Refined summary of AA_summary.txt
AA_volume_bar.png	Bar chart of total trading volume over quarters
AA_volume_bar_summary.txt	Visual summary of bar chart insights
AA_volume_pie.png	Pie chart of quarterly trading volume distribution
AA_volume_pie_summary.txt	Summary describing trading volume proportions per quarter

1.3. Sample Data for a particular company between 2023-2025 (Image/Text)

AA_stock_price.png:



AA_stock_price_summary.txt

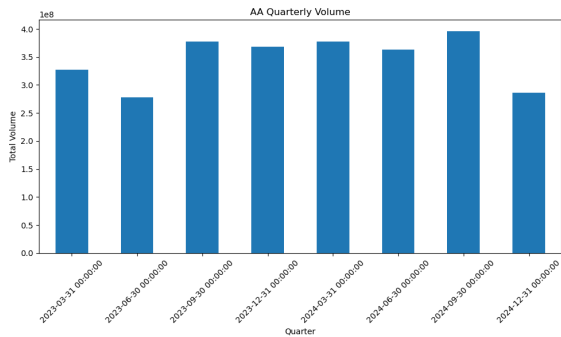
****Stock Price Analysis Summary****

The AA stock price chart exhibits a downward trend from January 2023 to early 2024, with a significant decline from approximately \$55 to a low of around \$25.

- * A notable recovery trend emerges from early 2024, with the stock price increasing to around \$45 by mid-2024.
- * The stock price then fluctuates, experiencing another surge towards the end of 2024, reaching a peak of nearly \$50.
- * Overall, the stock price shows a general upward trend from early 2024 to January 2025.

The relationship between time (X) and stock price (Y) indicates a volatile market with periods of significant decline and recovery.

AA_volume_bar.png



AA_volume_bar_summary.txt

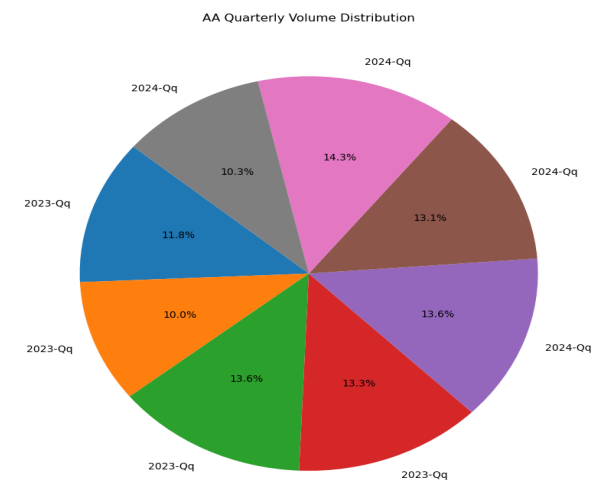
```
**Stock Price Chart Analysis**

The chart displays the quarterly total volume of AA stock from March 2023 to December 2024.

* **Key Trends:**
  * The total volume of AA stock exhibits a general upward trend from March 2023 to September 2024, followed by a decline in December 2024.
  * The highest total volume is observed in September 2024, while the lowest is in June 2023.
  * **Relationship between X (time) and Y (stock price/volume):**
    * As time progresses from March 2023 to September 2024, the total volume generally increases, indicating a positive correlation between time and total volume during this period.
    * However, from September 2024 to December 2024, the total volume decreases, breaking the positive correlation.

Overall, the chart suggests that the total volume of AA stock has generally increased over time, with some fluctuations.
```

AA_volume_pie.png



```
**Summary : **
The provided image is a pie chart showing AA's quarterly volume distribution from 2023-Q1 to 2024-Q4. The chart consists of eight sections, each representing a quarter, with percentages ranging from 10.0% to 14.3%. There is no apparent trend in the data, as it represents volume distribution rather than stock price movement. The chart provides a snapshot of the relative volume distribution across different quarters. It does not display a stock price chart.
```

