DSP hw1 report

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How to execute

- Type `make` to compile, `make run TRAIN_ITER=<iterations>` to train and test the model using the provided files from TA.
- (additional) Type `make run_judge` to get the accuracy of the testing result using the provided labeled files from TA.

Summary of my programs

1. Training:

   (1) Use Baum-Welch algorithm to calculate forward probabilities α and backward probabilities β for every sequence line $\{o_t\}$ in the data.

   (2) Calculate the temporary variables ϵ and γ and sum them up according to what is used for updating model later on.

   (3) After calculate ϵ and γ for all of the sequence and get some temporary sum, updating the model.

   (4) Do (1) to (3) for lots of iterations.

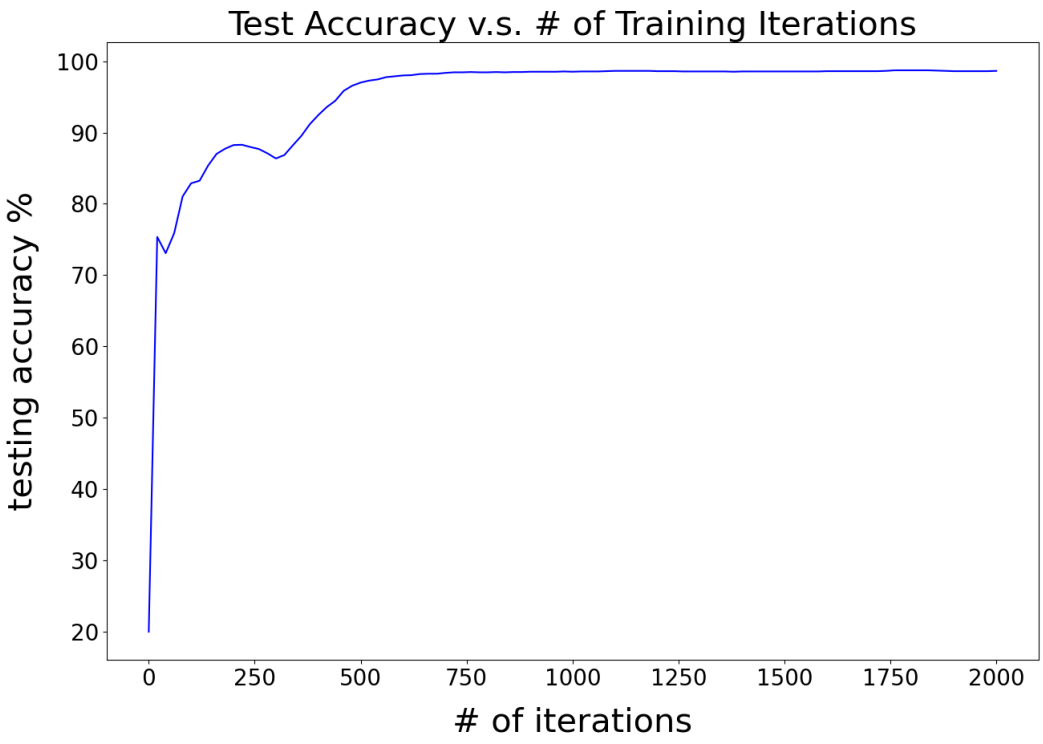
2. Testing:

   Use Viterbi Algorithm to find the model with the highest probability for the most probable path.

3. Judging:

   Calculate the correctness rate between the testing result and labeling result.

Result



Overall, the accuracy improves when number of iteration increases. When the iterations reach 500, the accuracy seems not to increase anymore and even drops a little bit. The overfitting phenomenon isn't obvious within 2000 times of iterations.