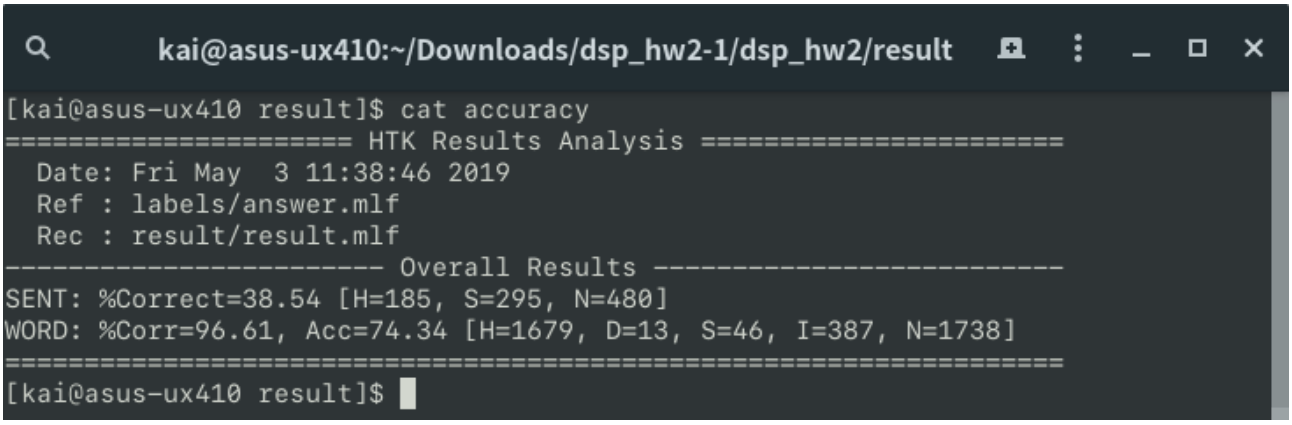
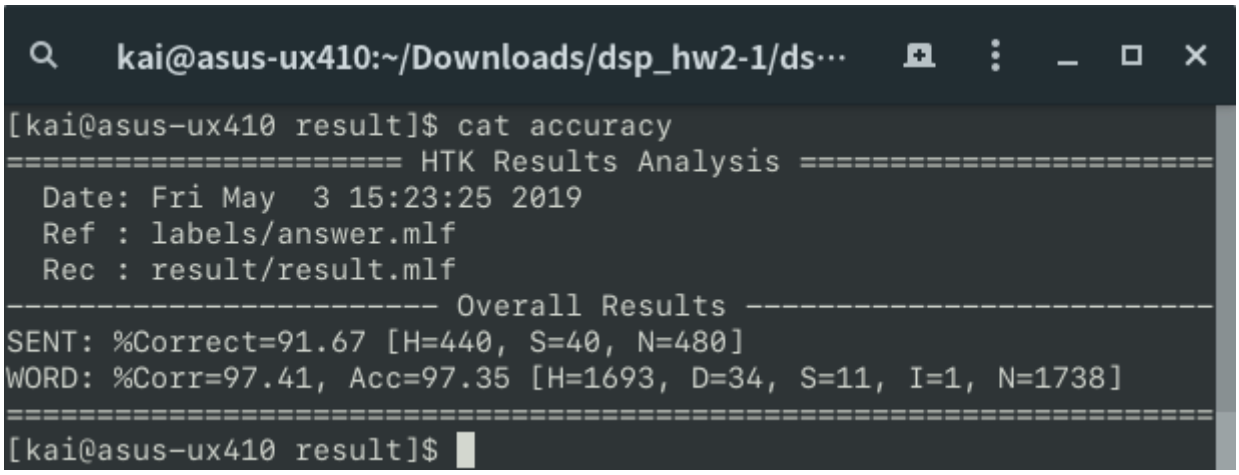
Homework 2 report b04501127 凌于凱

Enviroment
os: Archlinux
compiler: gcc version 8.3.0 (GCC)

