Promoting Fair Proposers, Fair Responders or Both? Cost-Efficient Interference in the Spatial Ultimatum Game

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INTRO

- Incentivising fair proposers, responders, or both, conditionally, using different interference mechanisms
- Rewarding happens from outside the network (i.e. institution, benefactor), different degrees of knowledge are considered, the institution is not omniscient
- We focus especially on the cost of interference and which mechanism to choose when budgeting

METHODS

- **Agent-based** model employing the one-shot **Ultimatum Game**
- **Lattice** of agents, to study spatially motivated interference schemes on a structured population
- **Two** main mechanisms of interference based on varying levels of knowledge about the population
- **Interference** means **artificially increasing the fitness of certain individuals** if some conditions are met – in this case the roles they are playing in the interaction and the frequency of those strategies either in their neighbourhood or in the overall population

RESULTS AND CONCLUSION

- When the external investor is restricted to population-level information gathering, targeting HH players (fair proposals and responses) ensures the most cost-efficient outcome
- If these cost requirements are relaxed, it is possible to maintain high levels of fairness by maintaining a proactive approach to investment. This is achieved by always investing if the number of fair individuals of the population drops below a threshold

Cost-Efficient Interference in the spatial Ultimatum Game is characterized by strictness – it is imperative to ensure that both proposals and responses are fair.

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Table 1: Most cost-efficient scheme to reach a minimum fairness of proposals for different mutation rates (population-based, stochastic update). There exists no schemes which satisfy the higher minimum fairness requirements in the case of very high mutation rate, written as '–' in the table.

Mut. rate	Min. fairness	Target	Threshold	θ	Cost
10^{-4}	75%	HH	0.3	0.1	530
10^{-4}	90%	HH	0.3	0.1	530
10^{-4}	99%	HH	0.3	0.4	999
10^{-2}	75%	HH	0.3	0.3	750
10^{-2}	90%	HH	0.3	0.7	1747
10^{-2}	99%	HH	1	0.1	487514
0.2	75%	HH	0.6	0.2	358089
0.2	90%	–	–	–	–
0.2	99%	–	–	–	–