Confidence Calibration for Convolutional Neural Networks Using Structured Dropout

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1 Summary

The paper describes about a structured dropout technique for confidence calibration in neural network. Also, they associate calibration with the correlation between the models sampled with dropout, which leads them to study structured dropout and its model diversity as well as confidence calibration through MC dropout techniques. And they empirically proves this through structured dropout techniques with MC dropouts, they achieve better results.

2 Strengths of the proposal

1. The approximate Bayesian methods, Monte-Carlo(MC) drop-channel, drop-block and drop-layer offers calibration with good accuracy. They achieve lower ECE than deep ensemble which is five times more computationally expensive technique.

2. The paper gives the theoretical reasoning behind their hypothesis. Thought their ECE and MSE, they suggests that the more accurate and diverse the model, the more accurate the ensemble.

3 Weaknesses of the proposal

1. The model is claiming for 3x3 structured dropouts throughout. However in a model with various convolution block, it is not really possible to do the constant 3x3 structured dropouts of convolution layers and still get a structured model as a result.

2. Even though we can increase the model's diversity through higher drop out rates,it affects model accuracy adversely. The technique that the author provides does not address the trade off between the model's accuracy and the diversity.

4 Results

The experiment results shows that the dropBlock, dropLayer and dropChannel offers the best confidence calibration thought dropout, then followed by deep ensemble methods in various datasets like SVHN, CIFAR-10 and CIFAR-100. The paper was able to reiterate the MC dropout techniques including dropBlock, dropLayer and dropChannel as an ensemble averaging strategy. The method is simple to implement and computationally less expensive while it promotes model diversity as well as improve the calibration for better predictions.

5 Discussion

To evaluate the result of various amounts of drop out, which will help us to relate the dropout with the diversity and confidence calibration achieved through it.

How the structured dropout and the initialization of values does relate to each other, given through the lottery ticket hypothesis, we know that there can be multiple winning lotteries.