Baseline
Number of states: 5
Gaussian mixtures: 2
iterations: 3

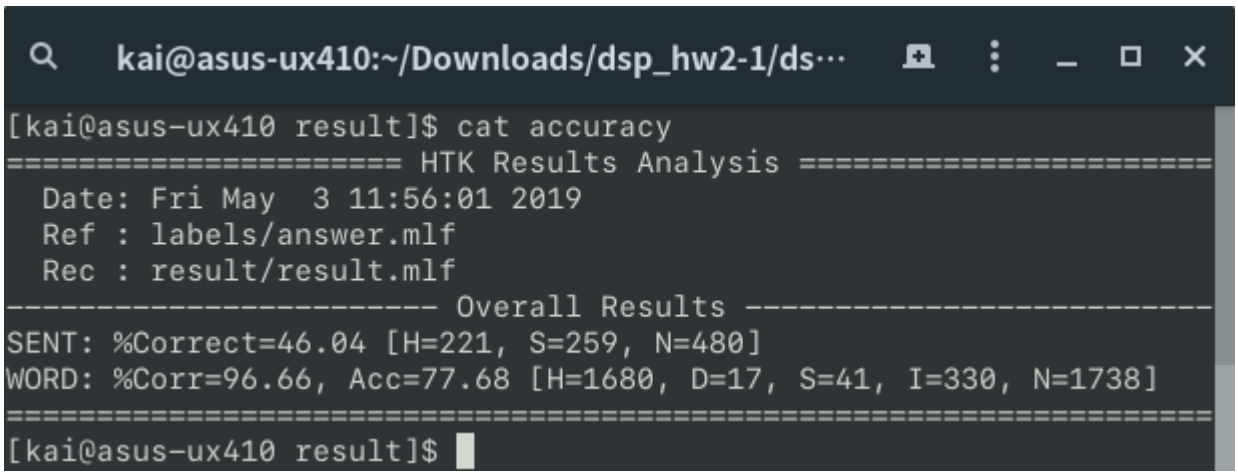


Best Accuracy
Number of states: 15
Gaussian mixtures: 12
iterations: 30

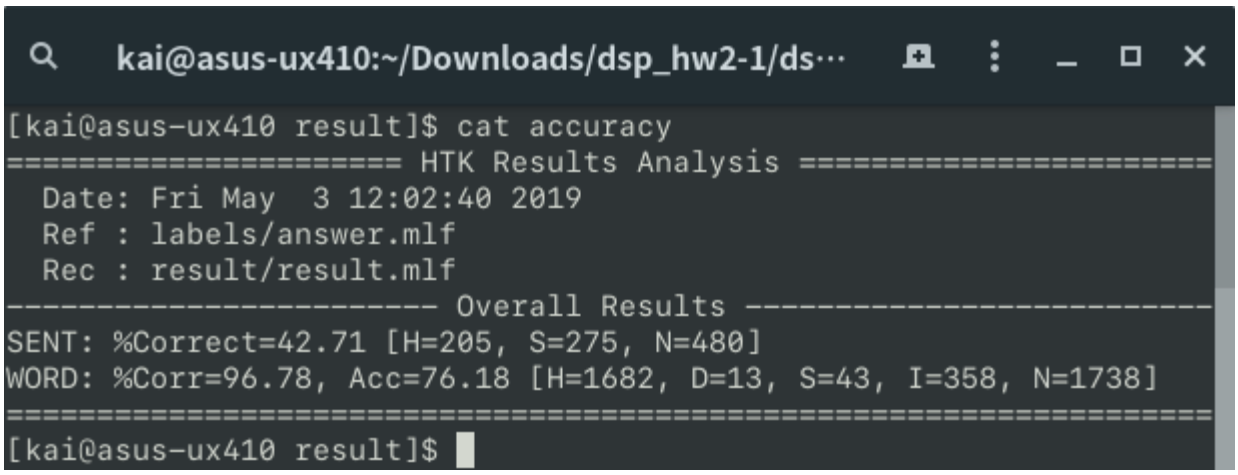


Discoveries
Test 1: increase iterations(Number of state: 5, Gaussian mixtures: 2)

