

Interactive comment on “Comment on “A hybrid model of self organizing maps and least square support vector machine for river flow forecasting” by Ismail et al. (2012)” by F. Fahimi and A. H. El-Shafie

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Referee #1 (RC8392):

Reply:

We would like to thank the authors for considering and accepting our comments on their paper and making modifications and corrections to the manuscript upon our comments. Furthermore, we also would like to thank the authors for their effort on further analyzing

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of the proposed hybrid model with larger SOM map sizes and providing new results.

Referee #2 (RC8401):

- The authors present clear points of discussion related to the original work “A hybrid model of self organizing maps and least square support vector machine for river flow forecasting”. The comments are well justified and point to important clarifications. However, it is not clear for me this as a publication. The comment seems not help to a scientific development or a contribution that will extend, complement or either improves the research findings. I believe that the updates and clarifications introduce in this comment to the original paper are oriented to mistakes which some of them were already expressed in previous reviews. In general, it is worth noticing the small problems that the publication has, but this does not contribute or add to the theory, the case study conclusions or methodology presented in the original publication.

Point 1(page 1392, line 4) This is a mistake in the original paper, which is not a scientific contribution but more a clarification on the way the figure is placed in the context of other charts.

Reply:

Regarding to the first comment, it is indicated that figure 8 which represented a compression of the performance of three other models with the performance of the proposed SOM-LSSVM hybrid model, was not correct because the illustrated observed river flow was different for SOM-LSSVM model. The authors of the original paper accepted our comment and represented a new (re-organized) graph for the predicted and observed river flow by SOM-LSSVM during testing period based on the original dataset for Bernam River. Obviously, figure 8 as a main illustration of this research results, in current form would lead readers to face several misunderstandings and uncertainties of the whole result of the manuscript. Therefore, the authors of this comment have concern about this figure and believe that this comment and main authors’ reply would help readers for better understanding of this issue. In the original study MAE, RMSE and R

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were just chosen by the authors as performance evaluation of the models. Therefore, illustration of predicted and observed river flow is important for comparing the performance of proposed hybrid model with the other models not only in assessing general trend but also, more importantly, in predicting pick points. As can be seen in the new re-organized figure, it is clear that this proposed SOM-LSSVM hybrid model have better accuracy in predicting pick points compared with ARIMA, ANN and, LSSVM models.

- Point 2 (page 1392, line 10) This was already addressed by the first reviews of the original paper and it was clearly mentioned by the reviewer that if size increases the number of samples in each cluster will be less, in fact the actual result on a SOM of 5x5 shows to have some cluster that might have zero, one or two samples in training and in validation. So theory of the methodology is limited by the case study. It was recommended in the original publication to explain this and highlight the limitation.

Reply:

Determining the best SOM map size becomes one of the main concerns among researchers in recent years. It is indicated by our comments that, according to the trend of the results, authors should continued their analyses by testing larger map sizes in order to achieve better results and find the optimum SOM map size for their proposed model. Furthermore, several references of utilising SOM in the field of hydrology were proposed in the comment to help readers to follow recent researches on determining the best SOM map size. According to the authors' reply to our comment, apparently, they accepted our point and continued their analyses with the same data by utilising larger SOM map sizes. Based on their new results they got better results for 8x7 in comparison with 2x2, 3x3, 4x4 and 5x5 which they represented in the main article. Moreover, the best results were achieved for 10x13 SOM map size. These new results prove significant improvement for new SOM-LSSVM hybrid proposed model for all three performance evaluation criteria including MAE, RMSE and also R. In our point of view, researches which represent new models should demonstrate how much the new models will improve the performance of modelling compare with other existing

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methods. Without a doubt, representing the best results of the study will helps the researchers not only in comparing the performance of this new model with existing approaches but also for conducting future studies to improve these novel hybrid models.

- Point 3 (page 1392, line 20) this statement indeed shows a mistake in the original paper which will help to improve the readability but does not contribute to the theory, case study or overall methodology presented.

Reply:

Regarding to the last comment, Eq. (2) represented general concept of three-layer MLP including input layer, output layer and one hidden layer. With reference to the previous studies, it was proved that an ANN model with adequate neuron nodes in a single hidden layer can provide required accuracy and also it was indicated that the performance of ANN models with single layer structures for forecasting hydrological variables is more reliable than ANN model structures with two hidden layers (Hornik et al., 1989; De Villars and Barnard (1993); Wang et al., 2006). According to the Dawson and Wilby (2001), sigmoid and hyperbolic are the most common activation functions in the literature. Authors chose linear and log-sigmoid function in their study. However, as mentioned in the comment, this equation and also definition of linear and log-sigmoid functions had problems. Authors of the original paper accepted our comment and corrected the equation and represented amendment of the explanations of Eq. (2) for Section 3.2 (Artificial Neural Network). In the end, we would like to thank anonymous reviewer for considering and agreeing our points in the comments. Based on the comment and above mentioned points, authors believe that this contribution highlights significant points of this manuscript which can help to improve it. Moreover, this comment and also authors' reply would make better overview and motivate researchers to conduct valuable researches on this proposed novel approach in the future studies.

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