Abstract

Flooding in DKI Jakarta remains a serious threat with escalating potential losses, while existing rainfall prediction systems are suboptimal; they focus excessively on accuracy without considering the balance between sensitivity and specificity—factors crucial for early warning systems. This research aims to develop a rainfall prediction model based on Support Vector Machine (SVM), optimized using Multi-objective Particle Swarm Optimization (MOPSO), to enhance rainfall detection capabilities while reducing false alarms. The expected benefits include supporting government decision-making regarding disaster mitigation, providing the public with more reliable information for flood preparedness, and advancing knowledge in the application of machine learning for weather prediction. The research methodology involves utilizing historical weather data from DKI Jakarta, constructing the SVM model, optimizing hyperparameters via MOPSO, and evaluating performance using sensitivity, specificity, and additional metrics. This study aligns with the author's research roadmap on artificial intelligence for disaster mitigation and supports the faculty's roadmap regarding data science development for environmental resilience. Potential partners include the BMKG and BPBD DKI Jakarta. Expected outputs include a publication in a reputable journal and a rainfall prediction model capable of integration with flood early warning systems.

Keywords:

Prediction Model, Support Vector Machine, Multi-objective Particle Swarm Optimization, Hyperparameter Optimization