A Critic Evaluation of Methods for COVID-19 Automatic Detection from X-Ray Images.

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Summary

Evaluating methods of COVID-19 automatic detection from X-ray images is a critical task,In this research paper, we analyzed the reliability of the typical testing procedures used in most studies addressing the automated diagnosis of COVID-19. We demonstrated how these techniques might be biased and come to predict traits that are more dependent on the source dataset than they are on the pertinent medical data. We also offered some ideas for developing a fresh testing procedure as well as a way to assess its bias. We are the first to offer this measure, to the best of our knowledge. In order to determine if combining a sizable number of datasets may provide a fresh, varied, and less biased dataset, we want to integrate new COVID-19 datasets in our analysis as future work.

Major Contribution of Paper

As mentioned in the previous works results were used to be biased which affects their accuracy, Efficiency, Adaptability, etc. So this paper offers a fair testing technique for COVID-19 classification. This might be the first to address this problem for COVID-19 x-ray images. In these tests demonstrate that the differences between the various datasets are so great. So Working on different different dataset like NIH,CHE,KAG and COV for getting a dataset which consist all the characteristics which required to produce and unbiased result. And by making a mixed dataset, to train the model which having all the characteristics that are comparable with other dataset, we can get our solution. If this also not works, a good preprocessing may be found that removes the dataset-dependent characteristics. By these mentioned protocols we can produce the fresh result without any biased result.

Paper Strength and Weakness

Strength: Few Strength points of the paper:-

1. Here Two methods are proposed and both are satisfying its title definition.
2. Evaluated the ROC-AUC of binary classifications and the confusion matrices for better classification and more accurate result.
3. AlexNet is very capable of recognizing the dataset as The lowest ROC-AUC value is reached for the COV vs. NIH classification, but it is still 0.92.

Weakness: Few weakness points of the paper:-

1. Sometime unbalancing the dataset by making more and more folds, and getting the accuracy of the ROC-AUC lesser then 0.5, which would mean that the two dataset cannot be distinguished by our model.
2. Blacking out the part of some image to make it unbiased can also cause to hide someunwanted reasult which can find some other disease.

Unanswered Question of Paper

Vaja et al shared a new COVID-19 dataset that was not available when we our experiments was running on and later it didnt give any clearification that it will go with the left-out data-set or it need to be revised to adjust the characteristics of new dataset.

Extended Work

1. The creation of new evaluation protocols will probably be helped by the availability of different sources of X-Ray images.
2. This experiments show that the difference between different datasets is so large that building a fair protocol merging the datasets that we considered might be very hard. One solution will be to find a dataset whose features are similar to the ones in COV. Otherwise, one can find an effective preprocessing that deletes the dataset-dependent features.

Maguolo G, Nanni L. A critic evaluation of methods for COVID-19 automatic detection from X-ray images. Information Fusion. 2021 Dec 1;76:1-7.