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Deep learning with Noisy Labels : Learning True Labels as Discrete Latent Variable

Authors : Azeddine El-Hassouny, Chandrashekhar Meshram, Geraldin Nanfack

Abstract : In recent years, learning from data with noisy labels (Label Noise) has been a major concern in supervised learning. This problem has become even more worrying in Deep Learning, where the generalization capabilities have been questioned lately. Indeed, deep learning requires a large amount of data that is generally collected by search engines, which frequently return data with unreliable labels. In this paper, we investigate the Label Noise in Deep Learning using variational inference. Our contributions are : (1) exploiting Label Noise concept where the true labels are learnt using reparameterization variational inference, while observed labels are learnt discriminatively. (2) the noise transition matrix is learnt during the training without any particular process, neither heuristic nor preliminary phases. The theoretical results shows how true label distribution can be learned by variational inference in any discriminate neural network, and the effectiveness of our approach is proved in several target datasets, such as MNIST and CIFAR32.

Keywords : label noise, deep learning, discrete latent variable, variational inference, MNIST, CIFAR32
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