

Prediksi Kebakaran Hutan berdasarkan Faktor Iklim untuk Sumatra menggunakan FLNN-PSO

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Abstract

Indonesia has experienced a concerning increase in forest fires since 1980. In 2019, the extent of forest fires in Sumatra significantly increased, resulting in a substantial amount of carbon emissions and contributing significantly to the country's total carbon emissions. Climate factors such as wind speed, temperature, and rainfall can influence forest fires. In this study, a prediction model was developed using the Functional Link Neural Network (FLNN), with Particle Swarm Optimization (PSO) for model fitting optimization. The dataset used includes carbon emissions from GFED and climate factors from ERA5 from 1998 to 2022, with the last four years used as test data. Three testing scenarios were conducted in this study to identify the dominant factors in the prediction model, accompanied by feature importance analysis. From the three testing scenarios, it was found that the involvement of time and location indices did not significantly contribute to reducing the error in the FLNN-PSO prediction model. Therefore, climate factors alone dominantly influenced accurate predictions with the FLNN-PSO model. The lowest Mean Absolute Error (MAE) for total carbon emissions in the Sumatra region obtained was 254.28 gC/m²/month .

Keywords: Forest fire, prediction, sumatra, carbon emission, functional link neural network (flnn), particle swarm optimization (pso)

