Универзитет „Св. Кирил и Методиј“ во Скопје
ФАКУЛТЕТ ЗА ИНФОРМАТИЧКИ НАУКИ И КОМПЈУТЕРСКО ИНЖЕНЕРСТВО

Macedonian Stock Market Analysis Web Application

Software Requirements Specification (SRS)

Prepared by :
Dea Jadrovska (221526)
Teodor Bogoeski (221511)
Blerona Muladauti (221541)

November, 2024

System Overview

The system automates data retrieval, transformation, and storage from the Macedonian Stock Exchange website, providing users with tools for technical and fundamental analyses and integrating machine learning predictions to guide trading decisions.

Functional Requirements

F.1 Data Retrieval and Transformation:
1.1 The system shall retrieve issuer list from the stock exchange website and filter by valid issuers.
1.2 The system shall check the last available date for each issuer's data in the database.
1.3 The system shall retrieve missing data, ensuring formatted dates and prices.
1.4 The system shall parse and store data in a structured format in the database
1.5 The system shall store at least 10 years of historical stock data for each issuer

F.2 Technical Analysis:
2.1 The system shall support price trend analysis and calculate support/resistance levels.

F.3 Fundamental Analysis:
3.1 The system shall scrape sentiment data from reports to support investment analysis.

F.4 Machine Learning Integration:
4.1 The system shall implement a machine learning model for predictive analysis and buy/sell recommendations.

F.5 Application Features
5.1 The system shall allow users to refresh the data view.
5.2 The system shall display the most recent stock data
5.3 The system shall allow users to search data for every symbol in the Historical Data
5.4 The system shall provide a recommendation (e.g., buy, hold, sell) based on ML analysis of the stock’s history.
5.4 The system shall provide users with options for worth-buying stocks based on market shares prediction.

Non - Functional Requirements

F1 Performance:
1.1 The data population should be optimised for efficiency.
1.2 The system shall process and store data for all issuers within a maximum of 5 minutes after retrieval.
1.3 Queries on the database for historical stock data should return results within 2 seconds for data up to 10 years.

F2 Scalability:
2.1 The system should manage data growth effectively.
2.2 The system shall support additional data sources and issuers without requiring significant changes to the existing architecture.
2.3 The application should handle up to 100,000 data entries per issuer without degradation in performance.

F3 Reliability:
3.1 The application should handle errors gracefully and ensure data integrity.
3.2 The system shall maintain a 99.9% uptime to ensure continuous access to stock data and recommendations.

F4 Usability:
4.1 Design should be intuitive for users with various analysis tools.

F5 Security:
5.1 All data transmitted between the server and client shall be encrypted using industry-standard encryption protocols.

F6 Maintainability
6.1 The system architecture should allow for updates to the machine learning model without affecting existing functionality.

User Scenarios, Personas

Personas:
1. Retail Investor - An individual investor interested in making profitable trades. They seek clear buy/sell recommendations and prefer straightforward tools.
2. Financial Analyst - A professional user who performs in-depth analysis and expects access to both technical and fundamental analysis tools.

User Scenarios:

1. A retail investor opens the application to check if any stocks have strong buy recommendations. They select a stock issuer, review the ML-based prediction, and make a purchase decision.
2. A financial analyst selects a specific issuer and uses both technical and fundamental analysis tools. They compare trend data and market sentiment before finalising an investment plan.

Descriptive Narratives

Iva:

