A*STAR Research Intern

Quantum Optimal Control, Reinforcement Learning | May 2024 - Aug 2024

RESEARCH AIM

Research aim:
- To improve fidelity of quantum calculations for single qubit gates with environmental noise.

My role:
- Control pulses that act on qubits are abstracted in the form of quantum gates.
- Use **Deep Reinforcement Learning** to learn parameters of a **control pulse** to simulate a gate operation.

MY CONTRIBUTION

- Proposed a **new action space** where the agent learns parameters of **different pulse waveforms and pulse durations**, accelerating learning of an RL agent
- Explored different **DRL** algorithms such as Proximal Policy Optimization, and Temporal Difference Learning
- Improved learning rate using different reward designs to penalize longer pulse durations.

PROJECT OVERVIEW