



TASK B.7.1 REPORT

COS30018
Intelligent Systems



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Task B7

This report documents the fulfillment of Task 1 of the "Task B.7 - Extension" assignment. The task required researching potential approaches for predicting company stock prices/trends beyond purely historical data and selecting one approved approach for implementation.

1. Summary of Research and Chosen Approach

As per the assignment requirements, research was conducted to identify potential extensions to the v0.6 codebase. The goal was to find a method that could enhance predictive accuracy by incorporating data sources other than historical stock prices. The chosen approach, which directly aligns with the assignment's suggestions, is **Sentiment Analysis with News Headlines and Social Media Data**.

Main Idea:

The core idea is to quantify market sentiment by analyzing the emotional tone of news articles and social media posts related to a specific company (e.g., CBA.AX). This sentiment score—a numerical representation of whether public and media sentiment is positive, negative, or neutral—will be engineered into a new feature. A sudden influx of negative headlines, for instance, can erode investor confidence and lead to a sell-off, a dynamic that purely technical models cannot capture. This feature will then be integrated into the existing Deep Learning (LSTM, GRU) and machine learning models to see if it improves their predictive power.

This approach was selected for the following reasons:

Fulfills Assignment Requirements: It directly addresses the prompt to use external data sources like social media mentions, moving beyond the limitations of purely historical price and volume data.

Logical Foundation: It is based on the well-established theory that market psychology is a significant driver of stock price movements. Financial markets are not purely rational; they are influenced by the collective emotions of investors, which are often shaped by news and public discourse.

Feasibility: The approach is well-documented in numerous online resources and academic papers, making it a suitable "Simple Extension" as defined by the assessment criteria. The availability of powerful Python libraries like VADER (Valence Aware Dictionary and sEntiment Reasoner) for sentiment analysis and various news APIs makes the implementation practical and achievable within the project's scope.

2. Fulfillment of Task 1: Research and Planning

Task 1, "Research potential approaches for predicting companies' stock prices/trends," has been successfully completed. The research has culminated in not just the selection of an idea, but also in the creation of a comprehensive set of planning documents that prove a deep and thorough investigation into the chosen approach. These documents provide a clear roadmap from concept to execution.

The following documents, derived from the research, have been prepared and constitute the complete fulfillment of this task:

1. **Idea Document:** A high-level summary defining the concept, its core rationale, and a clear implementation path. This document serves as the foundational proposal, outlining the "what" and the "why" of the sentiment analysis extension.

2. **Requirements Document:** A detailed specification that translates the high-level idea into concrete functional and non-functional requirements. It uses user stories and specific acceptance criteria

to define the expected behavior for data collection, sentiment processing, model integration, and final evaluation, ensuring all stakeholders have a clear understanding of the project's goals.

3. Design Document: A complete technical architecture plan that serves as the engineering blueprint for the system. It includes high-level diagrams, data flow models, component interface definitions (e.g., SentimentDataCollector, NewsAPIClient), data models, and critical considerations for error handling, testing, and security, ensuring a robust and scalable implementation.

4. Implementation Plan: A detailed, step-by-step project plan that breaks the development work into manageable tasks and phases. This roadmap covers everything from initial infrastructure setup and core component development to integration testing, documentation, and final deployment, ensuring the project progresses logically and efficiently.

Conclusion

Together, these documents demonstrate that the research phase is complete. A viable, well-documented, and logical extension has been identified and thoroughly planned, ready for project leader approval and subsequent implementation.