INTISARI

PERAMALAN DATA RUNTUN WAKTU MENGGUNAKAN METODE *SUPPORT VECTOR REGRESSION* (SVR), *LONG SHORT-TERM MEMORY* (LSTM), DAN *HYBRID* ARIMA-SVR

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Model ARIMA sering digunakan untuk meramalkan data runtun waktu. Namun, kesulitan dalam menemukan pola nonlinear dan kompleksitas data sering menyebabkan *overfitting* dan menurunkan performa. Oleh karena itu, peneliti telah menggunakan model *hybrid* yang menggabungkan model linear dengan model nonlinear sebagai pendekatan peramalan *time series* dan mengembangkan model yang dapat menyelesaikan permasalahan kompleksitas data tersebut, salah satunya jaringan saraf tiruan.

Dalam skripsi ini, digunakan metode *Support Vector Regression* (SVR), *Long Short-Term Memory* (LSTM), dan *hybrid* ARIMA-SVR. Kernel yang digunakan pada model SVR dan *hybrid* ARIMA-SVR adalah polinomial kuadratik dan RBF. Pada arsitektur LSTM dibentuk kombinasi arsitektur berdasarkan jumlah neuron sebanyak 50 dan 100 pada lapisan pertama dan kedua serta penggunaan fungsi aktivasi dan *dropout*. Berdasarkan hasil percobaan yang dilakukan didapatkan model *hybrid* ARIMA-SVR memiliki performa terbaik dibandingkan dengan model ARIMA, SVR, dan LSTM.

Kata Kunci: Runtun waktu, *hybrid* model, *Support Vector Regression*, *Long Short-Term Memory*, ARIMA-SVR, peramalan

ABSTRACT

FORECASTING TIME SERIES DATA USING SUPPORT VECTOR REGRESSION (SVR), LONG SHORT-TERM MEMORY (LSTM), AND HYBRID ARIMA-SVR METHODS

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ARIMA models are often used to forecast time series data. However, the difficulty in finding nonlinear patterns and the complexity of the data often cause overfitting and degrade performance. Therefore, researchers have used hybrid models that combine linear models with nonlinear models as a time series forecasting approach and developed models that can solve these data complexity problems, one of which is artificial neural networks.

In this thesis, Support Vector Regression (SVR), Long Short-Term Memory (LSTM), and hybrid ARIMA-SVR methods are used. The kernels used in the SVR and hybrid ARIMA-SVR models are quadratic polynomial and RBF. In the LSTM architecture, a combination of architectures is formed based on the number of neurons of 50 and 100 in the first and second layers as well as the activation function used and the use of dropouts. Based on the results of the experiments conducted, the hybrid ARIMA-SVR model has the best performance compared to the ARIMA, SVR, and LSTM models.

Keywords: Time series, hybrid model, Support Vector Regression, Long Short-Term Memory, ARIMA-SVR, forecasting.