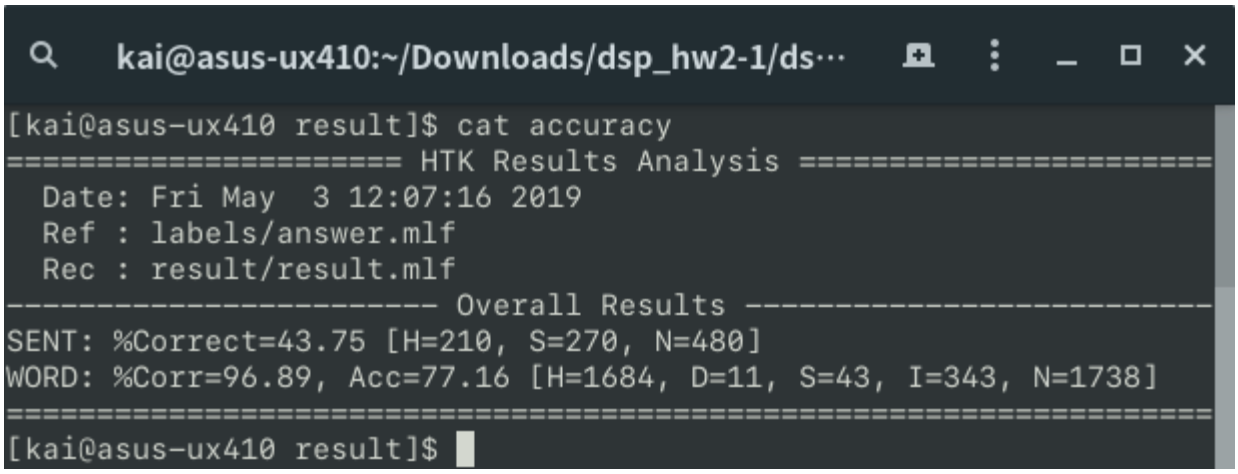
1. iterations: 10



2. iteration: 20



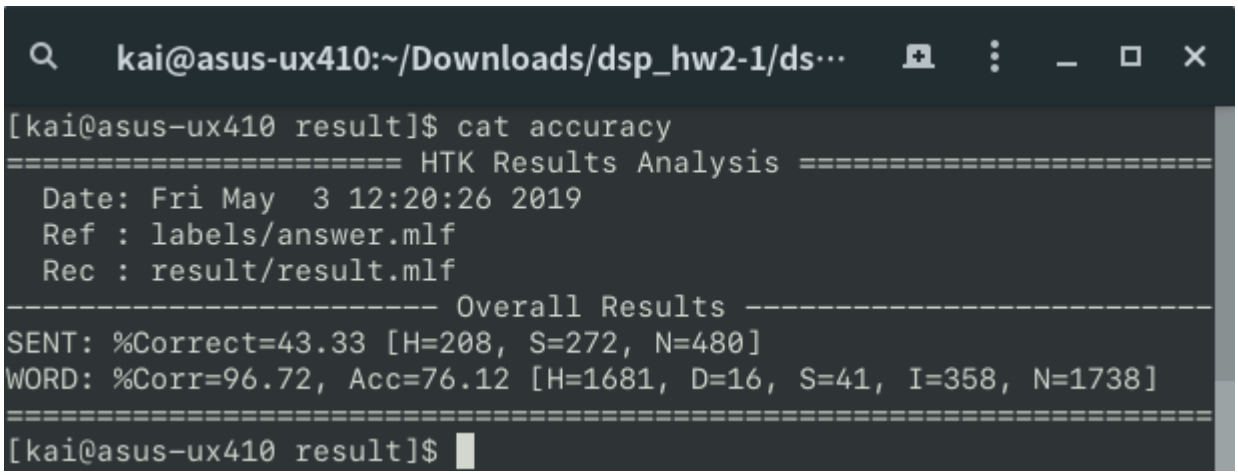
3. iteration: 30



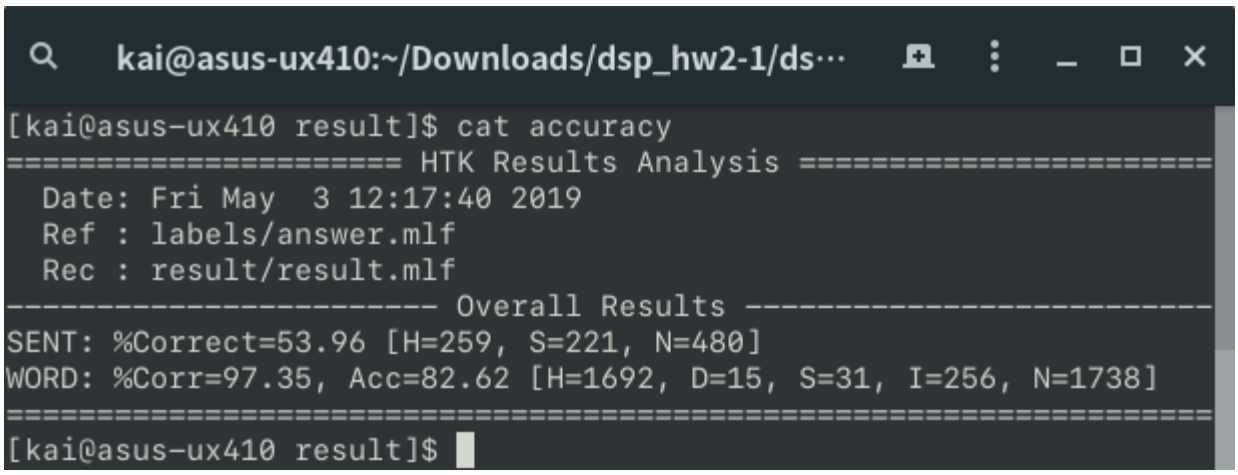
可以發現只改變若 iterations，accuracy 增加的幅度有限，影響幅度很小，到 iterations=10 的時候大概就已經收斂，若在繼續調高 iterations，accuracy 甚至會下降。

