



PROJECT REPORT
RICE PRODUCTION PREDICTION USING LONG
SHORT-TERM MEMORY (LSTM), GATED RECURRENT
UNIT (GRU), AND BIDIRECTIONAL LSTM (BiLSTM)

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ABSTRACT (ABSTRACT TITLE)

Rice yield prediction is a crucial contributor to national food security in Indonesia. This study aims to formulate a national rice yield forecasting model using Long Short-Term Memory (LSTM), Gated Recurrent Unit (GRU), and Bidirectional LSTM (BiLSTM) models. These three models were selected because of their ability to learn time series patterns and sequential data with long dependencies, with BiLSTM being able to process both time directions simultaneously. Multivariate annual time series data from 2000 to 2024 were used in this study. This dataset consists of rice production data from the Central Statistics Agency (BPS) and climate variables such as rainfall, and average temperature obtained from the BMKG and NOAA. The collected data underwent pre-processing, including normalization and quality control, and was then divided into training and testing data. The training process was conducted separately for each model. Model performance was evaluated using the Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE) metrics to measure prediction accuracy. The results of this study are expected to indicate which model is most optimal in predicting national rice production, while also evaluating the contribution of climate variables in improving predictions accuracy.

Keywords: Rice production prediction, LSTM, GRU, BiLSTM, Climate