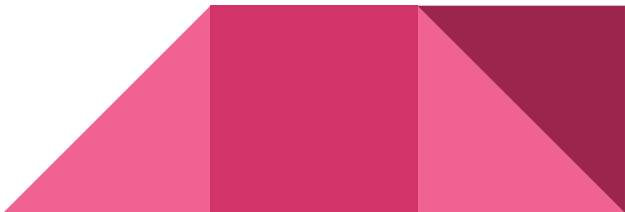


Multi Agent Implementation Of The Werewolf Game

Davide Sangiorgi

Matteo Conti

Game Rules

- Farmers vs Werewolves
 - Competition vs Cooperation
 - Game Phases: day & night
 - Agent's Actions as Voting Strategies
- 

Environment

Public



Private

data available to all agents

state of the game

no information about other agents

agent access is forbidden

controller secret vault

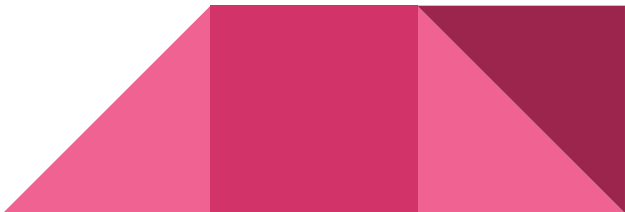
sensitive information



Controller

- Game Lifecycle Manager (phases, turns, ...)
 - Agents Lifecycle Manager (initialization, role assignment, ...)
 - Game Regulator (votes, actions ...)
 - Global Middleware (communication, election, ...)
- 

Nameserver

- Abstract Low-Level Agent Deployment
 - Local Socket Development (local port and namespace)
 - Agents' UUIDs Abstraction & Masking
 - Abstract Agents' "Physical" Interactions
- 

Communication

- Publish-Subscribe Communication Protocol
- Roles & Phases to Channels' Topics
- Message Encryption & Serialization



Agents

Independent entities capable of both taking actions and communicating with each other.

Main Components:

- Beliefs → partial and subjective representation of the environment
- Brain → actively update agent beliefs



Artifacts

Artifacts enhance the abilities of agents and grant them access to hidden information. They represent the “perks” of the game improving chance of winning.

Implemented artifacts:

- Seer → provides the possibility to ascertain the role of a player
- Bodyguard → provides the possibility to prevent a player elimination

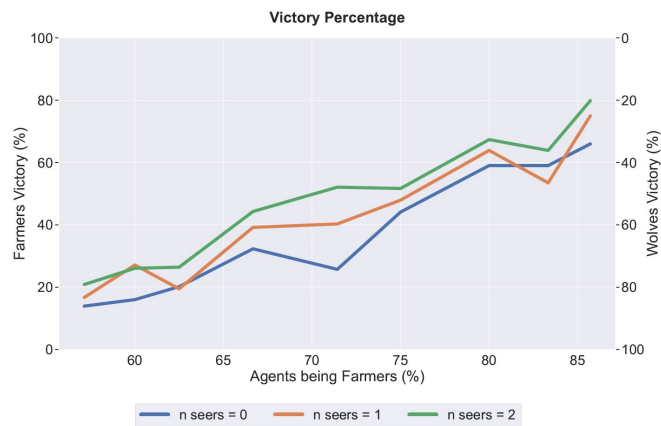
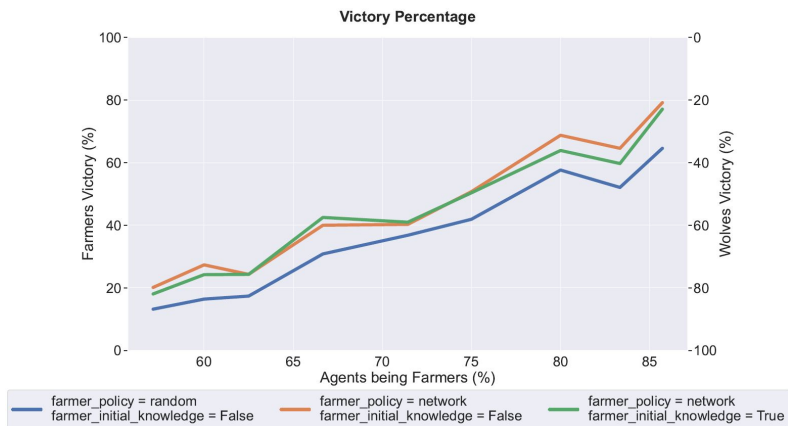


Voting

1. Agents query their individual brains and vote according to their beliefs
2. Votes are collected and we classify the result as:
valid, not valid, deadlock, not deadlock
3. Voting algorithm outputs a results or repeats the voting depending on the circumstances



Results



Future Improvements

- Bayesian network with incremental training
- Messages and agents uuid encryption
- Implementation of higher number of “perks”
- Increase the number of matches per configuration
- Improve the set of experiment metrics



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