

Opinion dynamics for decentralized collective decision-making in a swarm of robots

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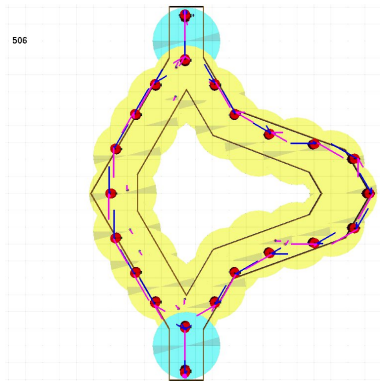
Example: Religious conversion

Branch of statistical physics
that deals with

- the definition of opinion states of a population, and
- the mechanisms that trigger transitions between states.

Our work: Goal

Can opinion dynamics models be used to make a large population of (simple) robots choose the best of a number of competing alternatives?



Our work: Opinion dynamics mechanism

- 1 Pick at random k groups of 3 individuals each
- 2 Each group selects the action according to a given decision rule
- 3 A selected action is adopted by all the individuals in a group
- 4 All groups perform the selected action
- 5 Once a group finishes, its members become available again to form another group

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Majority rule

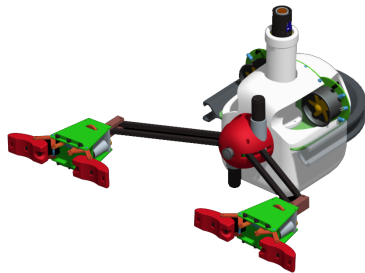
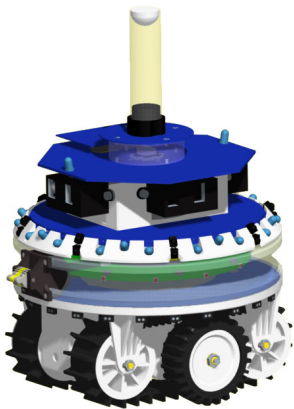


Our work: Majority rule as local decision rule

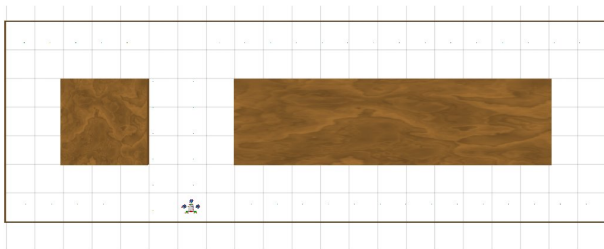
Majority rule



Our work: Robots

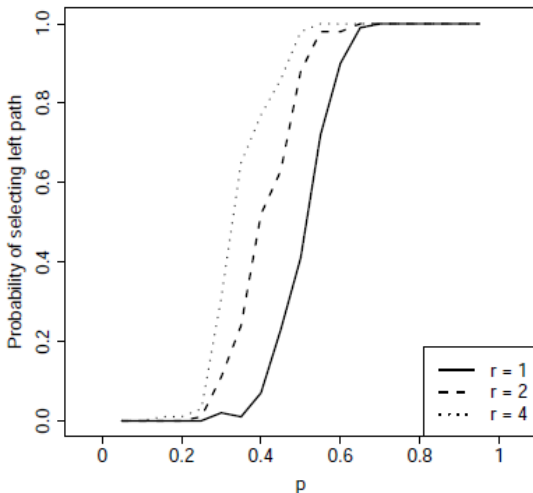


Our work: Example



Results: Population adoption probability

Majority rule (64 robots - 16 teams)



Majority rule: $N = 64$, $k = 16$

Ongoing and future work

- Different decision rules
- Task completion time variance
- Dynamic environments
- Multiple choices
- Analytical study
- Group scalability
- Speeding up convergence

Thank you

(More) Questions?