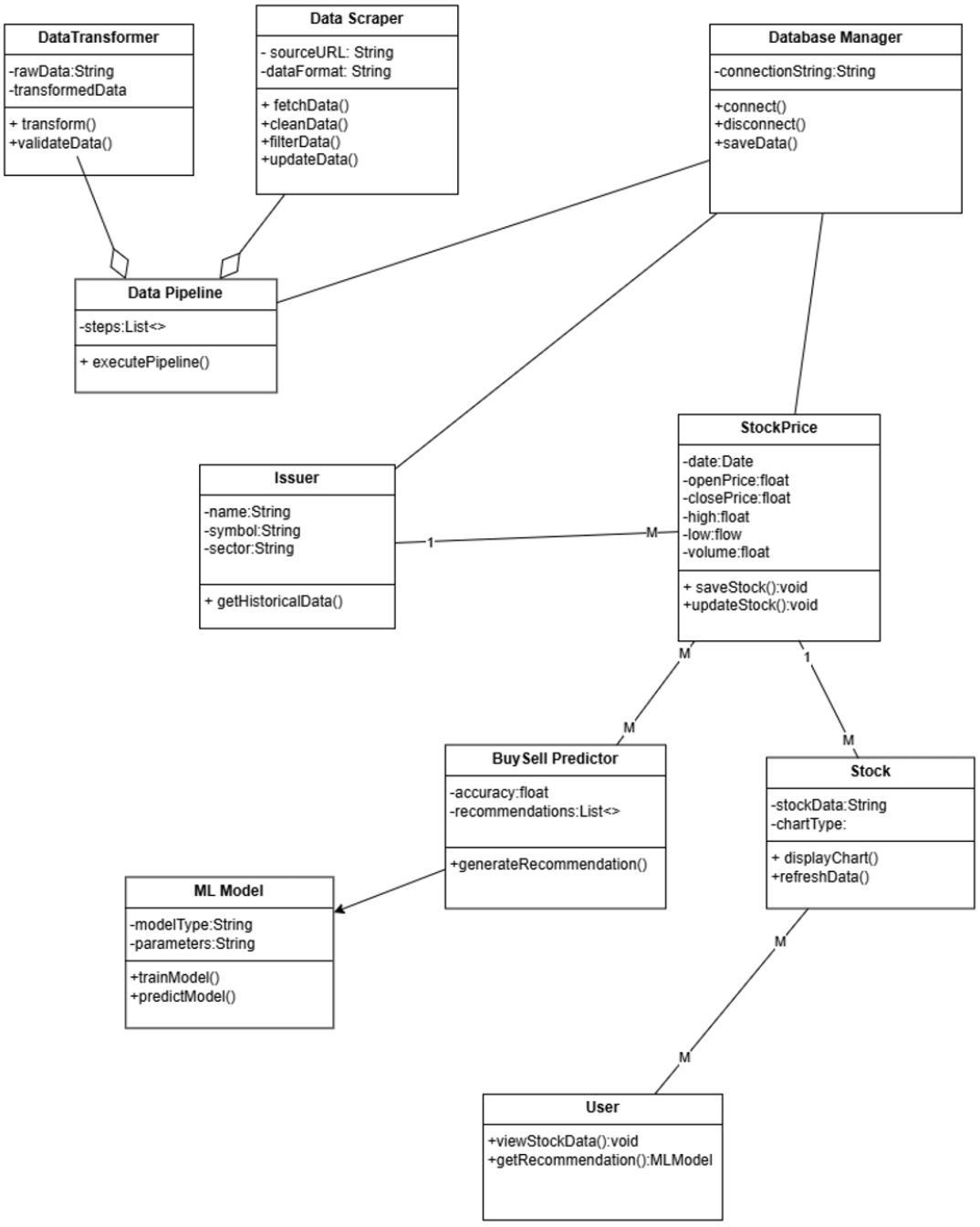
Iva, a retail investor, logs into the stock market application and navigates to the "Technical Analysis" page. She selects "Company X" from the list of issuers. The application pulls recent price trends and uses machine learning predictions to evaluate market sentiment. Based on this data, Iva receives a "buy" recommendation with a confidence score of 80%. She decides to buy shares, satisfied with the application's clear recommendation and supportive analysis.

