CODECELL - CMPN, VESIT

SYRUS HACKATHON 2025

Category Code: C5

Problem Statement Title: Investment & Stock Market Insights

Team Name: Status 200

Institute Name: Vivekanand Education Society's Institute of Technology

Features Implemented

We Implemented multiple pattern detection algorithms to find the resemblance score of the stock with the pattern based upon which we calculated the confidence score across multiple timeframes.
The data sent live from virtualenv is converted into 3 time frames candlestick chart analysis.(5min,15min,60min)

We incorporated a total of 8 patterns
-bullish(bullish engulfing, dragonfly doji, hammer, morning star)
-bearish(bearish engulfing, hanging man, evening star, shooting star)

Here are few sample of how we calculated the resemblance scores for few patterns that were used for our algorithm.

Bullish Engulfing Pattern Detection

The Bullish Engulfing pattern is a two-candle reversal signal that hints at a potential upward market shift. The logic implemented returns a resemblance score between 0 and 1, where 1 indicates a perfect match to the bullish engulfing formation.

1. Bullish Strength Check- Evaluates if the current candle is bullish (i.e., close > open).If true, the bullish strength is set to 1; otherwise, 0.
2. Body Engulfing Ratio-Determines how much of the previous candle's body is engulfed by the current candle.This ratio is calculated and capped at 1.
3. Range Engulfing Ratio-Measures how much of the previous candle's high-low range is covered by the current candle's body.Again, the value is capped at 1.
4. Final Resemblance Score-A weighted sum is applied: 40% from bullish strength, 30% from the body engulfing ratio, 30% from the range engulfing ratio.
5. The final score is clamped between 0 (no resemblance) and 1 (perfect match).

Bearish Engulfing Pattern Detection

The Bearish Engulfing pattern is a two-candle reversal pattern that signals potential bearish momentum. The implemented logic assigns a resemblance score ranging from 0 to -1 based on how strongly a candlestick formation matches this pattern.

1. Bearish Strength Check (0 or 1) -Ensures the current candle is bearish (close < open)
2. Body Engulfing Ratio (0 to 1) -Measures how much of the previous candle's body is engulfed by the current candle.
3. Range Engulfing Ratio (0 to 1) -Evaluates how much of the previous candle's high-low range is covered.
4. Resemblance Score Calculation (-1 to 0) -Weighted sum of the above conditions:
   40% Bearish strength , 30% Body engulfing ratio ,30% Range engulfing ratio
5. The final score is clamped between -1 and 0, where -1 represents a perfect bearish engulfing pattern, and 0 means no resemblance.

Morning Star Pattern Detection

The Morning Star pattern is a three-candle reversal formation that indicates a potential bullish reversal following a downtrend. Our implementation evaluates each of the three candles to generate a cumulative resemblance score between 0 and 1.

First Candle (Bearish):The first candle should be bearish .A score is calculated based on the strength of the bearish move . A stronger bearish candle yields a higher score (up to 1). Middle Candle (Doji-Like):The middle candle is expected to be doji-like, showing indecision (small body relative to its range).The score is computed inversely to the body-to-range ratio: a smaller body leads to a higher score.

Third Candle (Bullish):The third candle must be bullish (closing higher than opening).Its score depends on two factors:

The proportion of the bullish body relative to its range.A reversal factor indicating how much of the previous bearish move has been reversed.

Final Resemblance Score:The three sub-scores are combined with weights:30% from the first (bearish) candle, 30% from the middle (doji-like) candle,40% from the third (bullish) candle. The overall score is clamped between 0 (no resemblance) and 1 (perfect match).

Evening Star Pattern Detection

The Evening Star pattern is a three-candle reversal formation signaling a potential bearish trend. Our implementation evaluates each candle to generate a cumulative resemblance score ranging from 0 (no match) to -1 (perfect match for a bearish pattern).

First Candle (Bullish):The first candle must be bullish with a strong body.Its score is computed as the bullish body ratio, capped to a maximum of 1.
Middle Candle (Doji-Like):The middle candle is expected to have a very small body relative to its range, indicating indecision.The score decreases as the body becomes larger relative to the range, ideally nearing 0 when the candle is doji-like.
Third Candle (Bearish):The third candle should be bearish with a strong body.A bearish body ratio is calculated, and a reversal factor assesses how effectively it negates the bullish move from the first candle.
Final Resemblance Score:The three sub-scores are combined with weights (30% for the first candle, 30% for the middle candle, and 40% for the third candle).Since the Evening Star is a bearish pattern, the score is inverted to produce a final score between -1 (perfect bearish resemblance) and 0 (no resemblance).

