Learning to Compare : Relation Network for Few-Shot Learning

作者	Flood Sung et al.	主页	https://github.com/floodsung/LearningToCompare_FSL	程序	Pytorch

问题描述	Few-Shot Learning : reognise new classes given few examples. exists model : ① require complex inference mechanisms. ② complex RNN architectures. ③ fine-tuning target problems.		
解决思路	① decompose training into auxiliary meta-learning. (Embedding module) ② learn a transferrable deep metric for compare relations. (Relation module)	参考思路	References [36, 39]. RNNs : [39, 32, 29] Fine-tuning : [29, 10]

概念理解	① During meta-learning, learn a deep metric to compare a small number of images with episodes. ② Classify new class by computing relation scores between query and sample images of each class.	相关算法	$r_{i,j} = g_\phi(C(f_\varphi(x_i), f(x_j)))$. $i = 1, 2, \cdots, C$. Sample : x_i ; Query : x_j. loss : MSE. accuracy.

程序分块	I. Pre-processing : ① load train, val, test folders. ② load images and labels. ③ to Tensor. II. Training : ① get folders. ② define and load networks. ③ start to train and val. III. Testing : ① initial datas and nets. ② load the weights. ③ calculate results.	函数列表	① load_folders(); ② Task(); ③ get_data_loader(); ① get_folders(); ② net(); ③ train(); ① init(); ② load(); ③ test();

存在问题	① The results are distinctly difference among the two datasets, Omniglot (28x28x1) and miniImagenet (84x84x3). ② The more samples, the better accuracy, how about amount of samples? ③ When I use RN to train my own datas with 100,000 episodes, it got 83% and 89% accuracy for start and final respectively, does it works?

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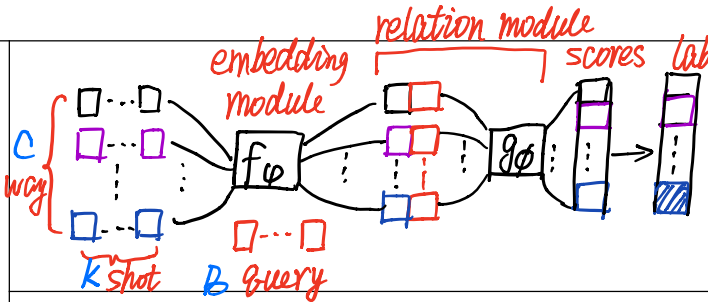
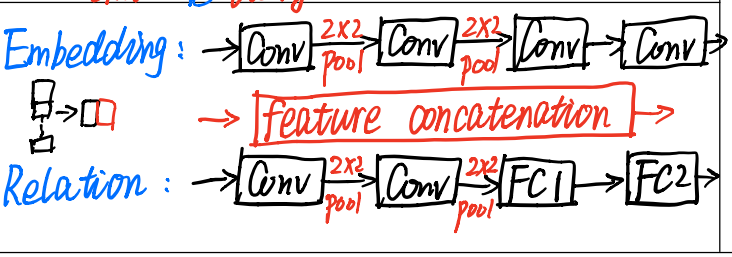
概念阐释





核心概念

C way: C classes,
k shot: k samples,
each episode: C x (k+B) images.
each query: C scores.

Conv: 64 x 3 x 3, BN, ReLU
FC1: FC, ReLU, H x 8
FC2: FC, sigmoid, 8 x 1

程序说明

task:
① load train/support/test data folders.
② load datas by classes, samples, querys.
③ process images, like resize, normalize etc.
④ transform datas to tensors.

train/test:
① init data folders. ② init networks.
③ define loss and optimizer. ④ load models.
⑤ init and load datas. ⑥ calculate features.
⑦ concatenate and calculate features.
⑧ backward + optimize. /calculate accuracy.

功能介绍

Pre-processing & Loading.

Traing & Testing.

改进

① tackle some problems and optimize some codes.
② train my own datas with Relation Network.

https://github.com/Gojay001/LearningToCompare_FSL

备注

3.2 Model, One-Shot, Line 3. (in the paper)
Sample x_j → Querys x_j.