Marko:

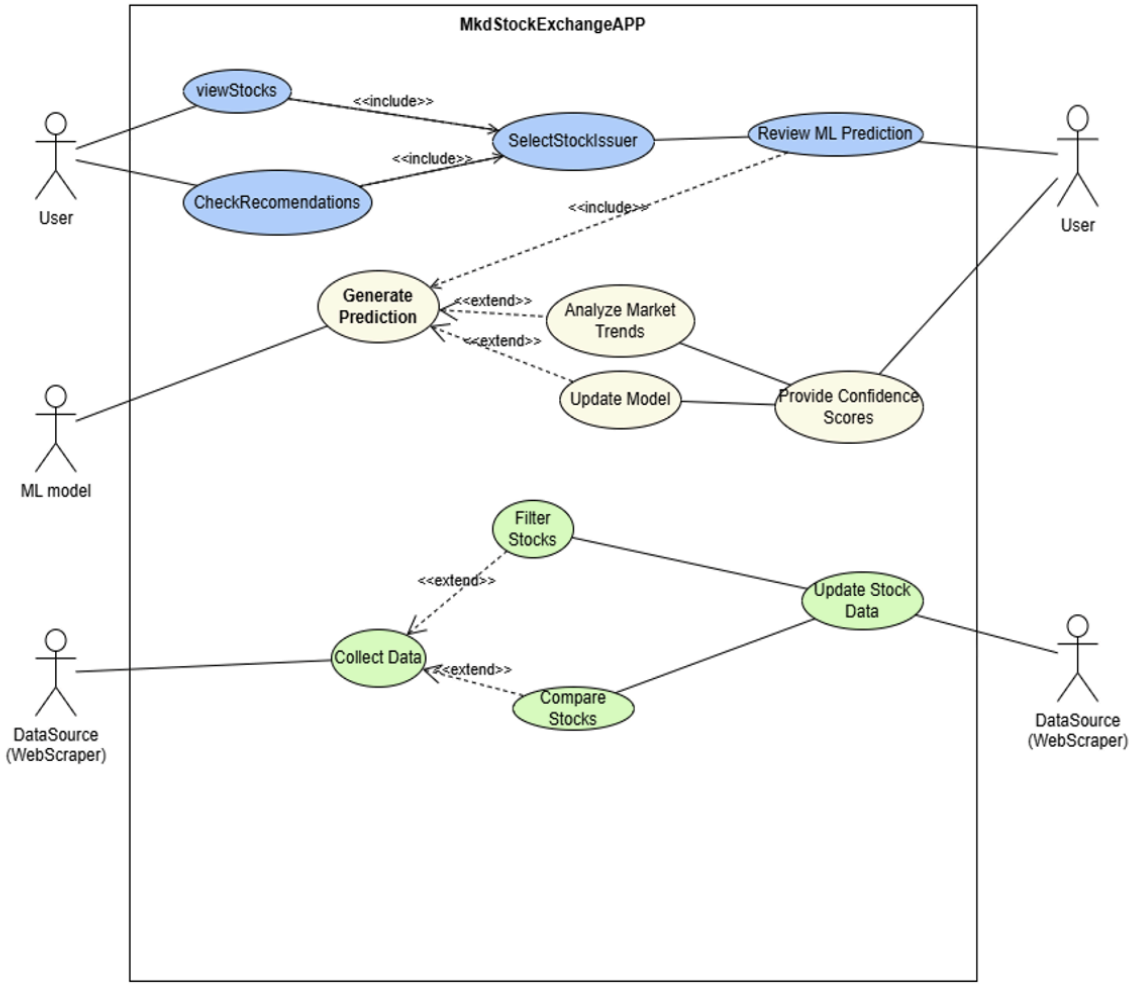
Marko, a financial analyst, logs into the stock market analysis app each morning to review recent trends and predictions. Today, he checks "Company Y" in the "Historical Data" section, where over ten years of stock information are available. The app’s machine learning model suggests a "hold" recommendation, indicating that the stock price is likely to stabilise. Marko uses the sentiment analysis tool to pull recent company reports, confirming positive market sentiment. With these insights, he decides to keep monitoring the stock, confident that the app’s data and recommendations support his investment strategy.

UML Diagrams

1. Class Diagram



2. Use Case Diagram



3. Activity Diagram