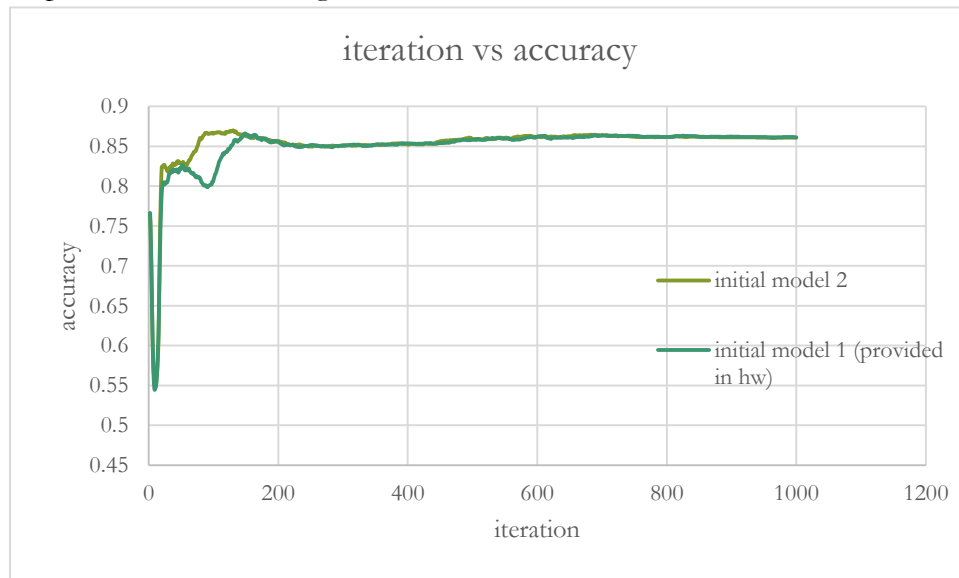# DSP HW1

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Environment:

1. Language: C++
2. Gcc version 4.9.2

Execution:

1. make: Generate train & test
2. make   clean: Remove train & test
3. Train: ./train iteration model_init.txt seq_model_01~05.txt model_01~05.txt
4. Test: ./test modellist.txt testing_data1~2.txt result1~2.txt

Results:

1. Experiment 1:   choosing different initial model

A. Initial model 1(model_init.txt)

   The figure shows that when iteration < 10, accuracy decreases rapidly; when iteration > 10, as iteration increases, the accuracy increases and reach 0.8708(max) when iteration = 978.

   However, the accuracy saturates after iteration > 800. From iteration 800~ 1000, the accuracy remains around 0.87, which shows no improvement.

B. Initial model 2

If I change the initial model to

$$\pi_1 = \pi_2 = \pi_3 = \pi_4 = 0.17$$
$$\pi_5 = \pi_6 = 0.16$$

,which is much more uniform than the one provided in this homework.

The training result of this initial model is different from the previous one I got. The maximum accuracy appears when iteration = 130, and the accuracy can reach 0.87, which shows that if we use different initial parameters, the result may reach different local maximal, and gives different accuracy.

2. Experiment 2: choosing different state number
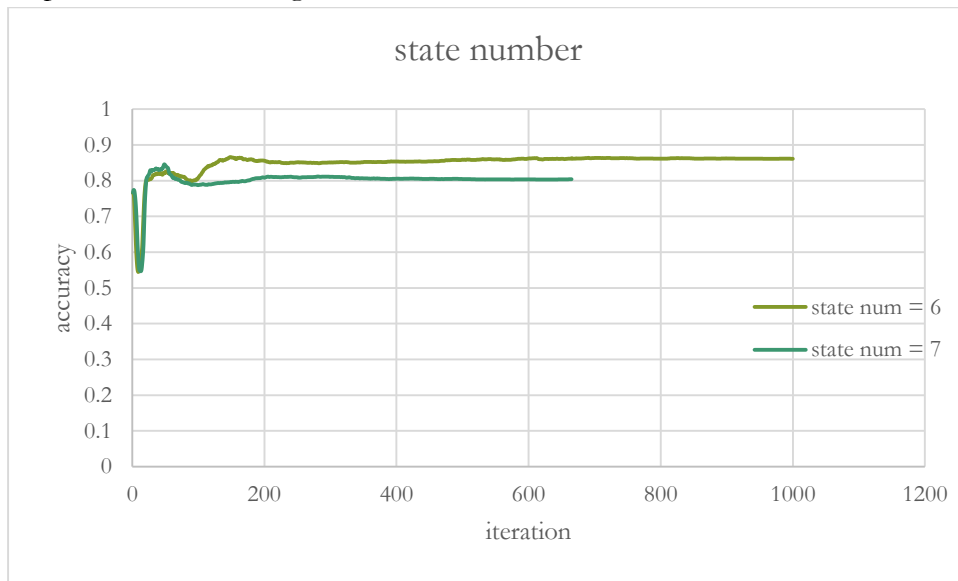
I produce an initial model with state number = 7, and trained for over 600 times. For state number = 7, the accuracy reaches 0.8456 when iteration = 49, which is not as good as the one when state number = 6. After iteration = 49, the accuracy begin to drop to around 0.80, and never climbs up again. We can conclude that state number will affect the accuracy, so we need to choose the number of states carefully.