

## Artificial Intelligence Assignment 3 report

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The code with c++ uses Inference class to encapsulate the two inference methods-----Likelihood and Gibbs sampling. The constructor will automatically complete the whole process of the algorithm. Firstly, it will read the data from the input file. Then it will run the Likelihood method and output the result. Finally, it will run the Gibbs method and output the result.

The posterior probability's changes with iterations of the two methods are show in the Fig 1.

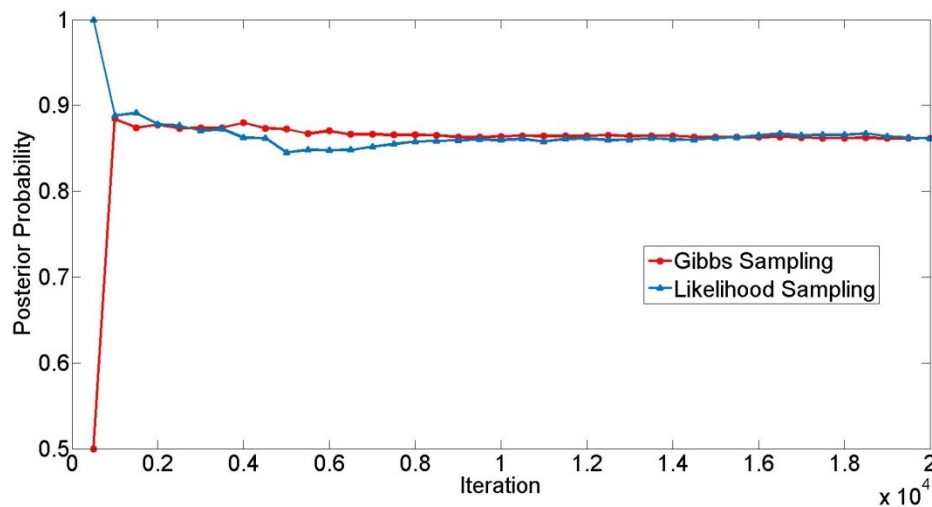


Fig 1 suggests that Likelihood methods get the higher posterior probability result in the early time but with the enough iteration of training (a large number of repeat tests), the result become stable at distribution  $\langle 0.862, 0.138 \rangle$ . However, the Gibbs method reaches the stable state more smoothly and quickly. The two methods both convergence to the approximately same stable state-----distribution  $\langle 0.862, 0.138 \rangle$ . The Gibbs method's runtime is less than the Likelihood method.