Curriculum Reinforcement Learning

Goal Generation[1]

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[1] Based on a blog by Lilian Weng

Automatic Goal Generation

- Let's assume that the task itself is fixed but the goal condition is flexible
  - For example, the goal position can change
  - That is, we define a set of states S^g that represent the goal

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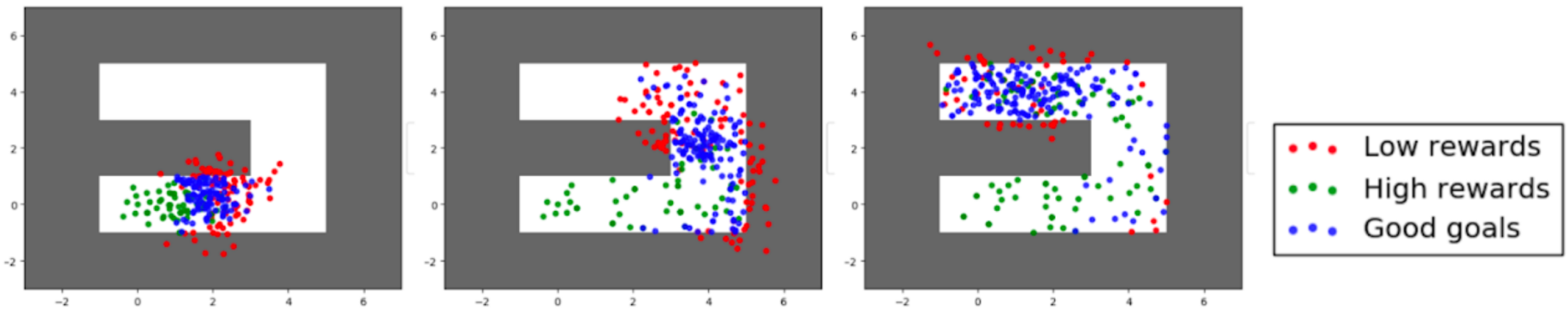
- Let's assume that the task itself is fixed but the goal condition is flexible
  - For example, the goal position can change
  - That is, we define a set of states S^g that represent the goal
- Idea: Generate the set of goals adaptively based on the learning needs of the agent

Example: GoalGAN [Florensa et al. 2017]

- Select which goals are of a currently appropriate difficulty
- Train a GAN to generate instances with that difficulty
- Train agent on those instances to improve
- You can see the results & generated images **here**

Example: GoalGAN [Florensa et al. 2017]



(a) Iteration 5 (b) Iteration 90 (c) Iterartion 350

Figure: Example training progress

Related Approaches

- The generator can be refined by including more criteria for goal generation like goal validity, feasibility and coverage [Racanière et al., 2020]
- The brute force variation: POET [Wang et al., 2019] & enhanced POET [Wang et al., 2019]
- Hindsight Experience Replay [Andrychowicz et al., 2017] variations generate intermediate goals to reach to final state