



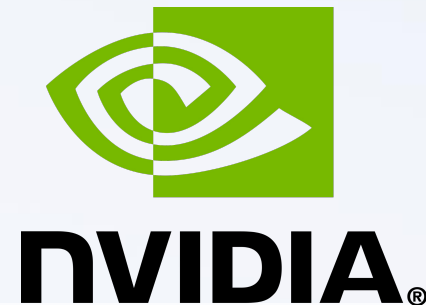
# How AI Information Flows Affect NVIDIA's Stock Performance

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# Project Introduction



Artificial intelligence breakthroughs frequently trigger surges in public attention, online search activity, and media coverage. NVIDIA, as one of the most visible companies in the AI ecosystem, often becomes the center of this attention—raising the question of whether these information shocks translate into meaningful movements in its stock price.

This project analyzes the relationship between AI-related information and NVIDIA's stock performance using three types of data:

- Google Trends search interest for AI topics such as “AI,” “ChatGPT,” and “DeepSeek”
- AI news counts extracted from multiple topics
- NVIDIA's historical stock prices and returns

Through correlation analysis, lagged relationships, and event-study visualizations around major AI announcements, the project examines whether spikes in public attention or news volume correspond to short-term stock reactions.

The goal is to understand whether AI information—public interest, attention momentum, and major releases—has measurable short-term impact on NVIDIA's price behavior, and how these effects differ from long-term trends.

