Small Sample Learning GAN Implementation

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1 Main Experimental Results

The results are in Table 1

Table 1: Mini-ImageNet Result: table items are [test result] ([valid result])

Model	5-way 1-shot	5-way 5-shot
Baseline (Chen et al., 2019)	42.11	62.53
Baseline++ (Chen et al., 2019)	48.24	66.43
DVE-Gauss (w/o pretrain trick)	≈ 43	≈ 63
DAE-Gauss (w/o pretrain trick)	≈ 44	≈ 64
ProtoNet (w/0 pretrain trick)	44.42	64.24
ProteNet+ (w/o pretrain trick)	48.91 (48.12)	66.52 (65.13)
ProtoNet	46.61	65.77
DVE-Gauss	46.43 (46.60)	66.92 (66.99)
DAE-Gauss	47.37 (48.53)	66.99 (68.18)
DVE-vMF	51.00 (50.92)	67.90 (66.67)
DAE-vMF	52.02 (52.08)	66.35 (67.89)

2 Comments

- About DAE (Discriminative Adversarial autoEncoder) model: use one amortized disriminator instead of K discriminators, a extension of Adversarial Autoencoder with supervised labels (+ discriminative loss, + trainable embedding) (Fig 2)
- Preprocessing matters in Mini-ImageNet dataset: Chen et al. (2019) A Closer Look at Few-shot Classification
  - Data augmentation
  - Careful design of output layer
- Mini-Imagenet is a noisy dataset

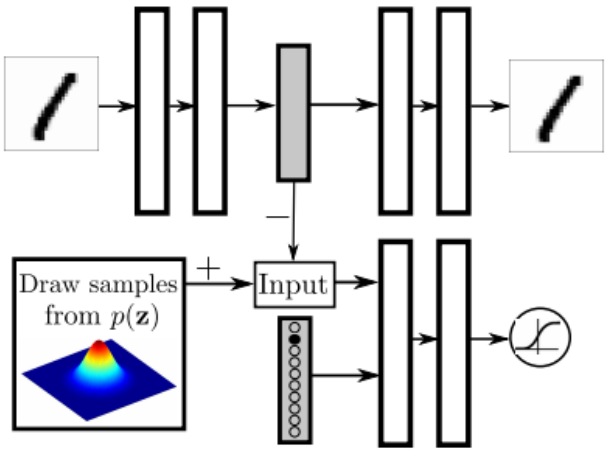

Figure 1: Adversarial Autoencoder with supervised labels

  - pretrain trick used in DVE (use BN/Dropout/Rotate Data Augmentation to train a CNN embedding)
    * Rotate Data Augmentation: prevent the pretrained CNN overfitting the data (which will make feature sparse)
    * Dropout: If don't use dropout, the performance of DVE will be 45/64
  - validation perf and test perf might not correlated after converge.

- For DAE Implementation
  - DAE could not be able to end-to-end learn a embedding (data or mini-imagenet itself).
  - DAE requires a high learning rate for embedding and unstable training process for embedding matching training process.
  - (w pretrain trick) both DAE and DVE seems to be a fine-tuned model (reach optimal after about 5-10 epoches)