Reviewer(s)' Comments to Author:

Reviewer: 1

Comments to the Author
This study proposed SIMPOR, an oversampling method for dealing with imbalanced data. The topic of the article is an interesting one. The article is presented clearly, and easy to follow.

My comments are as follows.
1. There are currently many approaches to handle the imbalanced data such as sampling method (under, over, and hybrid), cost-sensitivity learning, and ensemble methods. Therefore, the author needs to review the above approaches.

It is important to clarify why the experiment only compares the proposed method with other oversampling methods.

2. In table 2, why are these parameters chosen?

3. The processing time should be compared among the experimental methods.

4. The classes have been balanced after using the oversampling method, so the author needs to provide the accuracy to compare the experimental methods.

Reviewer: 2

Comments to the Author
This work explores "SIMPOR: Synthetic information towards maximum posterior ratio for deep learning on imbalanced data". There are many rooms to substantiate the scientific merit of the proposed approach, and certain revisions should take place before this work is considered for publication.
1. Inconsistency in data representation: The author used different public datasets for the binary classification. However, the data presentation is very confusing, considering the MOON dataset, the authors mentioned "create an imbalanced dataset with an Imbalance Ratio of 7:1 by randomly removing 1285 samples from one class,"
a. What attributes does the MOON dataset have?
b. There were 41 actual real-world datasets from KEEL, UCI, and Credit Card Fraud. In these cases, data classes belonging to each data category should be specifically indicated. So that readers can figure out the imbalance dataset precisely. It would be preferable to cite them appropriately; Recheck reference 19-21.
c. Table I displays the Imbalance Ratio (IR). It is unclear whether the author created the IR or if

it is based on original data; please explain briefly.

2. Substantiate model evaluation:

a. In A. Experimental Setup, What dataset is being used, and what is the total size of the data? Where is the testing accuracy? If the conditions are the same for all the models, what is the model's time complexity? It would be preferable to provide Precision and Recall statistics, so that readers may accurately gauge how well the model performs with the proposed approach.

b. Tables IV and V show results that are only slightly different from those of the other existing models while also outperforming the approaching model. If this is the case, what are the scientific merits of this approach when compared to other approaches?

c. In some data attributes, the F1 and AUC are the same, what is the author's contribution/comments in such scenarios?

3. Classification results: What are winning times? How the winning time is calculated, please explain; Table III, 1. Classification results, modify the inverted comma.

Additionally, the authors mentioned that the proposed technique improves the training performance and alleviates the class imbalance problem;

a. This claim needs to substantiate properly as there is no comparison or mention of training performance results or mention of them, and the issue of class imbalance is not adequately addressed.

b. How will overcome the synthesis of noisy and borderline samples as well as the tendency to interpolate the neighboring minority class? Need to include to justify the scientific merits of the proposed approach.

c. It has been shown that a deep learning model can achieve up to 12% higher F1 score when trained with a data set augmented by the proposed technique than with the current state-of-the-art techniques. This claim needs to substantiate properly.

Minor suggestion:

a. Please check the word and line spacing such as in Fig 7, caption.

b. Figure labelling are blurred, please change it.

c. Check the inverted comas in Table II.

d. We use a gradient ascent rate of 0.00001 but in Table II it is written as 0.1. Please make it consistent.