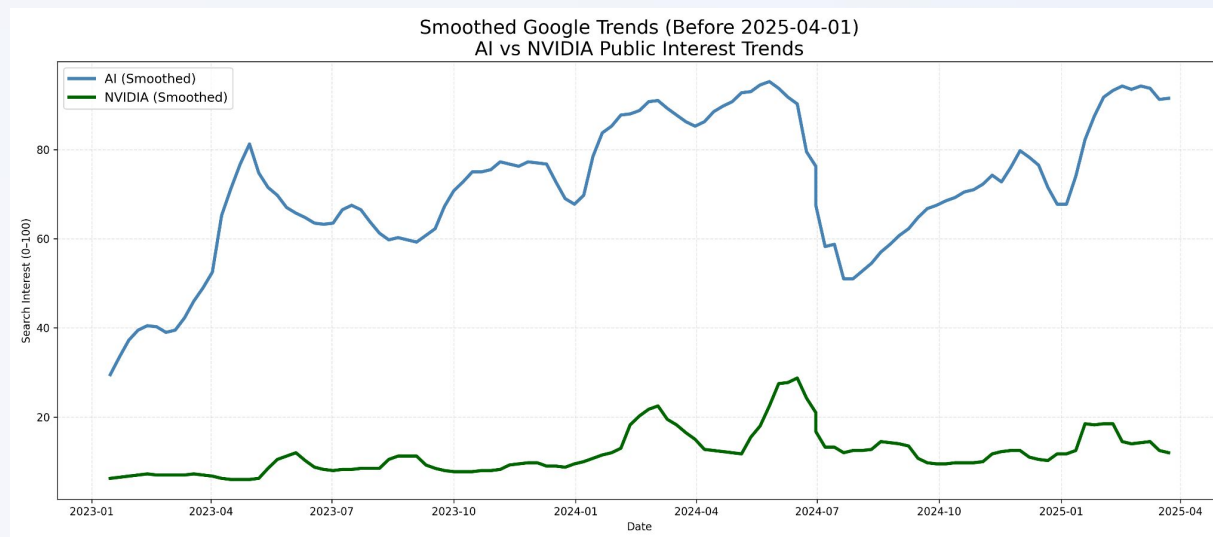
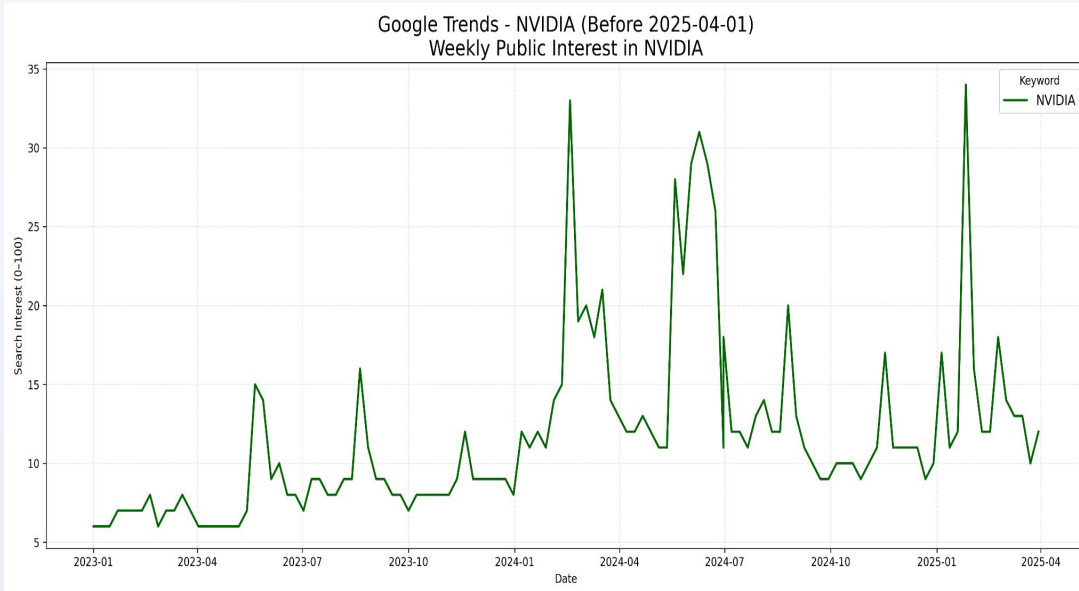
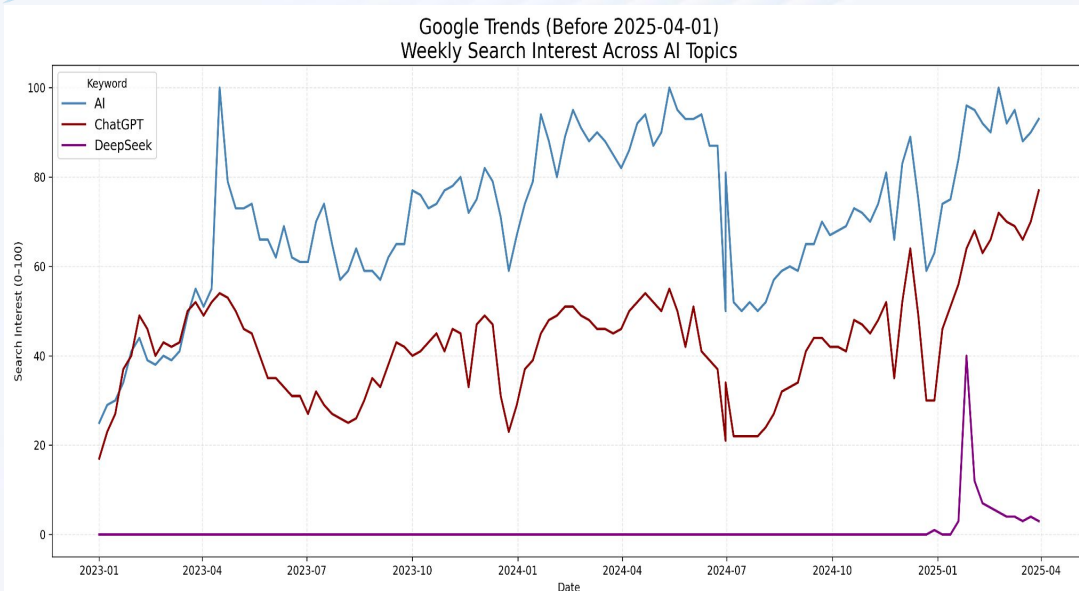


