

Homework #2

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Basic Execution

1. First, set the path in `set_htk_path.sh` so that it can be linked to htk.

```
b05902120 at linux12 in ~/dsp_hw2 executing
> cat set_htk_path.sh
PATH=$PATH: "/home/student/05/b05902120/dsp_hw2/htk341_debian_x86_64/"
```

2. Write the shell script to execute five file and implement to get the basic result: 74.34 by command `cat result/accuracy`.

After Modification

1. Change the number of iteration to be 15 in the file `03_training.sh` and get a bit better result: 78.48.

```
b05902120 at linux12 in ~/dsp_hw2 executing
> cat result/accuracy
===== HTK Results Analysis =====
Date: Tue Nov 13 23:44:44 2018
Ref : labels/answer.mlf
Rec : result/result.mlf
----- Overall Results -----
SENT: %Correct=45.83 [H=220, S=260, N=480]
WORD: %Corr=96.89, Acc=78.48 [H=1684, D=18, S=36, I=320, N=1738]
=====
```

2. Change the number of states to be 15 in the file `lib/proto` and get a much better result: 96.49.

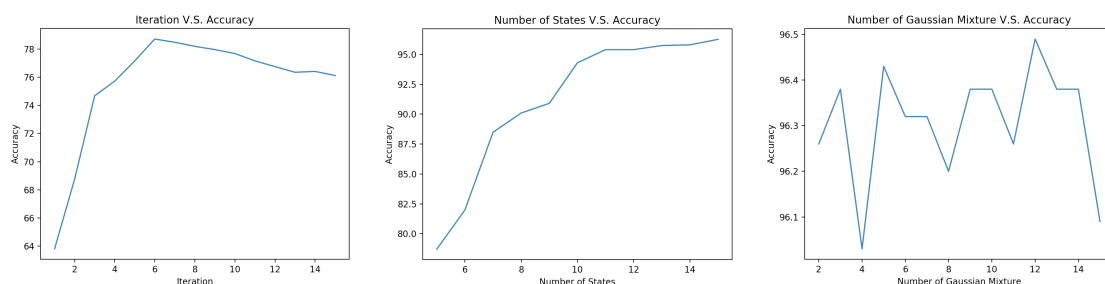
```
b05902120 at linux12 in ~/dsp_hw2 executing
> cat result/accuracy
===== HTK Results Analysis =====
Date: Tue Nov 13 23:52:46 2018
Ref : labels/answer.mlf
Rec : result/result.mlf
----- Overall Results -----
SENT: %Correct=89.58 [H=430, S=50, N=480]
WORD: %Corr=96.89, Acc=96.49 [H=1684, D=36, S=18, I=7, N=1738]
=====
```

- Change the number of Gaussian mixture to be 15 in the file `lib/proto` but the result is a bit better: 97.35.

```
b05902120 at linux12 in ~/dsp_hw2 executing
> cat result/accuracy
===== HTK Results Analysis =====
Date: Wed Nov 14 00:02:53 2018
Ref : labels/answer.mlf
Rec : result/result.mlf
----- Overall Results -----
SENT: %Correct=91.04 [H=437, S=43, N=480]
WORD: %Corr=97.35, Acc=97.01 [H=1692, D=34, S=12, I=6, N=1738]
=====
```

Advanced Examination

- Adjust the number of iteration with other original parameters. At last, find the highest accuracy 78.71 when it is 6. The worth mentioning is that the accuracy seems to have a upper bound as the iteration increasing.
- Adopt Greedy Algorithm; adjust the number of state with iteration 6 and other parameters. At last, find the highest accuracy 96.26 when it is 15. The worth mentioning is that the accuracy is increasing as the state increasing.
- Adopt Greedy Algorithm; adjust the number of Gaussian mixture with iteration 6 and state 15. At last, find the highest accuracy 96.49 when it is 12. The worth mentioning is that the accuracy is irregular as the Gaussian mixture increasing.



- After testing, finally get the best result: 97.99.

```
b05902120 at linux12 in ~/dsp_hw2 executing
> cat result/accuracy
===== HTK Results Analysis =====
Date: Tue Nov 13 23:35:24 2018
Ref : labels/answer.mlf
Rec : result/result.mlf
----- Overall Results -----
SENT: %Correct=93.54 [H=449, S=31, N=480]
WORD: %Corr=98.16, Acc=97.99 [H=1706, D=27, S=5, I=3, N=1738]
=====
```