

ABSTRACT

Uncertainty in production planning is a primary challenge for bread businesses, leading to overstocking or stockouts. To address this, a system capable of providing accurate sales predictions is required. This research aims to design and build a web-based application to predict daily bread sales by implementing the Autoregressive Integrated Moving Average (ARIMA) time series method. The system was developed using the Python programming language, the Flask framework, and a MySQL database.

The research methodology included system design, implementation, and testing. Initial tests to determine the best model parameters identified ARIMA(3,0,4) as the optimal model, with an MAE of 4.59 and an MSE of 35.13. Functional testing was also performed using the black-box method to ensure all features work as expected.

Furthermore, an experiment was conducted to investigate the impact of historical data volume on model performance by comparing results after adding 1 week, 1 month, 2 months, and 3 months of new data. The results show that the system was successfully built and functions well. The experiment proved that adding 2 months of historical data is most optimal for predictions in this case, yielding the lowest error rates with an MAE of 3.77 and an MSE of 21.58.

These findings indicate that the ARIMA model is effective for sales forecasting and that using an appropriate length of historical data is a key factor in achieving the best accuracy.

Keywords: *ARIMA, forecasting, time series, web application, MAE, MSE*