Test 2: increase Gaussian mixtures(number of state: 5, iteration: 15)

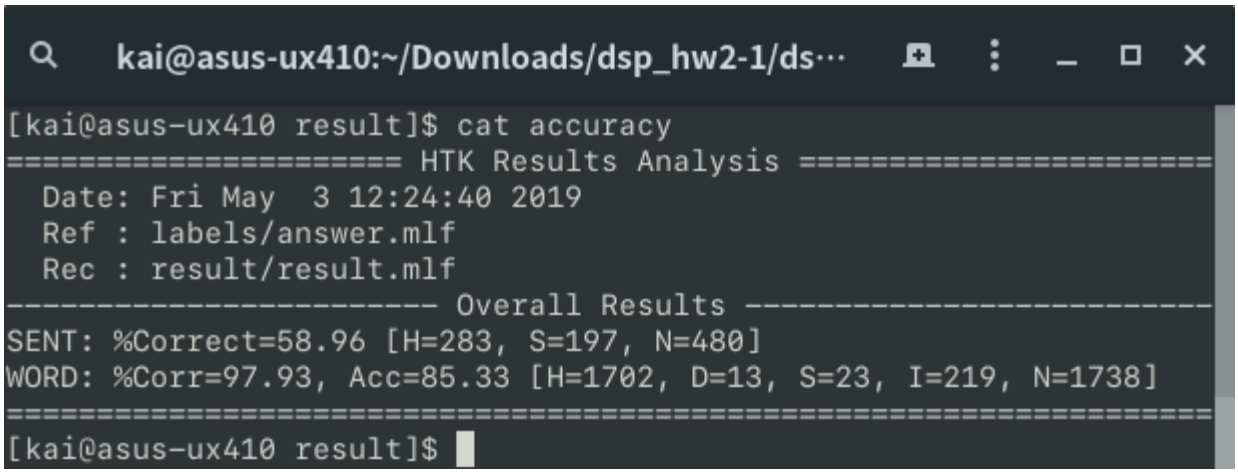
1. Gaussian mixtures: 2



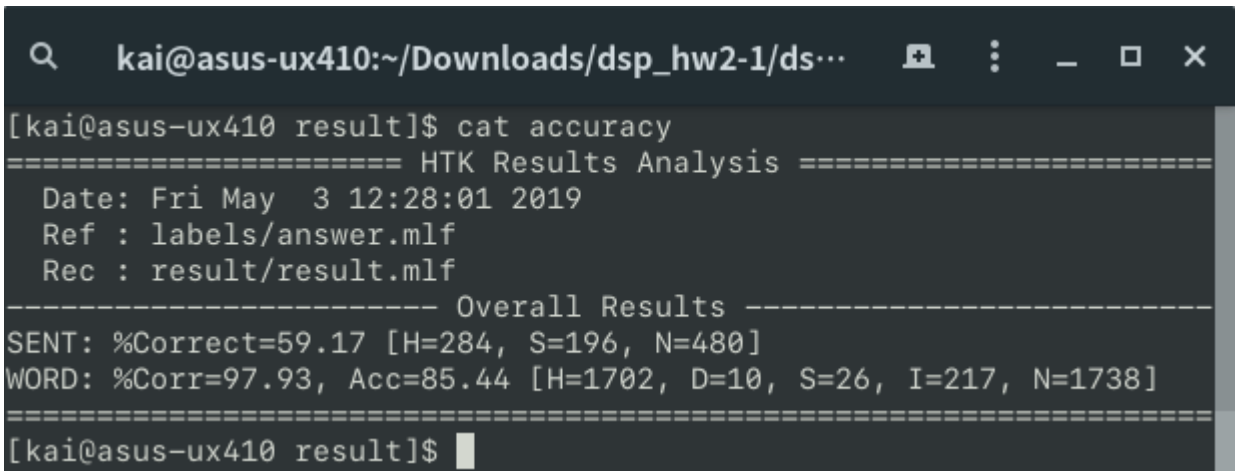
2. Gaussion mixtures: 4



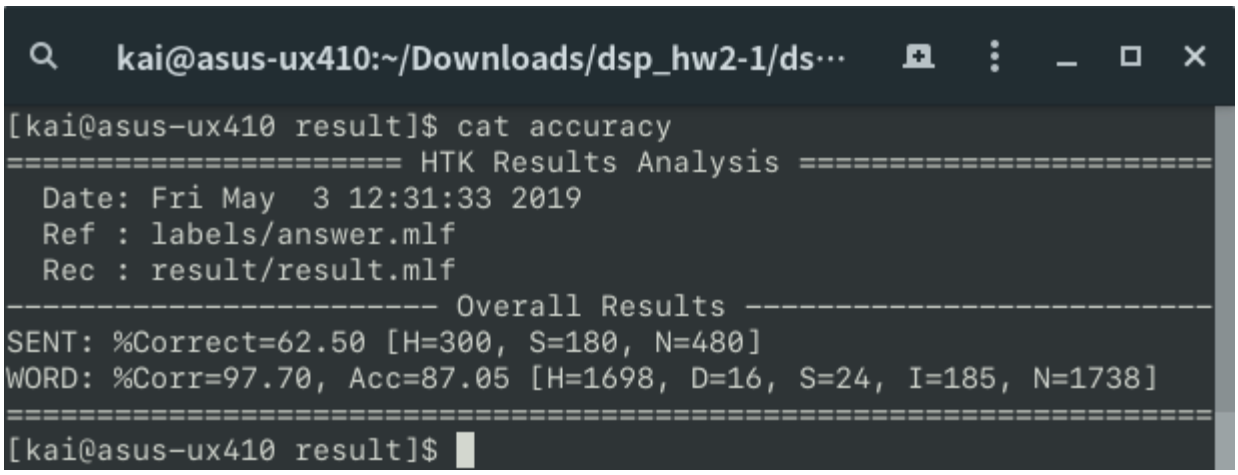
