

Interactive comment on “Estimation of effective calibration sample size using visible near infrared spectroscopy: deep learning vs machine learning” by Wartini Ng et al.

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Interactive comment on “Estimation of effective calibration sample size using visible near infrared spectroscopy: deep learning vs machine learning” by Wartini Ng et al. Anonymous Referee 2 Received and published: 16 March 2020 Thank you for taking the time to review our manuscript. We will address the comments and revise the paper accordingly. Kindly find our detailed responses as follow:

The manuscript tackles with an important and interesting topic; however, the presentation was really poor, not easy to follow. The most important issue is that the manuscript lacks the Discussion section! Actually the manuscript is not ready to be submitted to a

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Discussion paper



journal. We will elaborate the discussion section in the revised paper.

Apart from the Abstract and Introduction sections, the other sections were totally mixed in a way that in some parts you could not get, which section you are reading. For example, Lns. 176-196 are method but have been presented in the Results sections. This is a critical issue in a paper that needs to be solved. We will move it into Method section, and keep the results within Result section in the revised paper

The authors have compared CNN with PLSR and Cubist, as two common machine learning techniques, although Cubist have not been very common in soil spectroscopy so far compared to RF and SVM. It would be fine if these algorithms also be taken into account. We'll remove the word "common method" when referring to Cubist model. Several of the studies below had shown that Cubist > RF and SVM. Hence, the inclusion of RF and SVM would not be necessary. Sorenson, P. T., Small, C., Tappert, M. C., Quideau, S. A., Drozdowski, B., Underwood, A., and Janz, A. 2017. Monitoring organic carbon, total nitrogen, and pH for reclaimed soils using field reflectance spectroscopy. *Canadian Journal of Soil Science*, 97(2), 241-248. Sharififar, A., Singh, K., Jones, E., Ginting, F. I., and Minasny, B. 2019. Evaluating a low-cost portable NIR spectrometer for the prediction of soil organic and total carbon using different calibration models. *Soil Use and Management*, 35(4), 607-616. Silva, E. B., Giasson, É., Dotto, A. C., Caten, A. t., Demattê, J. A. M., Bacic, I. L. Z., and Veiga, M. d. 2019. A Regional Legacy Soil Dataset for Prediction of Sand and Clay Content with Vis-Nir-Swir, in Southern Brazil. *Revista Brasileira de Ciência do Solo*, 43.

Some parts repeating the same thing several times. For instance, the section 4.3. generally repeats the same contents in Lns. 158-163 and Lns. 168-173 that should be avoided. We understand that it seems that we are repeating the same thing several times. However, R2 itself is not enough in chemometrics. Thus, RMSE are also implemented to evaluate model performance. In our example, although it seems that Cubist and PLSR performed better than the CNN model in terms of R2 for smaller sample size (see Figure 5); there are larger variances in the RMSE of Cubist model in comparison

to CNN model. Based on the R2 itself, both PLSR and Cubist seemed to also perform similar. However, when we compare the model performance in terms of RMSE ratios, we can see that there are less variances using the PLSR model.

In presenting the comparison between PLSR and Cubist has been missed. Please compare them as well. In general, the Results sections should be more detailed furnished with more obtained values and comparison of them. Yes, we shall include the comparison between the PLSR and Cubist model within the revised script as well.

Surprisingly, the manuscript does not have the Discussion section, which is one of the most important parts of each paper. There are only some lines in the Result section whitin authors have presented the results of other similar studies (e.g. Lns. 148-151, Lns. 198-207, Lns. 212-215), which cannot be considered as the discussion of the results of the current work. Please separate the section of Results from the Discussion with detailed and informative discussion of your works' outputs. We'll elaborate the discussion as we have mentioned above.

Interactive comment on SOIL Discuss., <https://doi.org/10.5194/soil-2019-48>, 2019.

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