

Enhancing autonomy and efficiency in goal-conditioned reinforcement learning

Yang, Z.

Citation

Yang, Z. (2025, February 26). *Enhancing autonomy and efficiency in goal-conditioned reinforcement learning. SIKS Dissertation Series*. Retrieved from https://hdl.handle.net/1887/4196074

Version:	Publisher's Version
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Downloaded from:	https://hdl.handle.net/1887/4196074

Note: To cite this publication please use the final published version (if applicable).

Propositions accompanying the thesis

Enhancing Autonomy and Efficiency in Goal-Conditioned Reinforcement Learning

- 1. In reset-free settings, model-based reinforcement learning is always preferable over model-free. [Chapter 3]
- 2. In deterministic tasks where we require a quick solution, stitching previously encountered high-reward trajectories ('episodic memory') is preferable over reinforcement learning. [Chapter 4 & 5]
- 3. Adaptive switching between episodic memory and reinforcement learning gives both fast and optimal solutions. [Chapter 5]
- 4. When the agent reaches frontier goals, additional exploration near those goals expands the agent's knowledge boundary, leading to improved performance. [Chapter 6]
- 5. Reinforcement learning agents should context-dependently decide when, how and for how long to explore.
- 6. When downstream tasks are unknown, learning a world model should be the primary objective of an reinforcement learning agent.
- 7. We should strive for autonomous reinforcement learning agents that require as few human interventions as possible.
- 8. Getting reinforcement learning to work requires reading, thinking, engineering, experimenting, and organizing, and each aspect is indispensable.
- 9. If you do not yet have a clear goal in life, try to learn as much as possible about the world, since it will enable you to quickly adapt to future goals.

Zhao Yang Leiden, 26-02-2025