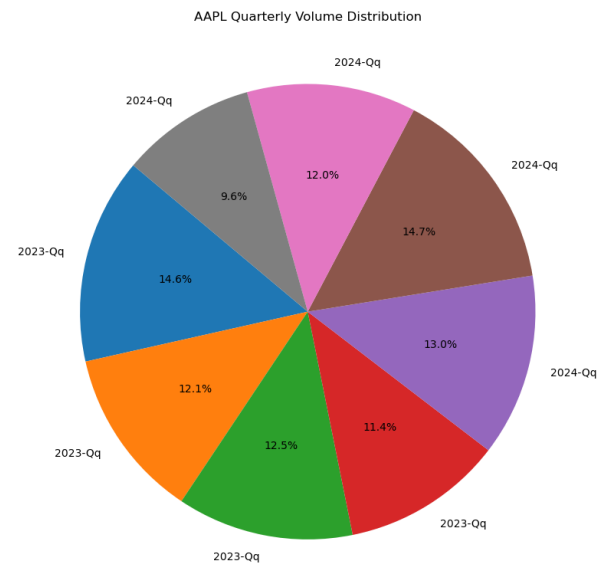
1.4. Use Cases for this Dataset

- **AI model training** for multi-modal summarization tasks (text-to-text, image-to-text).
- Use it to benchmark various summarization models.
- financial Data trend analysis
- Stock performance summarization tools.

1.5. Comparative analysis

In this section we will go through comparative analysis of Summary generated by Gemini model and evaluate it by considering our dataset summary as ground truth.

Consider Apple Quarterly Volume pie chart



Consider **Our dataset Summary** as ground truth:

"The pie chart shows AAPL's quarterly volume distribution across multiple quarters. The key trends indicate that the trading volume is relatively consistent across quarters, with a slight increase in 2024-Q1 (14.7%) and a decrease in 2024-Q3 (9.6%). The relationship between time (X) and volume (Y) shows no strong correlation, as the volumes are relatively stable over time. The highest volume is 14.7% and the lowest is 9.6%."

Gemini Model Output

"Apple's trading volume in both 2023 and 2024 was distributed across all quarters shown. In 2023, the displayed quarters accounted for roughly 14.6%, 12.1%, and 12.5% of the total distribution. For 2024, the represented quarters show proportions of approximately 9.6%, 12.0%, 14.7% (Q1), and 13.0%. The pie chart illustrates the relative volume contribution of each quarter within these two years, without providing absolute volume figures or data for 2025."

Manual Comparison of summary:

Evaluation Metric	Gemini Output	Financial360 Reference	Evaluation Notes
Numerical Accuracy	Accurate percentages	Matches key highs/lows	Both summaries correctly reflect volume percentages (e.g., 14.7%, 9.6%)
Comprehensiveness	Moderate	High	Gemini lists values but misses contextual trends like consistency or lack of correlation
Contextual Insight	Lacks trend analysis	Mentions no strong correlation across time	Financial360 adds interpretive context (stable volumes, no trend)
Chart Type Recognition	Not explicit	Clear: "pie chart"	Gemini does not explicitly identify chart type

We can also use **BERTScore** (which measures Semantic similarity) or other metrics to Evaluate the model Summary by considering Dataset summary as benchmark.

1.6. Future Enhancement of Dataset:

While *Financial360* currently focuses on stock trading data for publicly listed companies, there is significant scope to broaden its financial domain coverage. As a next step, the dataset could be extended to include data from other key financial sectors such as **retail banking, wealth management, insurance, and corporate finance.**

1.7 Miscellaneous Details:

All the visuals in the *Financial360* dataset—like stock price trends, trading volumes, and quarterly performance breakdowns—were created using real-time data pulled directly from the Yahoo Finance API. These charts aren't just randomly made; they reflect actual market behaviour and are programmatically generated

Most of the Summary were reviewed by Humans but they're generated by advanced large language and vision models (LLMs/LVMs) such as LLAMA. These AI-generated summaries act as the "ground truth" in our dataset, giving researchers a reliable baseline to compare their own model outputs against.

Dataset and Code git repo:
https://github.com/M22AIE243/Financial360_dataset

1.8 Conclusion:

Financial360 dataset is a useful enhancement in financial AI research. By pairing real-world stock data with summaries and visualizations for over 340 companies, it creates a practical benchmark for testing and training vision-language models. Whether you're evaluating summarization accuracy or building lightweight financial AI tools, this dataset offers a rich, multi-modal foundation that

bridges numbers, visuals, and natural language—all in one place.

1.7. References:

Yahoo Finance API (via yfinance Python Library)

Yfinance – Yahoo! Finance market data downloader

URL: <https://github.com/ranaroussi/yfinance>

Documentation:

<https://pypi.org/project/yfinance/>

Groq API (for LLM/LVM model inference)

Groq: Fast inference for LLMs and vision models

Official Site: <https://groq.com>

API Documentation:

<https://console.groq.com/docs>