STAT 542 Spring 2019

Coding Assignment 3 Bonus

Due Friday, March 29, 3AM

(Bonus Credit: 3pt) Consider a hidden Markov model (HMM) with **Two** hidden states (A or B) and whose outcome is a sequence of discrete random variables taking **Three** unique values.

Generate data from such an HMM, implement the Baum-Welch algorithm and the Viterbi algorithm. Check [Coding3_Bonus_HMM.html] on Piazza.

- Test your code on generated data with number of iterations for EM to be 100.
- Compare the outputs from your Baum-Welch algorithm and Viterbi algorithm with the ones from R package `HMM`.

What you need to submit?
A PDF file and the Rmd file that produces the PDF file.

- Follow the suggested code structure on [Coding3_Bonus_HMM.html]
- Report the estimated transition matrix $A_{2\times 2}$ and the estimated emission matrix $B_{2\times 3}$ from your code with 100 iterations; compare them with the output from `HMM`.
- Check whether the output from your Viterbi algorithm and the one from `HMM` are exactly the same.
- Name your Rmd file starting with

  `Assignment_3_HMM_xxxx_netID..`,

  where "xxxx" is the last 4-dig of your University ID.

  For example, the submission for Max Y. Chen with UID 672757127 and netID mychen12 would be named

  `Assignment_3_HMM_7127_mychen12_MaxChen.R`.

  You can add whatever characters after your netID.

- Name the PDF file (submitted along with your code) similarly, starting with

  `AssignmentOutput_3_HMM_xxxx_netID...pdf`,

  where "xxxx" is the last 4-dig of your University ID. You do not need to worry about the name of the Markdown file generated by your code.