3. Gaussion mixtures: 6



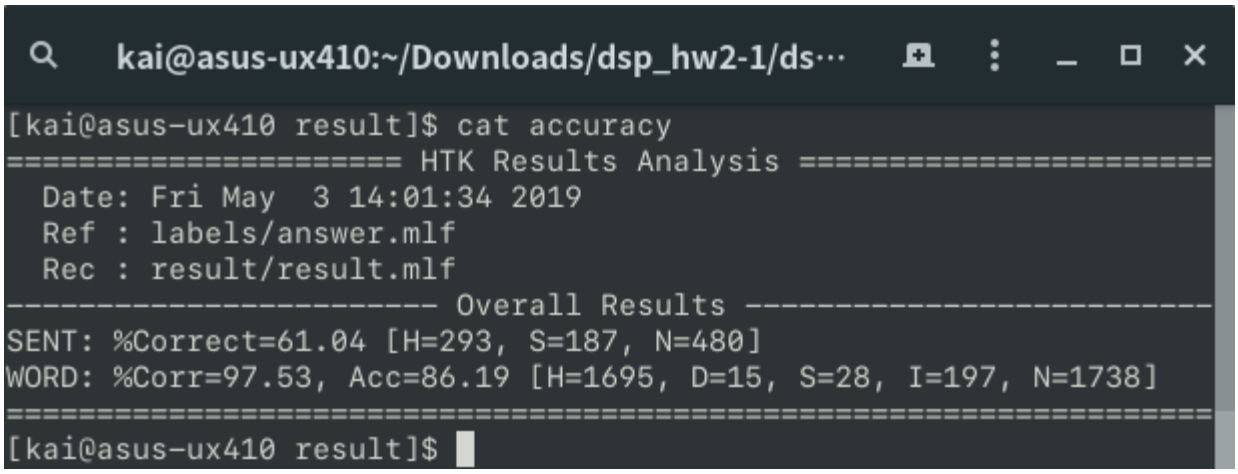
4. Gaussion mixtures: 8



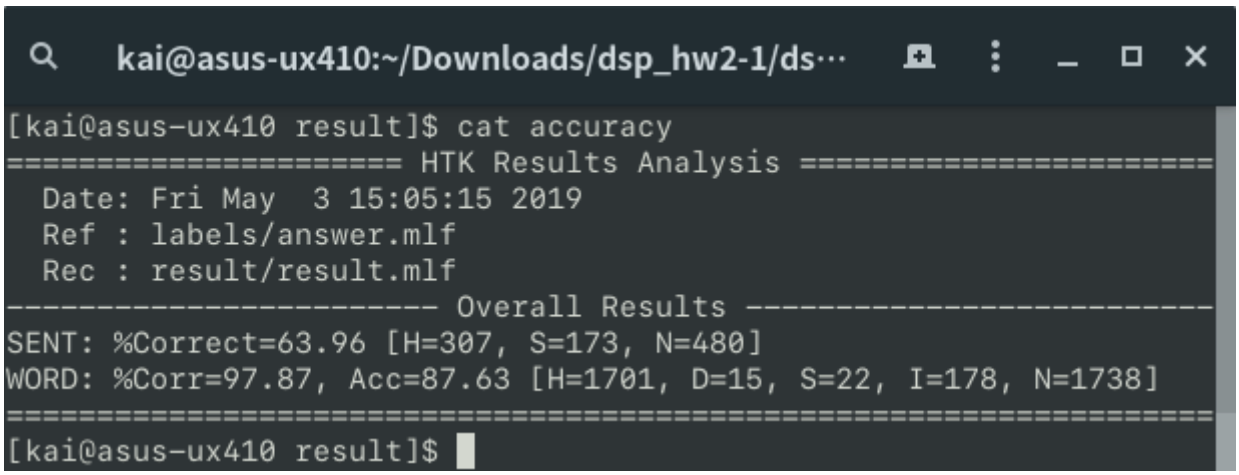
5. Gaussion mixtures: 10



6. Gaussion mixtures: 12



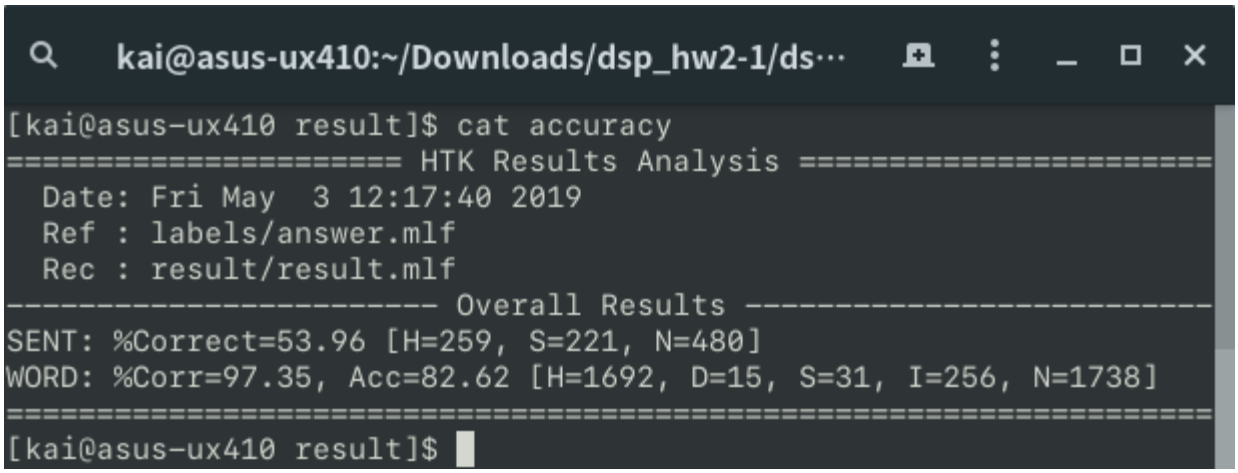
