Technical Assignment – Quant Developer Position

Qode Advisors LLP

Overview

You are required to build a data collection and analysis system for real-time market intelligence. This assignment evaluates your Python proficiency, system design capabilities, and understanding of financial markets.

Task Requirements

1. Data Collection

- Scrape Twitter/X for tweets containing Indian stock market discussions
- Focus on similar hashtags: #nifty50, #sensex, #intraday, #banknifty
- Extract: username, timestamp, content, engagement metrics, mentions, hashtags
- Target: Minimum 2000 tweets from the last 24 hours
- **Constraint**: No paid APIs allowed

2. Technical Implementation

- Implement efficient data structures for real-time processing
- Handle rate limiting and anti-bot measures creatively
- Optimize for both time and space complexity
- Include proper error handling and logging
- Code must be production-ready with appropriate documentation

3. Data Processing & Storage

- Clean and normalize collected data
- Design an efficient storage schema (Parquet format preferred)
- Implement data deduplication mechanisms

- Handle Unicode and special characters in Indian language content

4. Analysis & Insights

Convert textual data into quantitative signals for algorithmic trading:

- **Text-to-Signal Conversion**: Transform tweet content into numerical vectors using TF-IDF, word embeddings, or custom feature engineering
- **Memory-efficient visualization**: Create low-memory plotting solutions for large datasets (streaming plots, data sampling techniques)
- **Signal aggregation**: Combine multiple text features into composite trading signals with confidence intervals

5. Performance Optimization

- Implement concurrent processing where applicable
- Memory-efficient data handling for large datasets
- Consider scalability for processing 10x more data

Deliverables

Submit as a GitHub repository containing:

- Complete codebase with proper structure and documentation
- README with setup instructions and project overview
- Requirements file and environment setup
- Sample output data and analysis results
- Brief technical documentation explaining your approach

Repository should demonstrate professional software development practices.

Evaluation Criteria

- Code quality and software engineering practices
- Data structure selection and algorithmic efficiency
- Understanding of Indian market dynamics
- Problem-solving approach for technical constraints
- Scalability and maintainability of solution

Time Limit

24 hours from assignment receipt

Note: This assignment tests real-world problem-solving skills. Creative solutions to technical challenges are encouraged. Focus on demonstrating your ability to build robust, efficient systems rather than just completing the task. Strictly avoid the use of any paid APIs or Twitter API.