

UNIVERSITI TEKNOLOGI MARA

**FUZZY TIME SERIES SLIDING
WINDOW MODEL FOR RAINFALL
FORECASTING**

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ABSTRACT

Fuzzy time series (FTS) is popular among researchers to forecast rainfall. The division group of interval (u ,) in FTS is one of the critical factors that affect the accuracy of forecasting result. Most of the previous studies used the same division group of u which is 4, 3, and 2. This study defined the most suitable division group of u , from several division groups, to obtain S_j . The selection of division group w , is done by defining the average of RMSE that is calculated after each division groups of u , is used and tested to the rainfall data. Rainfall data from four Perlis gauge station are selected and deployed in this study which are taken from Department of Irrigation and Drainage (DID). Then, the forecasted rainfall results are validate using RMSE to choose the smallest average RMSE. The chosen division groups of u , is applied in FTSSW model. At the same time, FTS is combined with Sliding Window Algorithm (SWA) to enhance the model. Several enhancements made to SWA is the second objective in this study. SWA is enhanced by defining the value of temporal prediction (TP) to be fuzzified to S ,. Then, the S_j of TP values are defuzzified to the forecasted rainfall values based on the if-then rules which also analysed the trend of fuzzified TP values. Hence, both the enhanced models are combined to propose the fuzzy time series sliding window (FTSSW) model to forecast rainfall. Then the proposed model is validated, using two types of error measurement, which are root mean squared error (RMSE) and relative geometric root mean squared error (relative GRMSE). The result of of RMSE and relative GRMSE of FTSSW model is compared to SWA by Kapoor and Bedi (2013). Result show that the proposed model, FTSSW, is better and produces satisfactory forecasting result compared to the previous methods of SWA, according to the smallest value of RSME and relative GRMSE. The FTSSW model is suggested be tested with other types of data for forecasting.

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