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Game of Drones

Dynamic Trajectory Planning & Tracking in Multi-player Race

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In this project we propose a solution to the Tier 1 Task in Game of Drones, a simulation-based drone race organized by Microsoft Research. The goal was to race a drone against an opponent through a given set of gates.

Our solution focuses on trajectory planning, tracking, and collision avoidance. The trajectory was planned using a Cubic Hermite Spline through the gate centres. The spline tangents were augmented to smoothen the trajectory. A Pure Pursuit Controller (PPC) and a PID controller were used for trajectory tracking. The PPC was improved with scaled look ahead distance based on path curvature. To avoid collision, the trajectory was re-planned upon opponent interference.

On the qualification map, our solution was able to complete the race in 59 seconds. On the more complex final map, the solution was able to finish the race in 74.8 seconds. For future studies, a more precise trajectory tracker can be developed as it was the key foundation of optimization in trajectory planning and collision avoidance.