Socially Intelligent Genetic Agents for the Emergence of Explicit Norms

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Objective

- To engineer intelligent agents that support rich interactions between their stakeholders by sharing and reasoning about explanations for norm violations
- To understand how creating and sharing explanations for norm violations facilitates the emergence of norms

Research Questions

RQ (Goal). Do societies of agents who provide and evaluate explanations for norm violations achieve higher goal satisfaction?

RQ (Cohesion). Does providing and evaluating explanations lead to norms that improve social cohesion?

Concepts

Social norm characterizes interactions between agents; indicates whether an action should be performed

Social context is the circumstance under which an agents takes an action

Deviation is a perceived violation of a norm

SIGA

- A socially intelligent genetic agent (SIGA) adapts to social context and supports meeting social expectations
- SIGA is ethical — seeks to balance the needs of
  - Primary stakeholder (user), who directly interacts with the agent
  - Other stakeholders, who are affected by the agent's actions
- SIGA use (1) a rule learning algorithm called XCS which uses genetic algorithm to discover and evolve new norms and (2) reinforcement learning to identify valuable norms using the feedback received from other agents

Take Away & Directions

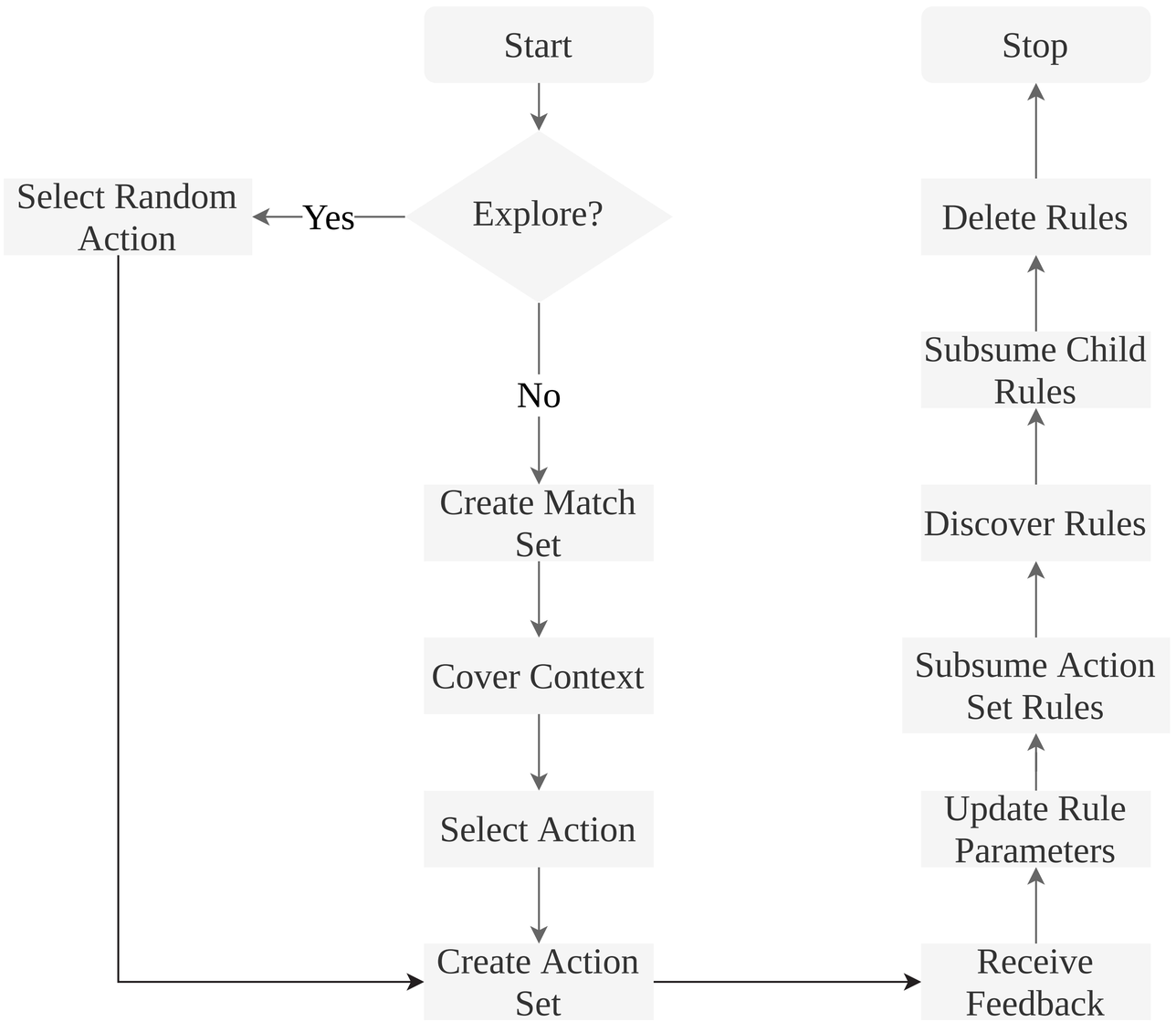
- SIGAs enable emergence of explicit norms in a decentralized system
- Explicit norms lead to better social experience and cohesion

Directions:

- Abstractions for privacy-respecting explanations
- Hierarchical ontology for learning complex norm boundaries
- Incorporating values and preferences