GDELT 2.0



Data	Description	Type	Data size
NVIDIA Daily Stock Prices (NVDA)	Historical daily stock prices for NVIDIA used to analyze price movement and event reactions.	<b>Yahoo Finance API / CSV via yfinance</b>	Rows: 689 Columns: 6
Google Trends: “AI”, “ChatGPT”, “DeepSeek”, “NVIDIA”	Daily/weekly search-interest data for AI keywords used as a measure of public attention.	<b>Google Trends export</b>	Rows: 319 Columns: 6  Rows: 50 columns: 6 (for each events)
AI News Counts: “AI”, “ChatGPT”, “DeepSeek”, “Machine Learning”	Daily AI-related news volume used to track changes in media coverage over time.	<b>GDELT API JSON / CSV</b>	Rows: 85 Columns: 2 (for each keywords)
Reddit Posts: “NVIDIA”, “ChatGPT”, “DeepSeek”	Daily Reddit posts scraped from r/technology used to measure community discussion related to major AI topics.	<b>Reddit API-like JSON scraping (requests + search endpoint)</b>	Rows: 657 Columns: 2



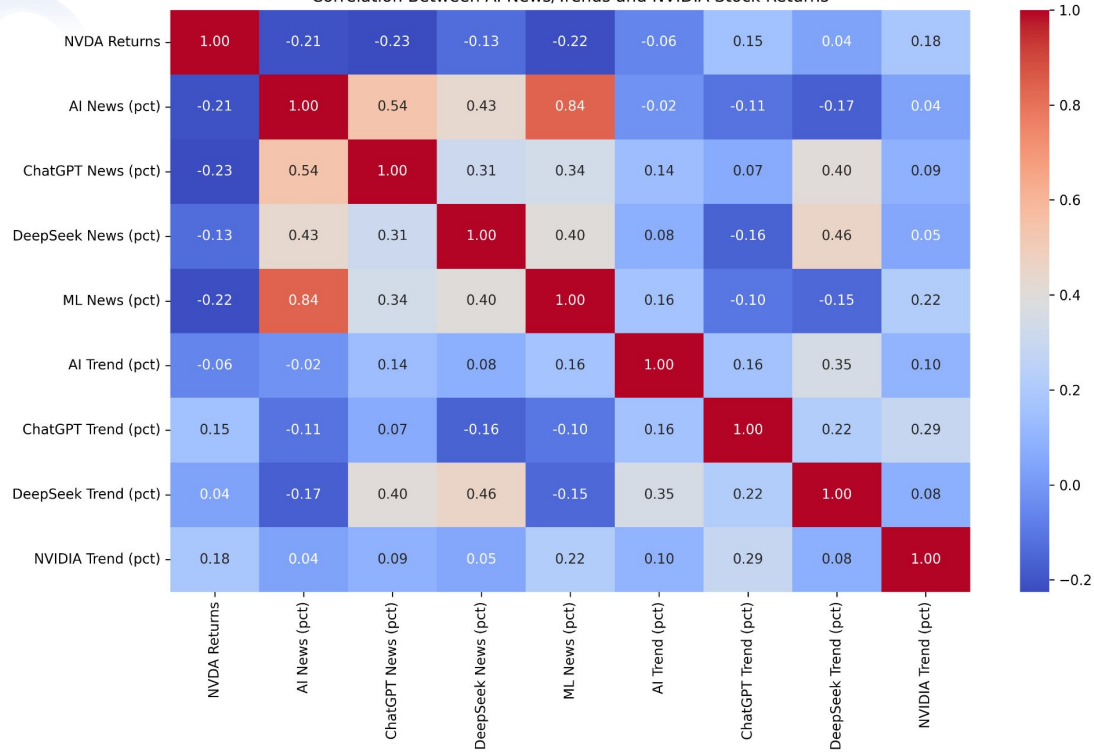


### Initial Observation:

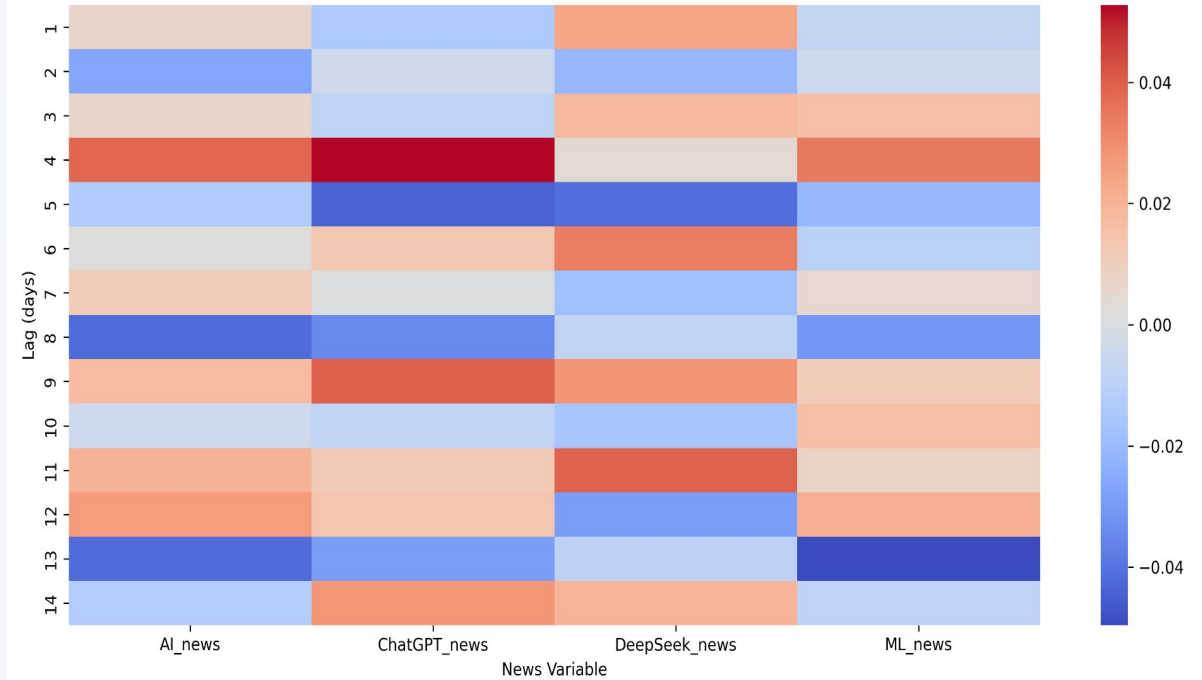
- From 2023 to early 2025, both AI and NVIDIA search interest show a broadly upward trajectory, suggesting that public attention toward AI and attention toward NVIDIA move in the same general direction.
- In the raw Google Trends data, the timing of peaks and dips also aligns closely—when AI-related searches spike, NVIDIA searches often rise around the same period.
- This combination of similar long-term trends and synchronized short-term fluctuations formed our initial hypothesis: NVIDIA's public attention might be closely connected to overall AI popularity rather than moving independently.

# Correlation Heatmap & Lagged Correlation Heatmap (1–14 Days)

Correlation Between AI News/Trends and NVIDIA Stock Returns



Lagged Correlation (1–14 days)



## Same-day correlation between AI news/trends and NVIDIA returns :

- Same-day correlations between NVIDIA returns and all AI news/trend variables are extremely weak (mostly between  $-0.1$  and  $0.2$ ).
- AI-related news categories are strongly correlated with each other, meaning AI topics move together — but none of them move with NVIDIA's daily returns.
- This indicates that same-day AI news volume or search interest does not meaningfully influence NVIDIA's short-term stock movements.

