

# Digital Speech Processing

## HW2-1 Report

林義聖

B03902048

November 24, 2016

### My Method

I've modified some configurations and content of scripts to get better accuracy of the testing result. And the comparison of the results is listed in the table on next page. What we can modify are:

- # of gaussian mixture
- # of states
- hmm states of each model
- # of iterations of training STEP 1
- # of iterations of training STEP 3
- # of iterations of training STEP 5

### Observation

I observed some relationship between each configurations:

1. Increasing # of gaussian mixture will increase the accuracy but has a limit
2. Increasing # of states will greatly increase the accuracy
3. Increasing # of iterations will greatly increase the accuracy
4. To get higher accuracy, # of gaussian mixture and # of states should be increased simultaneously
5. Higher # of gaussian mixture will lead to higher accuracy when # of iterations is large enough, or it will lead to overfit
6. Also, higher # of iterations will lead to higher accuracy when # of gaussian mixture and # of states are large enough, or it will lead to overfit

## Result

The highest accuracy of the result I got is 98.10%.

gaus. mixture	states	hmm state	iters of S1	iters of S3	iters of S5	accuracy
2	5	2-9	3	3	5	74.34%
2+1	5	2-9	3	3	5	74.05%
2+2	5	2-9	3	3	5	74.11%
2+3	5	2-9	3	3	5	76.81%
2+4	5	2-9	3	3	5	78.88%
2+5	5	2-9	3	3	5	77.27%
2+6	5	2-9	3	3	5	76.81%
2+4	5+1	2-9	3	3	5	85.79%
2+4	5+2	2-9	3	3	5	91.31%
2+4	5+3	2-9	3	3	5	92.12%
2+4	5+4	2-9	3	3	5	93.61%
2+4	5+5	2-9	3	3	5	95.63%
2+4	5+6	2-9	3	3	5	95.57%
2+4	5+6	2-10	3	3	5	95.63%
2+4	5+7	2-11	3	3	5	96.43%
2+4	5+8	2-12	3	3	5	96.66%
2+4	5+9	2-13	3	3	5	96.95%
2+4	5+10	2-14	3	3	5	97.58%
2+4	5+11	2-15	3	3	5	97.07%
2+4	5+12	2-16	3	3	5	96.84%
2+5	5+10	2-14	3	3	5	97.01%
2+6	5+10	2-14	3	3	5	96.78%
2+7	5+10	2-14	3	3	5	97.47%
2+8	5+10	2-14	3	3	5	97.30%
2+9	5+10	2-14	3	3	5	97.24%
2+10	5+10	2-14	3	3	5	97.41%
2+11	5+10	2-14	3	3	5	97.58%
2+11	5+10	2-14	3+1	3+1	5+1	97.64%
2+11	5+10	2-14	3+2	3+2	5+2	97.47%
2+11	5+10	2-14	3+3	3+3	5+3	97.64%
2+4	5+10	2-14	3+3	3+3	5+3	97.58%
2+4	5+10	2-14	3+3	3+3	5+6	97.58%
2+4	5+10	2-14	3+3	3+3	5+9	97.53%
2+4	5+10	2-14	3+3	3+3	5+12	97.58%
2+4	5+10	2-14	3+6	3+6	5+12	97.81%
2+4	5+10	2-14	3+20	3+20	5+20	97.87%
2+4	5+10	2-14	3+40	3+40	5+40	97.64%
2+10	5+10	2-14	3+40	3+40	5+40	97.99%
2+10	5+10	2-14	3+40	3+40	5+45	97.93%
2+10	5+10	2-14	3+50	3+50	5+50	98.10%