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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Landslide displacement prediction using the GA-LSSVM model and time series analysis: a case study of Three Gorges Reservoir, China" *by* Tao Wen et al.

Anonymous Referee #2

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GA-LSSVM model and time series analysis were adopted in this paper to produce landslide displacement prediction. The results illustrate GA-LSSVM model can be effectively used to predict landslide displacement and have better predictive ability than GRNN model and BP model. Therefore, this study proved the reliability of this prediction method and spread it in an efficient way. This would be potentially interesting for the journal NHESS. However, there are still some spelling and grammatical mistakes need to be revise, some confusing expressions need to be improve and some questions need to be answer and explain. Thus, it is recommended that the article can be accepted for publication if major revisions can be made as follow suggestions. 1. Introduction P1_29,"...external factors, such as geological conditions..."ïijŇ geological

conditions should be internal factors. P1_36,"in recently years" should be " in recent years" P2_23-26, Here, the studies, which also used GA-LSSVM model to predict landslide displacement, are suggested to be mentioned. For example, Cai Z, Xu W, Meng Y, et al. Prediction of landslide displacement based on GA-LSSVM with multiple factors. Bulletin of Engineering Geology & the Environment, 2016, 75(2):637-646.

2. Methodology P3_24, "By searching or a function..."ïijŇhere "or" I guess is a spelling mistake. P4_17-18, I suggest the authors to supplement an equation contains both C and σ to express the model. P4_22-P5_2, These could be mentioned in introduction or put forward in a discussion section. P5_23-24, "The sampling...sampling data." This sentence is confusing. Why the data is independent. P5_26, It is not strict to conclude GA-LSSVM model has higher accuracy than other models due to the consideration of the trigger factors. Some other models also consider the trigger factors. P6, Fig 2, The technical route of left part is not clear. The methodology section is too long, authors are suggested to focus the introduction on what is new and what is developed by the authors to use the methodology to predict landslide displacement.

3.Case study P6_7,P6_17,P6_20-21,P6_25,P6_27-28, language should be improved. P7, Fig.4,& P8, Fig.5,the numbers in the legend needs to be explained. P8_9-10, "in frontal area were relatively low" and "in the middle-rear areas were very high" are not consist with the monitoring data. P9_5, The location of the local road in fig.7 is suggested to be marked on the map P9_17-21, There is no groundwater monitoring method or data mention Here.

4.Landslide displacement prediction P11_5-6, "The model... regarding...", language should be improved. P11_17-19, R2 are calculated according to the total data or to the predictive part of the data? Fig.9 is suggested to mark the R2 ,calculated according to the predictive part of the data, on the curves. P12_11-16, " slight lag" is not described clearly. P12 Fig.10, P13 Fig.11, why the authors choose the current month and past two month as two time periods for the indexes of variation of reservoir water level and rainfall? Is this choice reasonable? Because the influence period

should be determined by detailed analyzing on the respond relationship between landslide displacement and influence factors. P13_16-18," the cumulative rainfall in the current month, the cumulative rainfall in the past two months, the reservoir water level, the variation in the reservoir water level in the current month, the variation in the reservoir water level in the past two months, and groundwater depth are selected as input variables", these variables have strong correlation, for instance, the reservoir water level and groundwater depth. Will this kind of dependent relationship between the variables influence the accuracy of prediction? How the authors think about it? P14_9-10,"Notably,. . .water level." However, Fig.12 (b) did not match well. P14-16 Table 3, Table 4, Table 5, the measured cumulative displacement data are not from small to large in time. For example, ZG85ïijŇ2012/11/1, 3442.907mm is smaller than 2012/10/1, 3460.208mm. Please explain why the cumulative displacement decreased?

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-87/nhess-2017-87-RC3-supplement.pdf

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