Variational learning

Homework | Agent-based modelling, Konstanz, 2024

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1. Simulate five variational learners for 1000 learning steps with learning rate $\gamma = 0.01$ in a learning environment characterized by the probabilities P1 = 0.4, P12 = 0.5 and P2 = 0.1 (these are the probabilities that were used in the lecture). Plot the five trajectories in the same plot.

> 💡 Tip
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> To draw into an already existing plot, use `plot!()` instead of `plot()`.

2. Repeat the above exercise, but this time with five learners with $\gamma = 0.001$, and then with five learners with $\gamma = 1$.

3. Now repeat both of the above points, but this time in an environment characterized by probabilities P1 = 0.1, P12 = 0.5 and P2 = 0.4.

4. Based on your observations, what would you say is the effect of

   a. the learning rate parameter?
   b. the probabilities of occurrence of the different types of string?

5. By consulting the Plots.jl documentation, modify your trajectory plots so that

   a. the trajectory is represented by points instead of lines
   b. the x-axis is labelled "learning iteration"
   c. the y-axis is labelled "probability of G1"
   d. the plot title is "A variational learning trajectory"