Effects of Clan-based Agents on Iterated Prisoner's Dilemma Strategies in Evolving Spatial Environments

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1

Background

- **Prisoner's dilemma**: game played between two players, choose to cooperate or defect without knowing each other's move.
- The reward of single defection is **higher** than mutual cooperation ➡️😈.
- **Iterated prisoner's dilemma**: play that game multiple times.
- **Spatial environment**: Players can move around, games are only played between neighbours.
- **Evolving environment**: Bad players die, better players reproduce ➡️ Survival of the fittest!
- **Clans-based agents**: players are members of clans, with two strategies for in-clan and out-clan games.

2

Key question

How do clan-based agents affect Iterated Prisoner's Dilemma strategies in evolving spatial environments?

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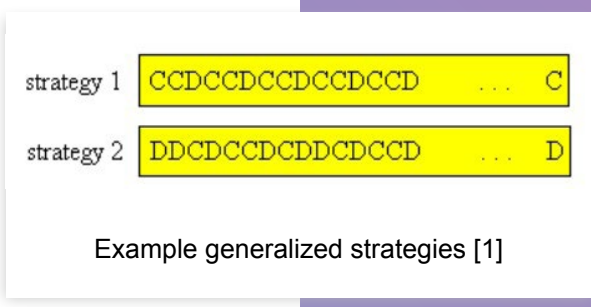
Methods

- Simulation of evolving spatial environment in **Netlogo**.
- Generalize strategies using genetic algorithms.
- Extend agents with clans.



Example generalized strategies [1]

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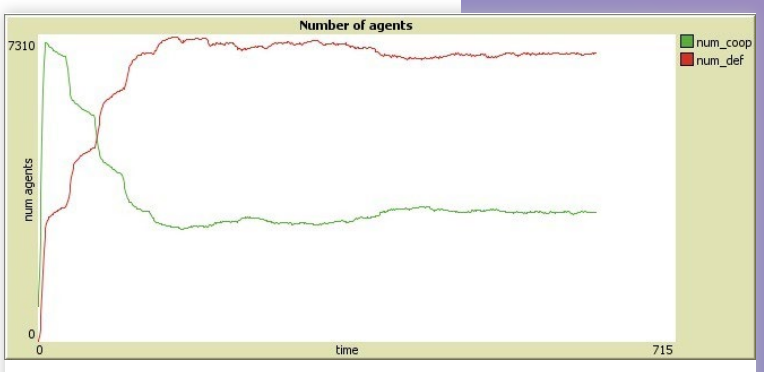
Progress

- Established baseline without genetic algorithms: **cooperating in-clan and defecting out-clan strategies seem to win**.
- Finishing implementation genetic algorithms.
- Examining proper parameter sets.



Baseline evolution out-clan strategies

5

Future

- Extend agents to support kinship and clans combined.
- Run, tweak, and repeat!

[1] B. A. Julstrom, "The development of cooperation in genetic algorithms for the iterated prisoner's dilemma," 032000.