**CHAPTER FIVE**

# Introduction

This chapter presents a summary of the research findings, draws conclusions based on the study's outcomes, identifies challenges encountered during implementation, outlines lessons learned, and provides recommendations for future work. The study focused on developing a web-based stock price prediction system using the Facebook Prophet model, designed to assist investors in making data-driven decisions.

# Findings

* + - Functionality: The developed system can accurately forecast stock prices for selected companies using historical data retrieved via the yfinance API. Users can specify forecasting periods and visualize results with Plotly charts.
    - Model Performance: The Facebook Prophet model proved effective for time-series forecasting with daily data. It performed well under normal market conditions and provided interpretable outputs.
    - User Interface: Streamlit enabled the development of a user-friendly web interface. Users could interact with the app without needing technical expertise.
    - Visualization: Interactive charts such as line plots, candlestick charts, and component forecasts enhanced user understanding of trends and model components.
    - User Feedback: Initial user testing (with finance students and novice investors) confirmed that the application was easy to navigate, informative, and helpful for educational and investment purposes.

# Conclusions

The research demonstrates that integrating machine learning models like Facebook Prophet into a web-based application can significantly enhance the ability of investors to forecast stock prices. The project achieved its goal of creating a functional, interactive, and accessible forecasting system. While the system is limited to selected companies and does not incorporate external market factors (e.g., news, earnings reports), it provides a solid foundation for time-series-based financial forecasting.

# Challenges

* + - Data Quality and Availability: Stock data from Yahoo Finance occasionally had missing or inconsistent values, which required preprocessing.
    - Model Limitations: Prophet assumes that future trends mirror past behaviors, which may not hold true in volatile or irregular markets.
    - Deployment Issues: Hosting the application with external dependencies like yfinance and Prophet sometimes caused delays and required robust error handling.
    - Limited Scope: The model did not incorporate non-price indicators such as sentiment analysis, financial ratios, or macroeconomic factors, which could improve accuracy.

# Lessons Learnt

* + - Iterative Development Helps: Using Agile methodology allowed for continuous testing and user feedback, which improved the system's usability and performance.
    - Data Preprocessing is Critical: Quality input data significantly influences model output, especially for time-series forecasting.
    - Model Interpretability Matters: The choice of Prophet over more complex models (e.g., LSTM) balanced prediction accuracy and interpretability for users with non-technical backgrounds.
    - User-Centered Design is Key: Simplicity in interface design enhanced accessibility, particularly for users unfamiliar with machine learning or programming.

# Recommendations for Future Works

* Support for More Stocks
* Incorporation of External Variables
* Alternative Forecasting Models
* Mobile Compatibility
* Prediction Summary and Insights
* Real-time Data and Alerts

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