ETH
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Distributed Computing

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Clone Robust Distances in Games

Many modern evaluation settings–such as AI benchmarks or multi-agent games–aggregate performance across a set of tasks or opponents. A persistent issue in such systems is redundancy bias: duplicating or introducing highly similar strategies can artificially skew rankings or evaluations. While prior work has addressed this problem for perfect clones, robustness to approximate clones remains limited and often relies on restrictive assumptions about the underlying space.

This project aims to develop a clone-robust notion of distance for strategy spaces in multi-player or multi-strategy games. Building on recent work on clone-robust weighting in metric spaces, the project extends these ideas to multi-dimensional game-theoretic settings by embedding strategies into a metric space derived from their payoff profiles against opponents. The central goal is to define a distance between strategies that remains invariant to the introduction of approximate clones among opponents. Such a distance would enable stable ranking and evaluation even in high-dimensional or redundant strategy sets, and could serve as a foundation for clone-robust extensions of multi-agent evaluation methods, such as evolutionary or equilibrium-based ranking frameworks.

Requirements: This project demands strong mathematical proficiency. Candidates should be highly motivated, capable of independent work, and eager to contribute their own ideas.

Interested? Please reach out for more details!
In a few sentences, describe your motivation for this project, highlighting any relevant courses or prior projects that your transcript can further illustrate.

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