Experiment Report

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01.02-01.08

These two weeks, I mainly focus on experiments. I did many experiments on the database. Firstly, I trained on 98classes of WHOI 2013 images, and test on 98 classes of WHOI 2014 images. Mix class is deleted firstly because of the huge amount and the processing speed is too slow. The other four classes are deleted because these four classes are empty in 2013 database but not empty in 2014 database, also means that these four classes are empty in training database but not empty in test database. So I deleted these four classes. Secondly, after the processing of mix class finished, I started to do experiment on 103 classes. I also add four classes which are deleted before into the training database and test database again. Because these four classes images are less than 100, and what we need is the accuracy improvement from one-single channel network to three-channel network. So I think I can use all the 2013 images as training database and all the 2014 images as test database.

1 The experiment on 98 classes database

The local feature images are get by bilateral filtering and the local feature images are get by Gaussian high-pass filtering and logarithmic enhancement. The accuracy is overall accuracy.

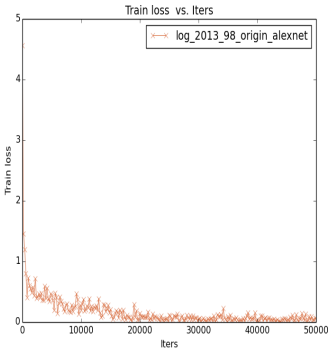
表 1: Accuracy of Plankton Classification

training database	test database	network	input data	accuracy
WHOI2013 98classes	WHOI2014 98 classes	one-channel AlexNet	original images	87.51%
WHOI2013 98classes	WHOI2014 98 classes	one-channel AlexNet	local-feature images	88.11%
WHOI2013 98classes	WHOI2014 98 classes	one-channel AlexNet	global-feature images	81.95%
WHOI2013 98classes	WHOI2014 98 classes	three-channel AlexNet	original&local&global images	88.04%

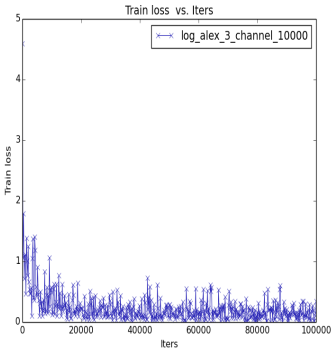
In Dai Jialun's paper, he just adds meanfile on original images in 3-channel network. He didn't add meanfile on the channel of local feature images channel and global feature images channel. But in my first experiment, I add meanfile on three channels, so I also do an experiment with only one meanfile original images channel.

表 2: Accuracy of Plankton Classification

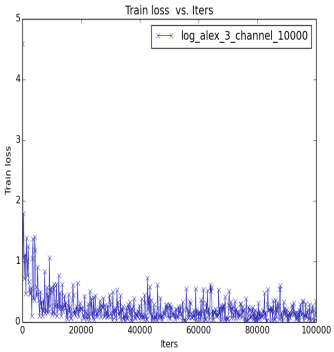
database	network	input data	accuracy	
WHOI2013	2014 98classes	one-channel AlexNet	original&local&global images with three meanfiles	88.04%
WHOI2013	2014 98classes	three-channel AlexNet	original&local&global images with one meanfile	87.99%



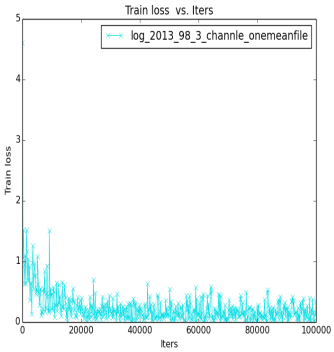
(a) Training loss of one-channel AlexNet on original images



(b) Training loss of three-channel AlexNet on original&local feature&global feature images



(c) Training loss of three-channel AlexNet with three meanfiles



(d) Training loss of three-channel AlexNet with one meanfile

2 The experiment on 103 classes database

表 3: Accuracy of Plankton Classification

training database	test database	network	input data	accuracy
WHOI2013 98classes	WHOI2014 103 classes	one-channel AlexNet	original images	93.17%
WHOI2013 98classes	WHOI2014 103 classes	one-channel AlexNet	local-feature images	93.63%
WHOI2013 98classes	WHOI2014 103 classes	one-channel AlexNet	global-feature images	90.29%
WHOI2013 98classes	WHOI2014 103 classes	three-channel AlexNet	original&local&global images	93.10%

In the experiment we can see that, the bilateral filtering to get global feature method didn't get better overall accuracy.