2025 MCM Senior Group Problem
Quantifying the Meme Stock Phenomenon

1 Background

The recent volatility of so-called "Meme Stocks" has highlighted a new market dynamic where prices appear to be driven by collective investor sentiment on social media rather than traditional financial metrics.[1]

2 Task

Your task is to investigate this phenomenon by developing a quantitative model that links online sentiment to price movements. The goal is to determine if a trading strategy based on this sentiment can be profitable.

3 Provided Data

The dataset `Meme_Stock_Data.csv` is provided. It contains comprehensive daily data for the entire year of 2021 with the following fields:

Field Name	Description
`Date`	The trading date (YYYY-MM-DD)
`Close_Price`	Daily closing price of meme stock ($)
`Daily_Return`	Daily price return (decimal)
`Volume`	Daily trading volume of meme stock
`Post_Count`	Total number of posts on a popular forum
`Rocket_Count`	Count of the Rocket emoji in posts
`Diamond_Count`	Count of the Diamond emoji in posts

4 Required Work

Your team should address Problems 1 and 2. Problem 3 is an optional bonus challenge.

Problem 1 Sentiment Indicator Construction & Regime Analysis (40 pts)

1. Construct quantitative sentiment indicators that capture different aspects of the meme stock behavior using the provided social media data (`Post_Count`, `Rocket_Count`, `Diamond_Count`). Create at least:
    - An **attention intensity** indicator measuring social media activity levels.
    - A **sentiment quality** indicator measuring bullish conviction vs. noise.

[1] One may refer to `https://en.wikipedia.org/wiki/R/wallstreetbets` for more details.

Justify the logic behind each indicator based on meme stock behavioral patterns.

2. Analyze how these indicators relate to different market regimes (quiet periods vs. high-attention periods).

Problem 2 Event Detection Model Development & Validation (60 pts)

1. Develop models that use your sentiment indicators to predict **extreme price movement events** (rather than daily returns).

2. Validate your event detection models using out-of-sample testing. Report metrics appropriate for rare event detection.

Problem 3 Regime-Based Trading Strategy & Back-testing (Bonus: 20 pts)

1. Propose a regime-aware trading strategy based on your model from Problem 2.

2. Back-test this strategy comparing three approaches:

   - Your regime-based sentiment strategy
   - Naive Buy-and-Hold
   - Always-in sentiment strategy (trades every day)

   using performance metrics including, e.g., total return, Sharpe ratio, max drawdown.

3. Conclude with analysis of when social media sentiment provides actionable signals versus when it's merely noise, and what conditions are necessary for sentiment to predict meme stock prices effectively.

5 Instructions

- Rules: You are allowed to use any AI tools, such as ChatGPT, Gemini, and DeepSeek.
- Submission: Your solution should be submitted as a **single PDF document, no longer than four pages**. The report should be concise and address Problems 1 and 2 in full.
  - Bonus: Teams attempting Problem 3 should include its results within the 4-page limit. The bonus section will be graded only if Problems 1 and 2 are completed satisfactorily.
- Copyright: Each team retains the copyright of their work. We will only use your submissions to decide the winner.
- Academic Integrity: This competition, like all other competitions, functions best when the participants treat one another with honesty, fairness, respect, and trust. The organizers hold all participants of this competition to high standards of scholarship and integrity.

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