The Algorithm – Confidence Score Evaluation

- Pattern Scoring:Each candlestick pattern (Bullish Engulfing, Bearish Engulfing, Morning Star, Evening Star, etc.) is analyzed individually.The computed scores are normalized-Bullish patterns score between 0 and 1. Bearish patterns score between -1 and 0.
- Aggregation Per Timeframe - Pattern scores are calculated on three different candlestick charts (5min, 15min, and 60min).For each timeframe, a cumulative score is obtained by:Taking the maximum bullish score across relevant patterns.Taking the minimum bearish score across relevant patterns.Summing these scores to yield a final score in the range [-1, 1].
- Final Confidence Calculation- The scores from the three timeframes are merged using a weighted average method.The weights can be static or dynamically adjusted (e.g., based on score variance) to emphasize more volatile or significant timeframes.The result is a final confidence value that reflects overall market sentiment with a range of -1 (strong bearish) to +1 (strong bullish).

Why and how the algorithm was implemented

Objective:Accurate Pattern Matching:
The algorithm was developed to perform precise, statistical candlestick pattern analysis. Unlike humans—who may overlook subtle details or introduce biases—this method ensures consistent pattern detection and evaluation based on strict mathematical criteria.

How It Works: Firstly the pattern resemblance score is generated and then aggregated upon multiple time frame analysis. For each time frame, individual pattern scores are aggregated (by taking maximum bullish and minimum bearish scores) to generate a final score for that interval.Final scores from all timeframes are combined using a weighted average method, producing a final confidence score.

Benefits: Reduced Human Error, Predictive Insight, Statistical Rigor, with this the automated intraday trading becomes efficient making consistent profits of

UPTIQ use in our project

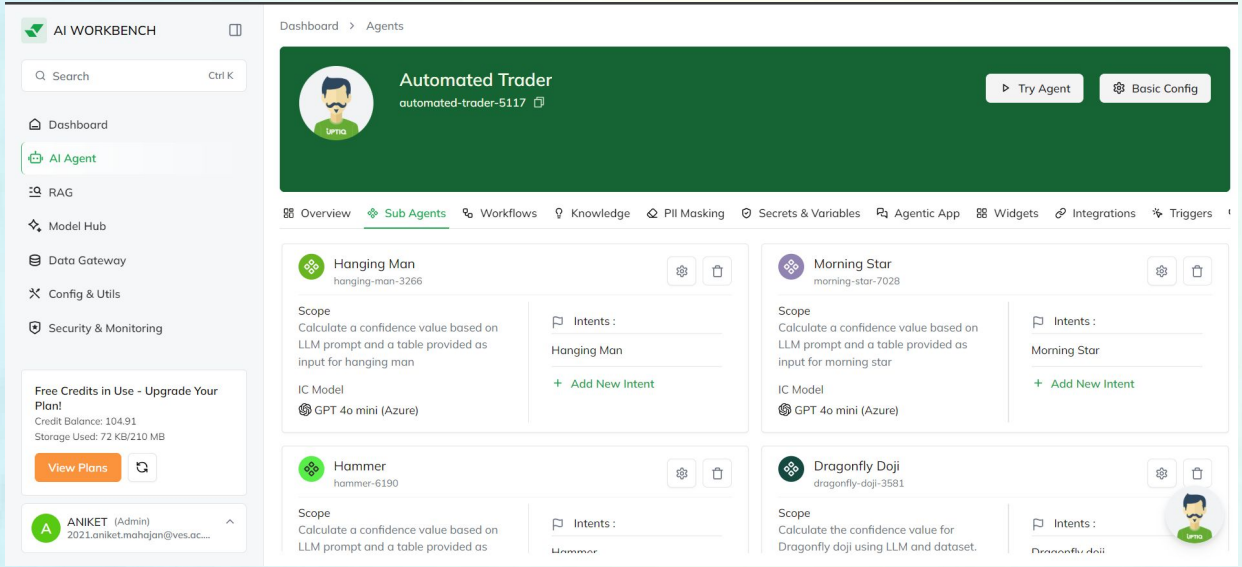
- The UPTIQ Agent is designed for automated calculation of resemblance scores for each candlestick pattern.
- A sub agent is created for each candlestick pattern which imports a sample dataset via read table and passes it over to the LLM prompt.
- An accurate prompt is provided to the LLM which provides resemblance scores for each timestamp present in the dataset.
- A swift workflow was generated for the intent of each sub agent which consisted of Start -> Table Read -> Prompt -> Display.