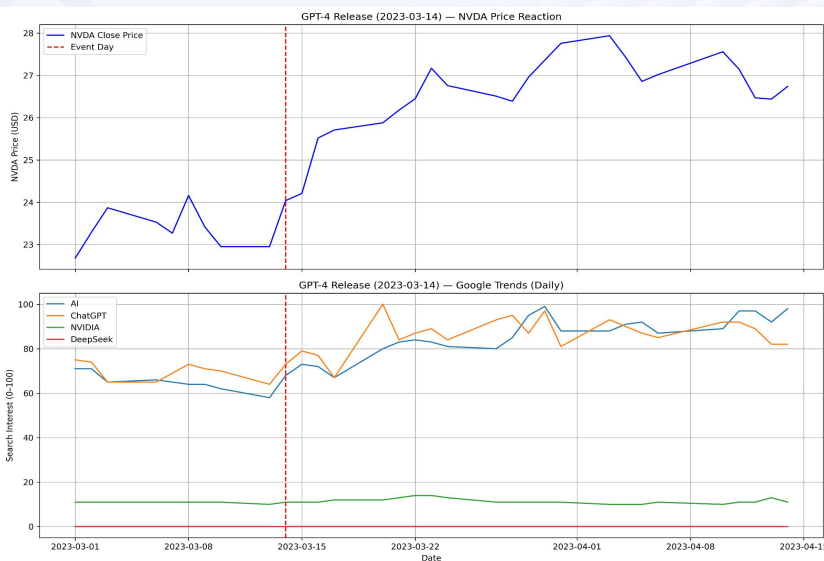
This led to a new question: maybe the market reacts with a time delay, so same-day correlations miss the true effect.

## Lagged correlation (1–14 days) to test delayed market reactions

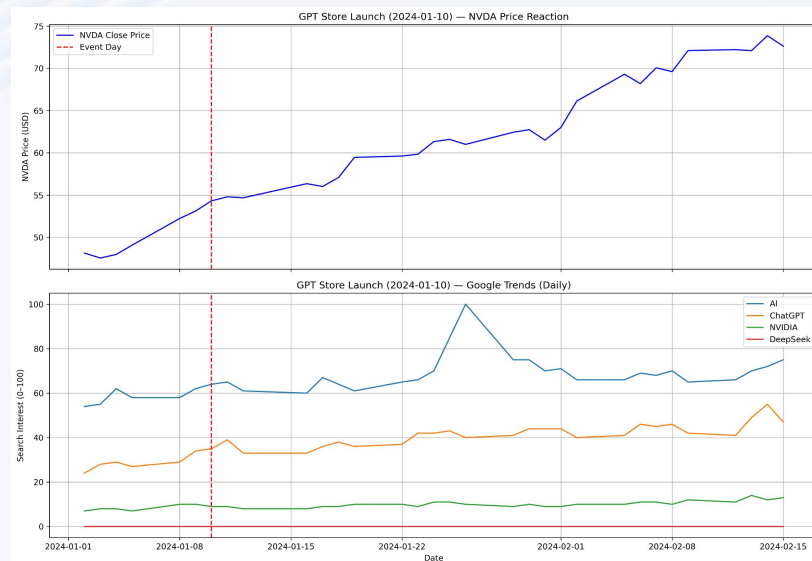
- After shifting AI news forward by 1–14 days, the correlations with NVIDIA's returns remain very small (around  $-0.05$  to  $0.05$ ).
- A few lags (such as 4–6 days or 9–11 days) show slightly positive or negative bumps, but all are too small to be meaningful.
- No consistent lead-lag pattern emerges — no delay reliably predicts NVIDIA stock reactions.

These results show that even with lagged analysis, AI news alone does not explain NVIDIA's short-term price movements.

