ABSTRACK

TIME SERIES MODELING USING THE HYBRID CONVOLUTIONAL NEURAL NETWORK (CNN)-LONG SHORT TERM MEMORY (LSTM) METHOD FOR INFLATION PREDICTION IN INDONESIA

By

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Inflation is an important macroeconomic indicator that reflects changes in the general prices of goods and services. In such conditions, conventional forecasting methods based on linear assumptions often have limitations in capturing dynamic patterns in time series data. This study applies a hybrid Convolutional Neural Network–Long Short-Term Memory (CNN-LSTM) deep learning model to model and predict monthly inflation in Indonesia. The CNN-LSTM model combines the ability of CNN to extract short-term patterns from time series data with the ability of LSTM to capture long-term dependencies. Monthly inflation data for Indonesia from 2000 to October 2025 was used in this study. The research stages included data pre-processing, data normalization, time series data formation, CNN-LSTM model development and training, and model performance evaluation. Model performance was evaluated using the Root Mean Squared Error and Mean Absolute Error metrics. This study aims to obtain an accurate inflation forecasting model and understand the ability of the CNN-LSTM hybrid model to capture inflation dynamics in Indonesia, thereby providing empirical support for economic planning and policy-making.

Keywords: Inflation, Time Series, Prediction, Deep Learning, Convolutional Neural Network, Long Short Term Memory, Mean Squared Error, Root Mean Squared Error, Mean Absolute Error.

ABSTRAK

PEMODELAN *TIME SERIES* MENGGUNAKAN METODE *HYBRID CONVOLUTIONAL NEURAL NETWORK* (CNN)-*LONG SHORT TERM MEMORY* (LSTM) UNTUK PREDIKSI INFLASI DI INDONESIA

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Inflasi merupakan indikator makroekonomi penting yang mencerminkan perubahan harga barang dan jasa secara umum. Dalam kondisi tersebut, metode peramalan konvensional berbasis asumsi linear sering kali memiliki keterbatasan dalam menangkap pola dinamis pada data deret waktu. Penelitian ini menerapkan model *deep learning hybrid Convolutional Neural Network–Long Short-Term Memory* (CNN-LSTM) untuk memodelkan dan memprediksi inflasi bulanan di Indonesia. Model CNN-LSTM mengombinasikan kemampuan CNN dalam mengekstraksi pola jangka pendek dari data deret waktu dengan kemampuan LSTM dalam menangkap ketergantungan jangka panjang. Data inflasi bulanan Indonesia periode 2000 hingga Oktober 2025 digunakan dalam penelitian ini. Tahapan penelitian meliputi pra-pemrosesan data, normalisasi data, pembentukan data deret waktu, pembangunan dan pelatihan model CNN-LSTM, serta evaluasi kinerja model. Kinerja model dievaluasi menggunakan metrik *Root Mean Squared Erro*r dan *Mean Absolute Error*. Penelitian ini bertujuan untuk memperoleh model peramalan inflasi yang akurat serta memahami kemampuan model hybrid CNN-LSTM dalam menangkap dinamika inflasi di Indonesia, sehingga dapat memberikan dukungan empiris bagi perencanaan dan pengambilan kebijakan ekonomi.

Kata-kata kunci: Inflasi, Deret Waktu, Prediksi, *Deep Learning, Convolutional Neural Network, Long Short Term Memory, Mean Squared Error, Root Mean Squared Error, Mean Absolute Error*.