7. Gaussion mixtures: 12, iterations: 30



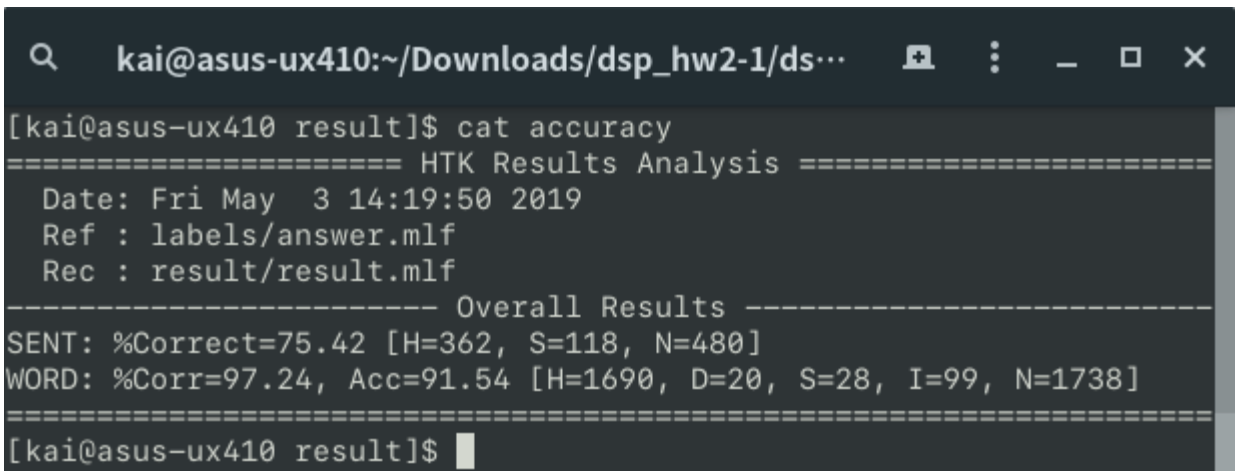
可以發現隨著 Gaussion mixtures 提昇，accuracy 會逐漸上升，但上升幅度也有限，到不了規定的 0.95，且若我們不改變 iterations 時，過高的 Gaussion mixtures 可能會讓 accuracy 降低，推測是計算量更大，使得 model 並沒有達到收斂，需要再去調高 iterations，才能達到收斂。