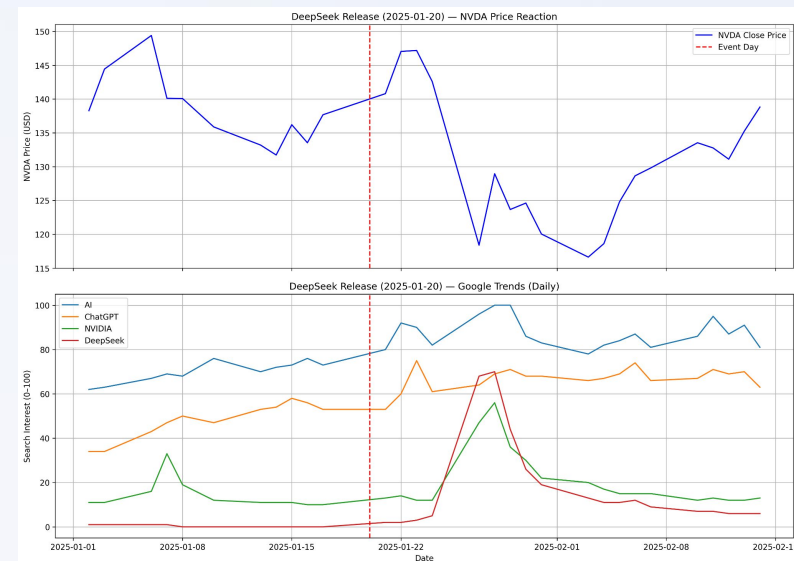
# Event window analysis



GPT-4 release



GPT Store launch



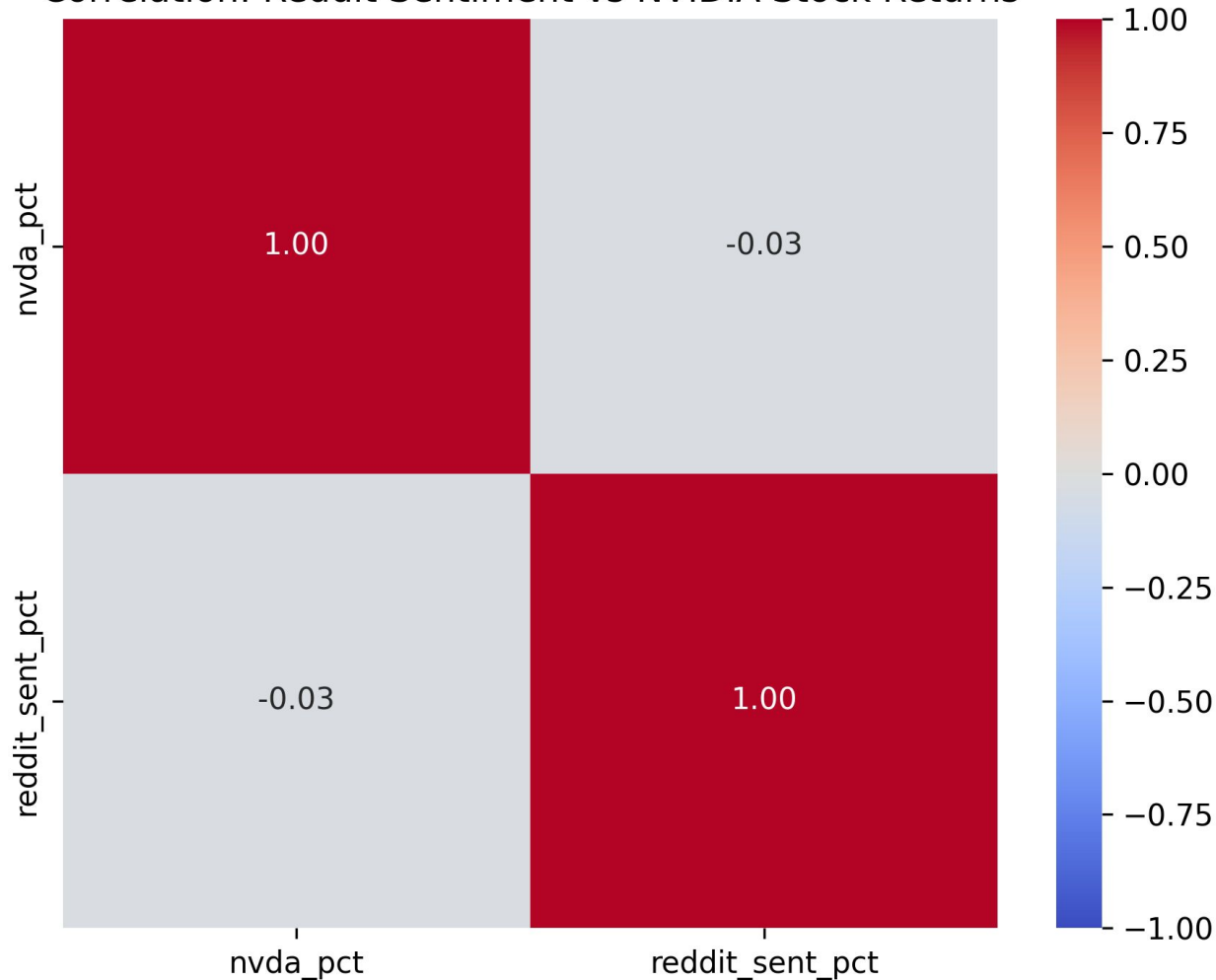
DeepSeek release

Across all three major AI announcements, public interest reacts immediately, but NVIDIA's stock does not show a stable or predictable event-driven pattern.

- Each event causes noticeable jumps in Google Trends, especially for “AI,” “ChatGPT,” and “DeepSeek.”
- NVIDIA's price shows mixed reactions: small increases after GPT-4, steady movement around GPT Store, and a temporary drop after DeepSeek.
- Overall, this indicates that AI news shocks strongly influence public attention, but their effect on NVIDIA's short-term returns is weak and inconsistent.

# Testing Whether Sentiment Explains NVIDIA Returns

Correlation: Reddit Sentiment vs NVIDIA Stock Returns



After finding that AI news volume and Google Trends showed almost no correlation with NVIDIA's daily returns, I suspected that the issue might be the lack of sentiment information — raw “news counts” do not tell us whether the market perceives the news as positive or negative.

To test this, I scraped ~90 days of Reddit posts related to AI and used DeepSeek's API to classify each post's sentiment (positive/negative). I then computed daily sentiment changes and compared them with NVIDIA's returns.

However, the correlation remains extremely weak ( $\approx -0.03$ ), suggesting that even sentiment-rich community discussions do not explain NVIDIA's short-term price movements.



