

ABSTRACT

Rice productivity in West Java shows a trend of stagnation and fluctuations that require accurate prediction models for food security. This study applies the CART decision tree algorithm and LSTM neural network with time-based feature expansion ($t-1$ to $t-5$) to historical data from 2018–2023 to classify rice productivity in 27 regencies/cities in West Java for the period 2024–2028. Seven variables of rice planting area, rainfall, rainy days, humidity, temperature, sunshine, and number of farmers were subjected to time-based feature expansion to obtain a feature combination. CART excelled with accuracy up to 100% in the two- and four-year scenarios, while LSTM only achieved a maximum of 66.67%. Feature analysis confirmed the dominance of structural factors (planting area and number of farmers), climatological variables as short- to medium-term predictors, and humidity as a long-term predictor. The predicted spatial map identifies high-productivity zones in Karawang, Subang, and Indramayu, as well as low-productivity zones in the western and southern regions, and supports strategic decision-making for land consolidation, targeted interventions, and sustainable agricultural development.

Keywords: rice productivity prediction, classification and regression tree, long short-term memory, time-based feature expansion, spatial visualization, West Java