Tech Stack

Frontend: React and Tailwind CSS

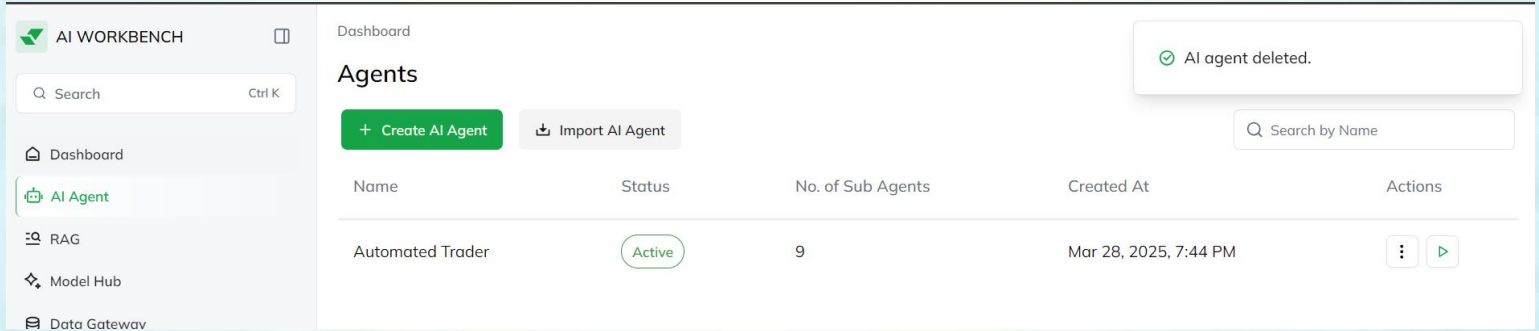
Backend: Python, Uptiq.ai

Implementation/Prototype/Use Case Diagram (screenshots)



Implemented Backend

Implementation/Prototype/Use Case Diagram (screenshots)



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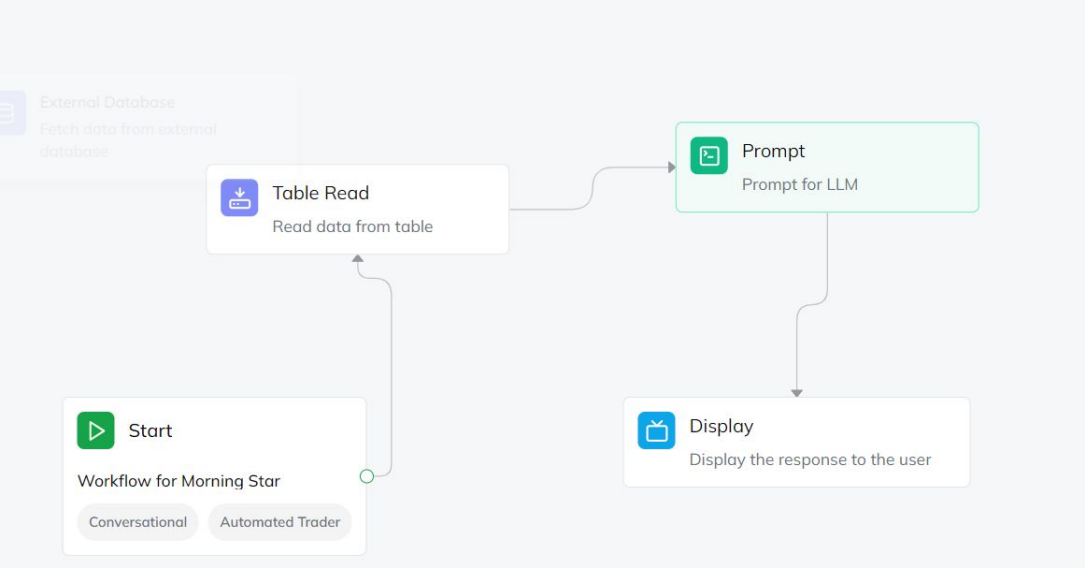