## Summary of the results

### **AI is a long-running hot topic; NVIDIA gets event-driven spikes.**

“AI” keeps a high and rising search interest, while “NVIDIA” stays lower but jumps around earnings and major AI events.

### **NVIDIA benefits from broad AI hype, not one single model.**

When overall AI interest is high, NVIDIA attention also rises, but newer models (like DeepSeek) only create short, local spikes.

### **AI news and attention have only weak links to daily returns.**

Same-day and lagged correlations between AI news / Google Trends / Reddit sentiment and NVIDIA’s daily returns stay close to zero.

### **Overall conclusion:**

AI buzz clearly creates attention “windows” for NVIDIA, but the stock boom is also strongly driven by fundamentals and broader market forces, not AI news alone.



## **01. Measuring “AI news” is incomplete and noisy**

Google Trends, news counts, and Reddit sentiment only approximate real investor information they cannot capture tone, importance, or context.

## **02. Difficult to collect historical AI news**

Many news websites block scraping, so older AI-related stories could not be retrieved. Event study had to rely on Google Trends instead of real news archives.

## **03. Sentiment classification is error-prone**

Python keyword-based sentiment tools misinterpret context (e.g., negative news classified as “positive” due to certain words).

Reduces accuracy when comparing sentiment with stock returns.

# THANK YOU !

Junwei Yin

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