THESIS PLAN: "SCALABLE CONTINUOUS RL WITH KULLBACK-LEIBLER POLICY CHAIN"
UNDERGRADUATE FINAL YEAR PROJECT
CHRIS DOYLE

DEADLINES:

- 25th January – Introduction/Background
- 25th March – [Entire Thesis] & Demo to be completed
- 25th March – Demo Presentation
- 12th April – Final Deadline for Thesis

BY 25th JANUARY:

ABSTRACT (OUTLINE PROBLEM & SOLUTION):

☒ Define lifelong learning.
☒ Define lifelong reinforcement learning.
☒ Existing issues being solved (scalability, catastrophic forgetting).
☐ Introduce idea of Kullback-Leibler Policy Chain (i.e. 2 parts, KL & RL).

INTRODUCTION

☒ Reinforcement Learning -> Lifelong Learning.
☒ Define catastrophic forgetting.
☐ What the worst case scenario etc. is.

BACKGROUND

☒ Define Reinforcement Learning.
☐ Define Policy Gradient Methods.
☐ Define Kullback-Leibler Divergence & how it is being used in this project.
  - Compare policies in adjacent figures to show effect

BY 25th MARCH

THEORY OF APPROACH

☐ Explain the concept of Kullback-Leibler policy chain in a mathematical sense.
☐ Derive & explain conceptualised cost function.

PRACTICAL EXPERIMENT

☐ Create GridWorld environment & ability to change reward etc.
☐ Create RL agent to learn GW.
☐ Add functionality to record and turn to GIF.
☐ Add functionality to change the reward.
☐ Add KLPC functionality.

RESULTS

☐ Output of grid with snapshot of arrows whose length reflects the prob of that action.
☐ DEMO: GIF of standard RL agent vs GIF of KLPC agent

CONCLUSIONS

- [ ] How generalizable is this approach to other environments?
- [ ] Compare to other approaches.
- [ ] Shortcomings of this approach.
  - Outside boundary smaller % of grid as grid grows
  - Technique works best when goals of tasks align similarly
  - Worst case scenario with infinite tasks: uniform inside, perfect outside