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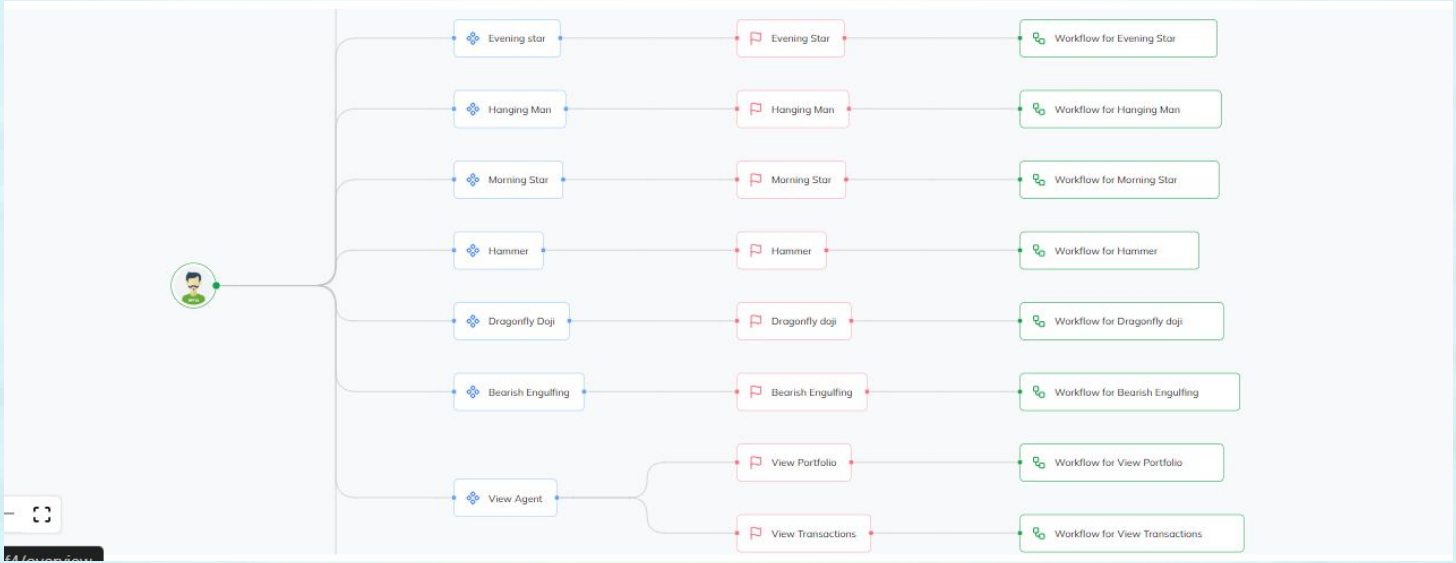

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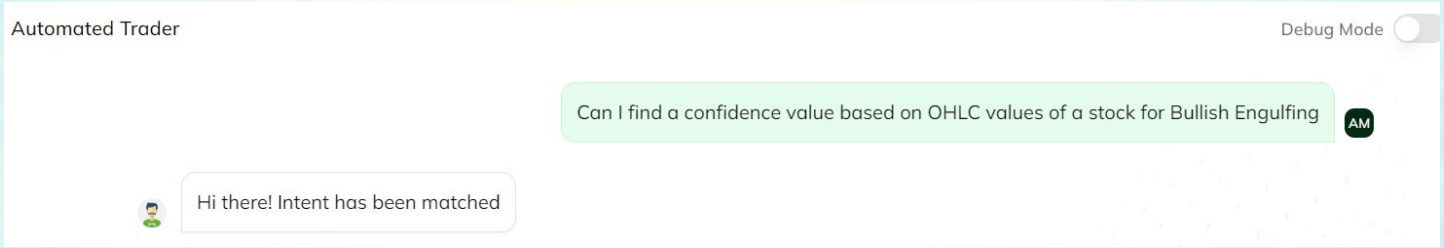

