Review:
AutoDropout: Learning Dropout Patterns to Regularize Deep Networks

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What are droupout patterns?

Aggressive regularizations are usually applied to Neural Network due to the over-parameterization. Dropout is a regularization method which randomly selects the neurons from some intermediate layers of the network and replaces the values of the neurons with 0. With different kinds of inputs and different network architecture, different dropout patterns should be imposed. For examples, in the text domain, dropping the neurons in the vertical connections performs better than randomly dropping; in image domain, dropping contiguous squares of neurons in the convolutional layers works well with ResNet while such dropping pattern is not successful for EfficientNet.

What is AutoDropout and what problem does it attempt to solve?

Designing the specialized dropout patterns with particular network architecture, task and input domain is difficult. This observation motivates the proposal of AutoDropout.

AutoDropout automates the process of designing the dropout patterns with given datasets and target network. First, AutoDropout defines a search space by describing the dropout patterns with parameters including size, stride, number of repeat, rotation parameters, and whether the pattern shares across different features. Second, AutoDropout trains the parameters by Reinforcement Learning (RL), whose reward is the validation performance of the pattern on a target network and the dataset.

How dose AutoDropout differ from regular dropout?

In regular dropout, we need to manually design a particular dropout pattern which leverages the input and network architecture best. AutoDropout automates this designing process.

What are the strengthens and weaknesses of AutoDropout?

Strengthens: AutoDropout frees the process to find the dropout pattern manually, and the automatic designing is able to find dropout patterns which significantly improve the common-used patterns.

Weaknesses: AutoDropout is very expansive, because AutoDropout is a data-driven method (uses RL to train the patterns).