CHAPTER V
CONCLUSIONS AND SUGGESTIONS

5.1. Conclusion

Based on the findings of this study on broiler chicken price prediction in East Java Province using the Long Short-Term Memory (LSTM) algorithm optimized with Particle Swarm Optimization (PSO), the following conclusions were obtained:

1. The Long Short-Term Memory (LSTM) model was effectively implemented to predict broiler chicken prices in East Java Province using daily historical data from January 2018 to January 2026. The modeling process was carried out through data preprocessing, feature engineering, normalization using Min-Max Scaling, sequence formation with a 30-day time window, and evaluation using the Walk-Forward Validation method as much as five folds.
2. According to the evaluation outcomes measured using the MAE, RMSE, and MAPE metrics, the baseline LSTM model achieved an average MAE of 560.08, RMSE of 731.39, MAPE of 1.6273%. This relatively low MAPE indicates that the baseline LSTM model is capable of accurately forecasting broiler chicken prices by learning historical price patterns.
3. The application of Particle Swarm Optimization (PSO) significantly enhanced the predictive performance of the LSTM model through hyperparameter optimization. The best scenario was obtained in scenario 8 configuration with a combination of 15 particles and 10 iterations, which resulted in an average MAE of 232.89, RMSE of 364.95, and MAPE of 0.6814%. Relative to the baseline LSTM model, the application of PSO successfully improved model performance with a decrease in MAE of 58.42%, RMSE of 50.10%, and MAPE of 58.13%. These results indicate that hyperparameter optimization using PSO is effective in increasing the accuracy of broiler chicken price forecasting across East Java Province.

5.2. Suggestions

Based on the findings of this study, the following recommendations are proposed for future research:

1. Adding external variables such as corn prices, animal feed prices, inflation, rainfall, religious holidays, and other economic factors to obtain a more comprehensive data representation.
2. Compare the predictive performance of the LSTM–PSO model with alternative deep learning architectures, including GRU, Bi-LSTM, CNN-LSTM, Transformer, and other hybrid approaches.
3. Developing other hyperparameter optimization techniques, including Bayesian Optimization, Genetic Algorithm, or Differential Evolution to find out the most effective optimization method in the case of food commodity price prediction.