ISIC 2019 LESION DIAGNOSIS

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ABSTRACT

This report demonstrate the method for ISIC 2019 Challenge, Skin Lesion Analysis Towards Melanoma Detection. Our method utilize the state-of-art deep neural network in classification task. And set certain threshold to classify unseen unknown class in training set. The mean accuracy in validation set is 97.5%.

***K*eywords** Image classification · Skin lesion classification

1 Introduction

The ISIC 2019 challenge is a common yet challenging image classification task. The challenging comes from reasons below. First, the categories in training set is highly balanced. Second, the exposure in images is not consistent, which requires color consistency algorithms to correct. Third, we need to predict the unknown class in test set, which has not occured in training set.

2 Method

2.1 Preprocessing

The most crucial part of prepossessing is color constancy. We adopted Shades of Gray method proposed by Finlayson, with Minkowski norm p=6. Then we resized image to 300 by 300 to save computation time. And add random flip both horizontally and vertically, and add color jitter, and 30 degrees random affine transformation, finally we random crop the image back to 224 by 224, and normalize by mean and standard deviation of training images.

2.2 Classification network

Currently, FixResNeXt-101 is reported to have 86.4% top-1 accuracy on Imagenet. However, it requires extra training data and too much computational resource. Therefore we chose SENet(Squeeze-and-Excitation Networks) in our task, which has 82.7% top-1 accuracy on Imagenet and not additional data is required. Ensembling method is a common way to increase performance in image classification task, however, we do not have time and GPUs to train other neural networks.

2.3 Loss function

Loss function is crucial to imbalanced datasets. Focal loss and weighted cross entropy loss are designed for such case. We chose weighted cross entropy since others reported it has better performance last year.

2.4 Unknown class prediction

We used the naive way to make the unknown class prediction, that is, setting the threshold. A sample is predicted unknown if probabilities of all other classes are below the threshold. A potential better way is finding some outliers, and label it as unknown in training.

3 Evaluation result

We did not use 5-fold cross validation directly due to this is a highly unbalanced dataset. instead we picked 200 samples from each class to form the validation set. The weighted accuracy is 97.5%.

4 Conclusion

If I had more time and more GPUs, I'll definitely do ensemble method, and trying out different loss functions to solve the unknown class issue. I don't like working alone, and I'm too hungry and don't know what to eat, so be it.

References

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