Realizing a SIGA

A SIGA use (1) a rule learning algorithm called XCS which uses genetic algorithm to discover and evolve new norms and (2) reinforcement learning to identify valuable norms using the feedback received from other agents



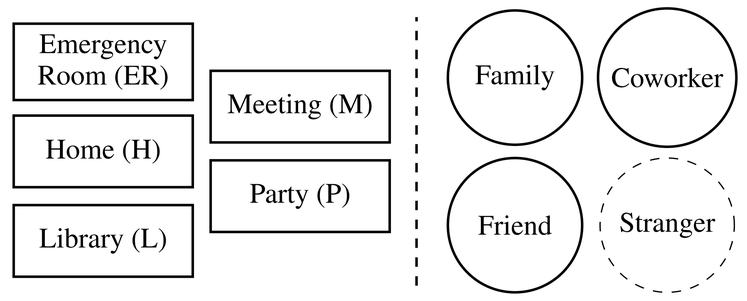
Evaluation Setup

Agent societies. Pragmatic, considerate, selfish, and mixed

Learning strategies. Fixed, NSIGA (learning from sanctions), and XSIGA (learning from sharing explanations)

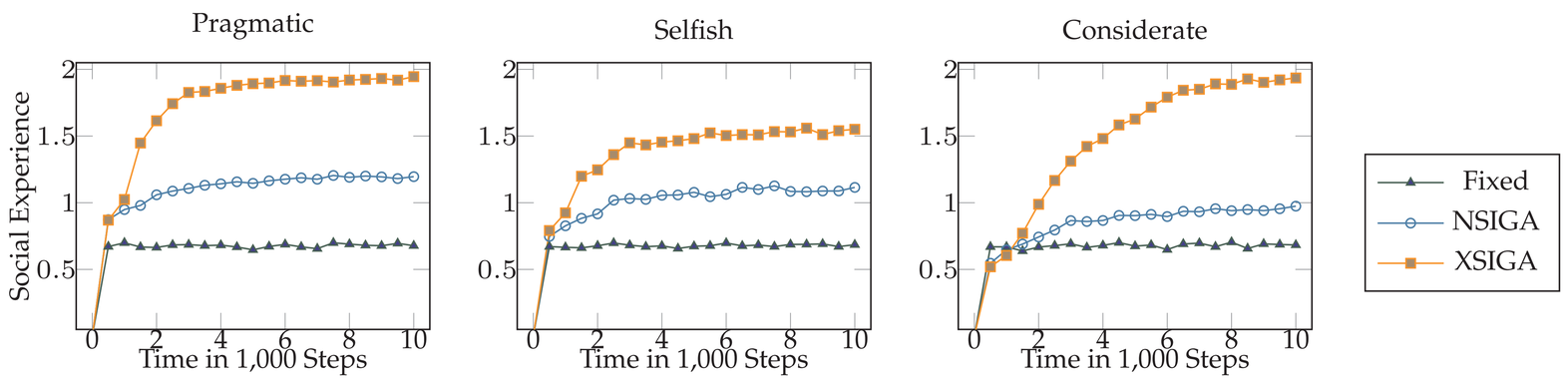
Metrics. Social experience, cohesion, and adoption

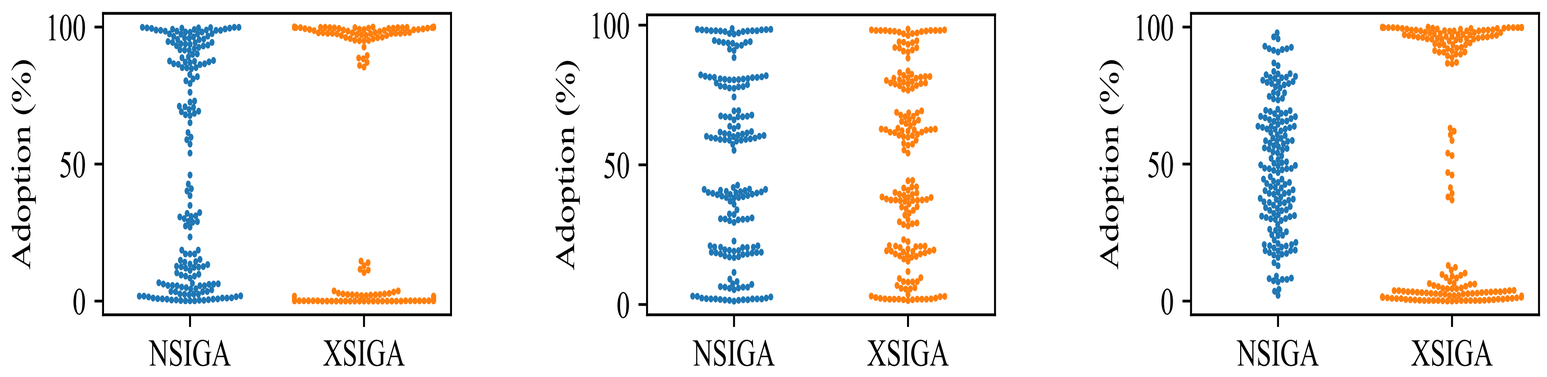
Ringer Simulation



Results: Comparing XSIGAs with Baselines

XSIGAs yield higher social experience and norm adoption than baselines





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