

## INTISARI

***Metode Autoregressive Integrated Moving Average with Exogenous Variables, Multilayer Perceptron, Convolutional Neural Network, dan Gated Recurrent Unit***  
**untuk Peramalan Data Runtun Waktu**  
**(Studi Kasus: Data Cuaca Harian Provinsi Daerah Istimewa Yogyakarta**  
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Perubahan iklim global telah menyebabkan peningkatan intensitas cuaca ekstrem yang berdampak signifikan pada berbagai sektor kehidupan. Oleh karena itu, prediksi cuaca yang akurat sangat diperlukan untuk mendukung pengambilan keputusan di berbagai bidang. Penelitian ini bertujuan untuk mengimplementasikan dan membandingkan performa dua pendekatan pemodelan, yaitu *Statistical Learning (Autoregressive Integrated Moving Average with Exogenous Variables)* serta *Deep Learning (Multilayer Perceptron, Convolutional Neural Network, dan Gated Recurrent Unit)* dalam peramalan data runtun waktu. Penelitian difokuskan pada prediksi cuaca harian di Provinsi Daerah Istimewa Yogyakarta, yang diperoleh dari *Visual Crossing Weather* untuk periode 2020 hingga 2024, mencakup berbagai variabel cuaca seperti suhu, kelembaban, dan lain-lain. Berdasarkan analisis dan evaluasi performa model, diperoleh kesimpulan bahwa model MLP memiliki performa paling akurat dalam memprediksi suhu harian. Keunggulan MLP dapat disebabkan oleh kemampuannya menangkap hubungan non-linear yang kompleks antar fitur cuaca pada hari yang sama, namun tetap stabil pada data historis yang terbatas. Dengan demikian, MLP direkomendasikan sebagai model peramalan suhu harian yang tepat untuk wilayah Yogyakarta.

## ABSTRACT

**Autoregressive Integrated Moving Average with Exogenous Variables,  
Multilayer Perceptron, Convolutional Neural Network, and Gated Recurrent  
Unit Methods for Time Series Forecasting  
(Case Study: Daily Weather Data in Daerah Istimewa Yogyakarta Province for  
2020 - 2024)**

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Global climate change has led to an increase in the intensity of extreme weather events, significantly impacting various sectors of life. Therefore, accurate weather forecasting is essential to support informed decision-making across affected fields. This study aims to implement and compare the performance of two modeling approaches, which are Statistical Learning (Autoregressive Integrated Moving Average with Exogenous Variables) and Deep Learning (Multilayer Perceptron, Convolutional Neural Network, and Gated Recurrent Unit) in forecasting time series data. The study focuses on daily weather prediction in the Special Region of Yogyakarta, using data obtained from Visual Crossing Weather covering the period from 2020 to 2024, which includes various weather variables such as temperature, humidity, and others. Based on the model performance analysis and evaluation, it is concluded that the MLP model demonstrates the most accurate performance in predicting daily temperature. This advantage is likely due to its ability to capture complex non-linear relationships among same-day weather features while remaining stable with limited historical data. Therefore, MLP is recommended as the most suitable model for daily temperature forecasting in the Yogyakarta region.