**Functional Requirements List**

**Information Collection:**

1.1. The system SHALL be coordinated with financial data sources using APIs or data providers to gather historical stock prices.

1.2. The system SHALL integrate sources for relevant financial indicators, news sentiment, and macroeconomic data.

**Information Preprocessing:**

2.1. The system MAY generate methods to clean and handle missing data in historical stock prices and other datasets.

2.2. The system SHALL normalize and scale the data for consistency and comparability.

**Feature Engineering:**

3.1. The system MAY implement algorithms to generate new features such as moving averages, relative strength indicators, or technical indicators.

3.2. The system SHALL transform data to capture relevant patterns and trends.

**Algorithm Selection:**

4.1. The system MAY select and implement machine learning algorithms (e.g., linear regression, decision trees, random forests, neural networks).

4.2. The system MAY optimize algorithms based on performance metrics.

**Training and Testing:**

5.1. The system SHALL partition historical data into training and testing sets.

5.2. The system SHALL establish a plan for retraining the model to adapt to changing market conditions.

**Forecast Generation:**

6.1. The system SHALL use the trained model to generate stock price forecasts based on historical and current data.

6.2. The system MAY provide confidence levels or probability distributions for predictions.

**Evaluation Metrics:**

7.1. The system SHALL calculate metrics such as MAE, MSE, or accuracy to evaluate model performance.

7.2. The system SHALL evaluate the model against historical data to gauge effectiveness.

**User Interface:**

8.1. The system MAY develop an interface for users to input parameters, visualize predictions, and analyze results.

8.2. The system MAY incorporate visualizations of historical and predicted stock prices.

**Alerts and Notifications:**

9.1. The system SHOULD implement alerts for users based on significant changes in stock prices or model predictions.

9.2. The system MAY provide notifications for potential investment opportunities or risks.

**Interpretability:**

10.1. The system SHALL provide explanations for model predictions to enhance user understanding.

10.2. The system MAY include visualizations of feature importance and contribution to predictions.

**Model Explainability:**

11.1. The system SHALL implement methods to make model decisions more interpretable.

11.2. The system MAY visualize the decision-making process of the model.

**Continuous Monitoring:**

12.1. The system SHALL establish continuous monitoring of model performance.

12.2. The system MAY periodically validate against out-of-sample data.

**Data Visualization:**

13.1. The system SHALL provide interactive charts and graphs for users to explore historical stock data and model predictions.

**Customizable Alerts:**

14.1. The system SHOULD allow users to customize alert thresholds based on their risk tolerance and investment strategies.

**Feedback Mechanism:**

15.1. The system MAY incorporate a feedback mechanism for users to provide input on the accuracy of forecasts, which can be used for model refinement.

**Cross-Platform Compatibility:**

16.1.The system MAY ensure cross-platform compatibility, allowing users to access features seamlessly across various devices and operating systems.