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In reference to amt-2021-405 "Identification of tropical cyclones via deep convolutional neural network based on satellite cloud images":

The authors appreciate the referee for his/her valuable comments and suggestions. We will address these concerns below by first quoting the comments.

Comments from Referee #3

General comments:

1. This paper presents a research on classification of TC and non-TC pictures from satellite cloud images using the Deep convolutional neural network. Two image sets are used: the image set that covers all the Northwest Pacific Ocean basin with multi TCs, and L image set that covers small region of NWPO with single TC. The images are break out into training, validation and test sets.

Two DCNN models are trained for the two sets respectively. For the model trained with larger size images with multi TCs, the image pyramid technique is used to pre-process the images before training the model. Appropriate performance parameters are employed to evaluate the adequacy of the models. It shows that the pyramid technique improves the accuracy of the model.

The structures of the DCNN are well designed and presented in the paper. The results are well analyzed with proper discussion. The findings in this research should be valuable for further researches on this aspect, and even the models could be a useful basis for the meteorological agents to build their operational model on.

Response: We thank the reviewer for the comprehensive summary of this work as well as the encouraging comments. The manuscript has been revised according to the received comments.

Specific Comments:

2. Line 190ï¼ "Based previous tests" should be "Based on previous tests"

Response: Thanks for the careful revision. Revised accordingly.

3. Below section head 3.1.1ï¼ What does "The 10-fold cross-validation" mean? How is the "10-fold cross-validation" operated?

Response: Cross validation has been introduced briefly in the manuscript (Lines 229-231), as follows:

"On the other hand, to improve the robustness of the model performance, the cross-validation strategy (Kohavi, 1995) is often exploited. As introduced previously, the original data in this study are stratified into 10 parts, with 9 parts used as training/validation set and 1 part as test set. By using the cross-validation strategy, the data can be trained and tested upmost for 10 times".

Actually, cross validation is used as a standard technique in the field of machine learning. Thus, besides the above brief introduction, only a related reference is provided and cited in the text. We may detail how a cross-validation process is conducted through the following example.

Let's take 10-fold cross-validation for the L images as an example. After pre-processing, there are totally about 32,000 samples. We can randomly divide these images into 10 parts, with each part containing about 3,200 images. We then label the 10 parts with serial numbers from 1 to 10. After that, we can first take Parts 1-8 as the training set, Part 9 as the validation set, and Part 10 as the test set. As discussed in the manuscript, both training set and validation set are used during the training process, while the test set is utilized for examining the performance of the model. After the above operation, we can take Parts 2-9 as the training set, Part 10 as the validation set, and Part 1 as the test set, and to train and test the model. Similar operations can be repeated 10 times. We can then examine the robustness of the model performance based on 10 times of testing results.

From the above example, it can be seen that the 80% of training data for each of the 10 operations are selected randomly, and the distribution of the training/test set was also random. To sum, cross-validation technique is adopted to guarantee that the model is able to work robustly.

4. In Figure 5, what is the difference for TG-1 to TG-10? Any difference in parameter setting among them? The same question for TG-1 to TG-3 in Figure 14.

Response: The training, validation and test datasets involved in models TG1-to-TG10 are different, but other hyperparameters are the same. As stated in the response to Comment-3 about the cross-validation technique, in order to comprehensively evaluate the robustness of the model and to avoid potential influence caused by the contingency of data distribution, we train and validate the network for 10 times, leading to 10 parameterized models. It is clear that these models tend to be different in specific values of involved parameters/coefficients, so are the learning curves. In addition, random descent method is adopted to finalize the optimization function, which may also result in certain differences in the internal parameters of each model. Once such differences are significant, they will be reflected in the learning curve (such as over-fitting and under-fitting).

The author sincerely thanks the reviewer for his kind advice and meaningful comments, which are valuable in improving the quality of our manuscript.

Sincerely yours,

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