Title: Physics-Informed Machine Learning for Multi-Agent Differential Games

Abstract: Our objective is to develop trustworthy machine learning (ML) technology for multi-agent gaming in support of autonomous systems. Autonomous agents need to act cooperatively with team members, while competing with adversaries. Differential games represent an ideal theoretical framework for modeling these complex interactions but are notoriously difficult to solve both theoretically and computationally. To overcome these challenges, we plan to extend differential game theory to new settings and to identify ML algorithm architectures that have correspondences with representation formulas for differential games. In doing so, we leverage the computational advantages of existing ML machinery to potentially solve differential games in high dimensions and in real time, while also discovering new theoretical interpretations for ML informed by the physics of differential games.

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