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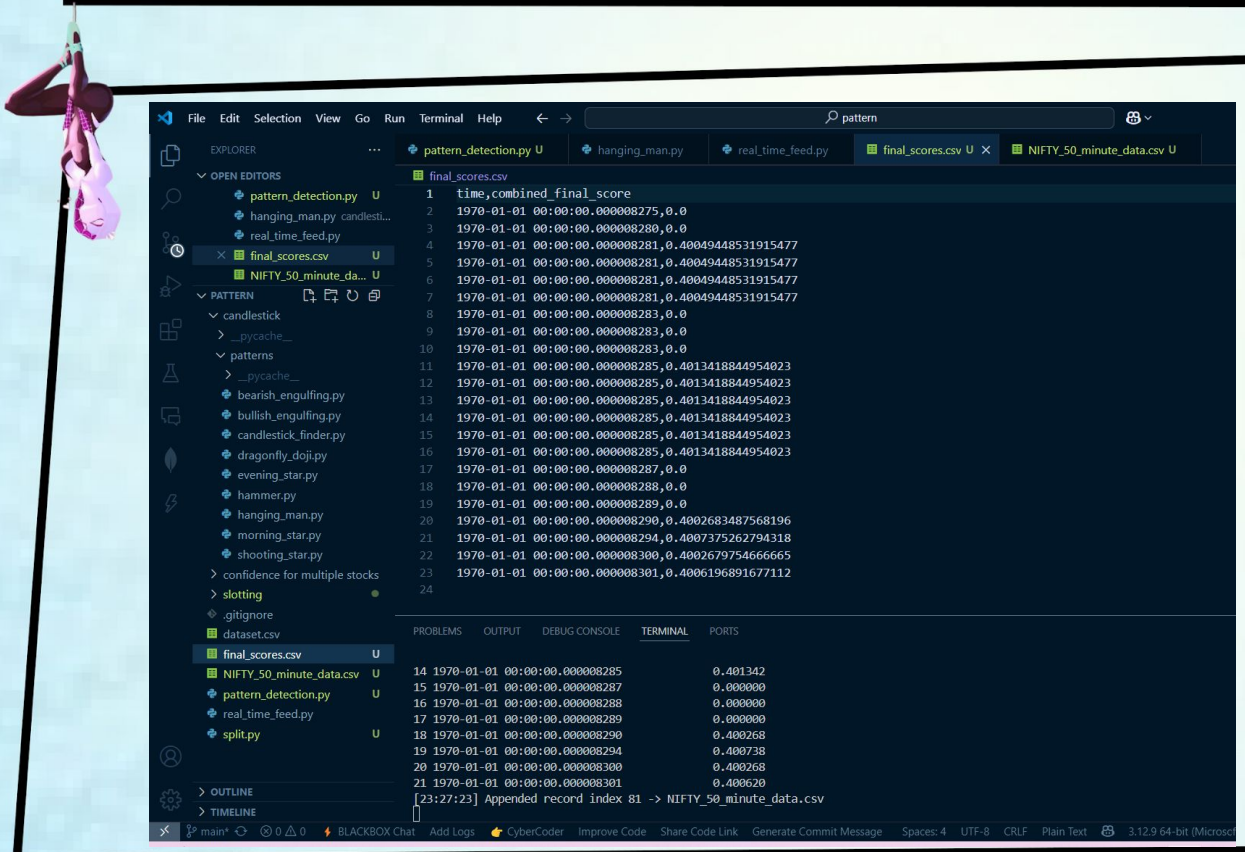

Backend setup with virtual environment calculating confidence score

Your Uptiq Agent & Mentor Feedback

- Initially, one sub-agent was handling all the tasks in our system.
- However, our mentor suggested dividing the workload among eight sub-agents, each responsible for a specific candlestick pattern.
- This approach helped in distributing the tasks efficiently.
- This allowed each sub agent to focus on calculating confidence scores through only one method.
- As a result, it significantly reduced crowding in our workflow.

Future Objectives

- Financial news will be scraped from the internet and will be provided to Gemini for summarization based on how it'll affect the stock domain(banking).
- The summarized text will be fed to sentiment analysis models.
- These models will generate a sentiment score that ranges between -1 to 1 where -1 indicates dip and 1 indicates rise.
- Based on this sentiment score which will be integrated with confidence score to predict the rise or dip of stock.