Digital Speech Processing *- Homework #2*

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Part1 (40%) - Run Baseline

```
1 ==================== HTK Results Analysis ====================
2   Date: Thu Nov 15 03:23:17 2018
3   Ref : labels/answer.mlf
4   Rec : result/result.mlf
5 -------------------- Overall Results --------------------
6 SENT: %Correct=38.54 [H=185, S=295, N=480]
7 WORD: %Corr=96.61, Acc=74.34 [H=1679, D=13, S=46, I=387, N=1738]
8 ====================================================================
```

Part2 (40%) - Improve Accuracy

Modification:

lib/mix2_10.hed:

```
 1 MU 10 {liN.state[2-9].mix}
 2 MU 10 {#i.state[2-9].mix}
 3 MU 10 {#er.state[2-9].mix}
 4 MU 10 {san.state[2-9].mix}
 5 MU 10 {sy.state[2-9].mix}
 6 MU 10 {#u.state[2-9].mix}
 7 MU 10 {liou.state[2-9].mix}
 8 MU 10 {qi.state[2-9].mix}
 9 MU 10 {ba.state[2-9].mix}
10 MU 10 {jiou.state[2-9].mix}
11 MU 18 {sil.state[2-4].mix}
```

lib/proto: change <NumStates> from 5 to 12

Result:

```
1 ==================== HTK Results Analysis ====================
2   Date: Thu Nov 15 03:34:53 2018
3   Ref : labels/answer.mlf
4   Rec : result/result.mlf
5 -------------------- Overall Results --------------------
6 SENT: %Correct=89.79 [H=431, S=49, N=480]
7 WORD: %Corr=97.41, Acc=96.66 [H=1693, D=28, S=17, I=13, N=1738]
8 ====================================================================
```

Part3 (30% + 10%) - Training Process

*First, I change lib/mix2_10.hed. I tried several times and got the best accuracy 80.78% with the setting showed in **Part2**.*

```
● ● ●   dsp_hw2 — b05902118@linux11:~/DSP/dsp_hw2 — ssh b05902118@linux11.c...
1 ==================== HTK Results Analysis ======================
2   Date: Thu Nov 15 04:39:41 2018
3   Ref : labels/answer.mlf
4   Rec : result/result.mlf
5 --------------------- Overall Results ------------------------
6 SENT: %Correct=51.25 [H=246, S=234, N=480]
7 WORD: %Corr=97.58, Acc=80.78 [H=1696, D=12, S=30, I=292, N=1738]
8 ==============================================================
```

*Then, I change lib/proto. Increase the number of states, mean and variance and modify **TransP**.*

Going through a series of experiment, I found the accuracy improved more significantly by increasing the number of states than modifying lib/ mix2_10.hed. In addition, whether increasing the number of states or modifying lib/mix2_10.hed, the higher accuracy we got, the more slowly the accuracy improved. When I change the number of states from 5 to 10 in lib/proto, I've already got 95% accuracy. However, when I set 20 states in lib/proto, the accuracy decreased.

```
● ● ●   dsp_hw2 — b05902118@linux11:~/DSP/hw2/dsp_hw2 — ssh b05902118@linux11....
1 ==================== HTK Results Analysis ======================
2   Date: Thu Nov 15 04:29:50 2018
3   Ref : labels/answer.mlf
4   Rec : result/result.mlf
5 --------------------- Overall Results ------------------------
6 SENT: %Correct=84.17 [H=404, S=76, N=480]
7 WORD: %Corr=94.71, Acc=94.71 [H=1646, D=74, S=18, I=0, N=1738]
8 ==============================================================
```