Test 3: increase number of state(Gaussion mixtures: 4, iteration: 15)

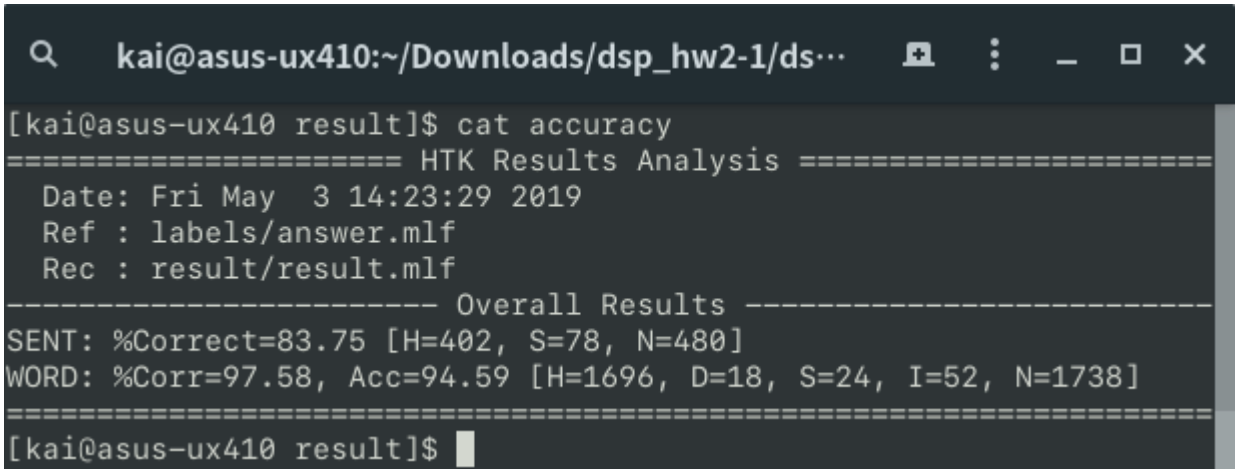
1. Number of state: 5



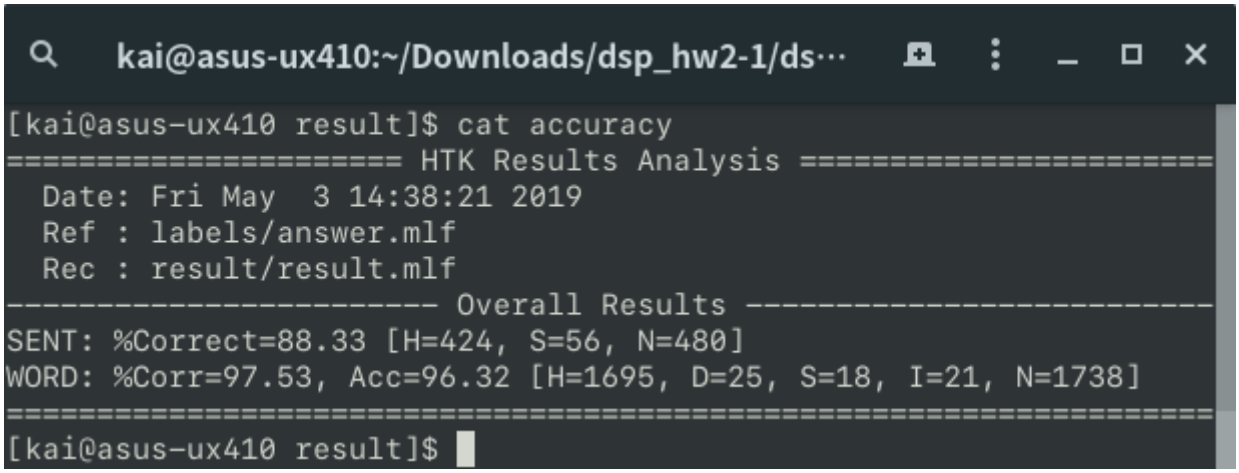
2. Number of state: 7



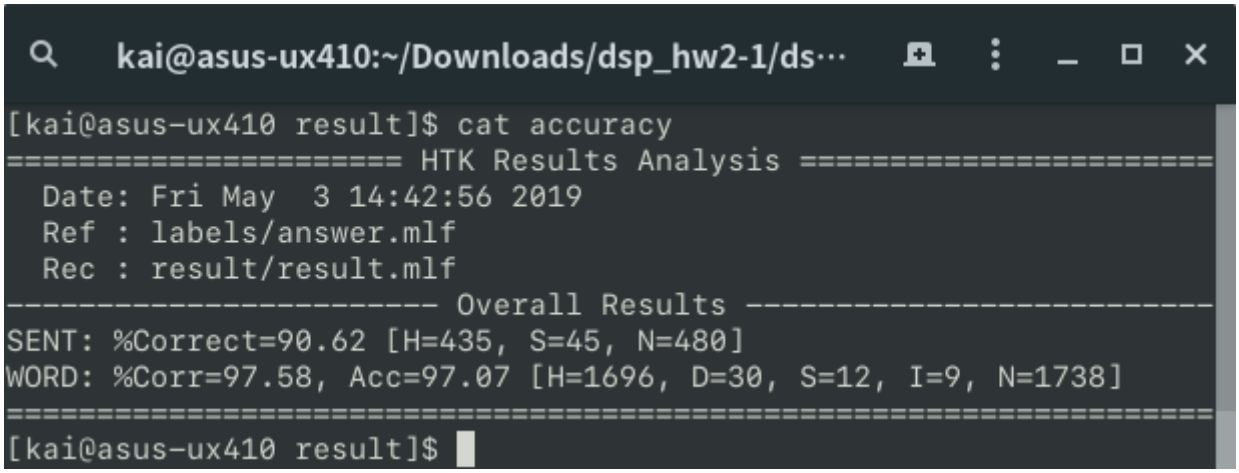
3. Number of state: 9



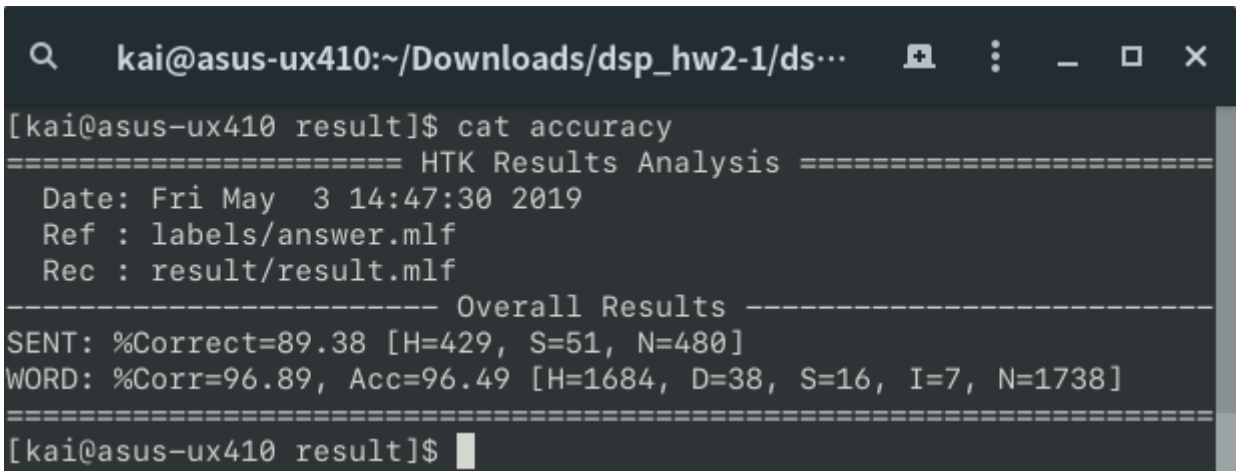
4. Number of state: 11



5. Number of state: 13



6. Number of state: 15



可以發現調整 Number of state 上升幅度比起前面兩個大很多，且不需要刻意去增加 iterations，就能使 accuracy 上升，因此可以推測 train state 的速度比 train gaussion 的速度要來的快達到收斂。

conclusion

調整 Number of state 所達到的效益最大，可以使得 accuracy 增加最多，接下來則是調整 Gaussion mixtures，但因為 Gaussion mixtures 越多則越慢達到收斂，故調整到相對的 iterations 才能達到它真正的效益。