Software Requirements

Specification

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1. Project Description

Application name: InsightStocks

The project aims to develop a web application that provides in-depth analysis and tracking of stocks listed on the Macedonian Stock Exchange. This platform will serve as a valuable tool for investors, financial analysts, and students by offering comprehensive data on historical stock performance, fundamental financial metrics, and technical indicators. By using a pipe-and-filter architecture, the application will automate the process of fetching, transforming, and storing data, ensuring accuracy and up-to-date information.

Key features of the application will include technical analysis tools, such as moving averages, RSI, and trend lines, which will help users visualize stock performance over time. Additionally, fundamental analysis will enable users to examine essential financial indicators, including P/E ratio, market capitalization, and earnings growth. The application will also incorporate predictive analytics, using historical data to forecast potential future trends through models like linear regression, time series, and machine learning algorithms. These predictions will help users make informed investment decisions by offering insights into possible future stock movements.

To provide personalized user experience, the application will include a secure login system, enabling users to save preferred analysis parameters, view saved data, and access custom reports. The platform will feature a clean, intuitive interface that allows users to view data visually, with options to filter by company and specific time periods. Furthermore, it will include a real-time table of the top 10 most actively traded stocks and a news feed section to keep users updated on the latest events affecting the stock market. In essence, this project aims to create a powerful yet user-friendly tool that empowers users to better understand market trends and stock potential, assisting both novice and professional investors in their financial analyses.

2. Specific Requirements

2.1. Functional requirements

2.1.1. The web application shall automatically retrieve historical stock data for all available issuers listed on the Macedonian Stock Exchange and update data periodically by adding only missing records since the last update.

2.1.2. The web application shall provide tools for technical analysis, including the calculation of RSI (Relative Strength Index) to identify overbought or oversold conditions and trend lines to visualize the direction of stock price movements.

2.1.3. The web application shall calculate and display key financial metrics for fundamental analysis, including the P/E Ratio (Price-to-Earnings Ratio) to evaluate stock valuation based on earnings per share.

2.1.4. The web application shall include predictive analysis features that use historical data to forecast potential future trends using models such as linear regression and time series analysis.

2.1.5. The web application shall allow users to filter and analyze data based on specific companies and selected time periods, providing options for both technical and fundamental analysis.

2.1.6. The web application shall provide graphical visualization of stock price history for specific companies.

2.1.7. The web application shall display a real-time table of the top 10 most actively traded stocks on the Macedonian Stock Exchange.

2.2. Non-functional requirements

2.2.1. The application shall load data and display analysis results within a reasonable time frame to ensure a smooth user experience.

2.2.2. The application shall offer a responsive and intuitive user interface, allowing users to navigate easily between different analysis tools and view data in graphical formats for easier interpretation.

2.2.3. The application shall be accessible across various devices, including computers, tablets, and mobile phones, and be compatible with major web browsers.

2.2.4. The application shall utilize modular code to support easy maintenance, upgrades, and the addition of new analysis features without disrupting existing functionality.

2.2.5. The application shall efficiently manage and process large data sets to handle the volume of historical stock data, ensuring optimal performance during calculations and visualizations..

2.2.6. The application shall be designed for scalability, allowing it to handle an increasing number of users and larger data volumes without significant degradation in performance.

2.2.7. The application shall ensure high availability, with minimal downtime, to provide users with consistent access to real-time data and analysis tools.

3. User Interaction Scenario

3.1. Use-case scenarios

3.1.1. Technical Analysis of a Selected Stock

- **Actor**: Professional investor
- **Aim**: To perform a technical analysis of a selected stock to understand its trading trends.
- **Precondition**: The user accesses the application

Main Flow:

1. The user opens the web application. Login is optional for accessing technical analysis.
2. The user navigates to the "Stocks" section and selects a stock for analysis.
3. The user selects the “Technical Analysis” option and chooses indicators, such as RSI and trend lines.
4. The application processes the data and displays the selected indicators as charts over a specified time period.
5. The user reviews the charts to make informed decisions about the stock.

Alternative Flow:

- If the data for the selected stock is unavailable, the application shows an error message.

3.1.2. Historical Price Analysis for Research

- **Actor**: Economics student
- **Aim**: To analyze the historical price data of a stock for research purposes.
- **Precondition**: The user accesses the application

Main Flow:

1. The user opens the application and goes to the “Historical Data” section.
2. The user selects a stock and specifies a time range (e.g., the last 5 years) for historical data.
3. The application retrieves and displays the data as charts and tables.
4. The user reviews or downloads the data in CSV format for further analysis.

Alternative Flow:

- If the selected time range is too large, the application suggests a smaller time range for better performance.

3.2. User Personas Scenario

3.2.1. Persona: Elena, 35 years old, Finance Manager

Elena is a finance manager who likes to invest part of her savings in stocks. Due to her busy schedule, she appreciates tools that provide quick insights without requiring too much of her time. She recently started using the web application to monitor her investments more closely.
One weekend, Elena logs into the app and navigates to the "Stock Price History" section. She selects a company she has invested in, "MakInvest," and the app displays an interactive graph of its stock price history over the past year. Elena quickly identifies a consistent upward trend and decides to keep her investment in MakInvest for a few more months. This visual insight gives her the confidence to make a quick, informed decision without digging through complex data tables.

3.2.2. Persona: Ana, 35 years old, Experienced Trader

Ana is a 35-year-old experienced trader who relies on data-driven insights to make informed trading decisions. She frequently uses advanced tools to analyze potential price movements and is always looking for ways to stay ahead of the market.

One morning, Ana opens her stock analysis application to explore potential trading opportunities. She navigates to the "Predictive Analysis" section, where she can access tools to forecast future price trends. She selects a stock she’s interested in, "ALK" and chooses a 1-month period for the prediction.

The application runs a predictive model, using techniques like linear regression and time series analysis, to estimate future trends. Within moments, Ana sees a chart displaying projected price movements with confidence intervals, helping her visualize the possible range of outcomes.

Ana reviews the prediction results carefully, analyzing the trends to decide if it aligns with her trading strategy. Confident in the analysis, she feels prepared to make an informed decision. If there isn't enough data to generate accurate predictions, the application suggests expanding the historical data period or choosing a different stock.

3.3. Descriptive Narrative Scenario

3.3.1. The user opens the stock analysis web application and navigates to the "Trend Chart" section. They select a specific stock, such as "Alkaloid," and set a time period for analysis, for example, the last 6 months. The application automatically retrieves and processes the historical price data for the selected stock, applying various technical indicators like moving averages, RSI (Relative Strength Index), and trend lines.
Once the data is prepared, the application displays it as an interactive chart. The user can visualize how the stock's price has changed over time and utilize various analysis tools, such as zooming into specific time periods or toggling specific indicators to clarify trends. This enables the user to easily identify key moments when the stock's price increased or decreased significantly, as well as to anticipate potential future price movements based on historical trends.