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Time series PF coil temperature forecasting using recurrent transformer model.

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In this paper, we propose recurrent transformer model, which is a method for forecasting the temperature of KSTAR PF coils, to protect PF coil while PF coil operation. In this work, we developed the transformer model that can recurrently forecast output using the current time input data and the hidden state of the previous time step. The amount of computation and memory overheads of running the recurrent transformer model is lower than standard transformer model. because the model computes forecasting output using only one input data without computing the entire sequence of time windows. The recurrent perceiver model has been trained using the KSTAR PF coil temperature dataset acquired from PF coil monitoring system. The performance of the proposed recurrent transformer model was compared with LSTM and standard transformer model in terms of r2 score, mean absolute error(MAE), root mean squared error(RMSE), mean absolute percentage error(MAPE), and quantile loss. The experiment results shows that the error of the proposed recurrent transformer model is significantly lower than those of other deep learning methods.

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