# Artificial Intelligence in a Multi-Agent Model

John Walsh
Computer Systems Research Lab 2008-2009

Abstract

Agent-based modeling is an extremely diverse field of research, and much analysis and research into the effectiveness of agent-based modeling. Agent-based modeling is valued for its ability to model scenarios in a level of detail that would be prohibitively complicated in an equation based model. I will investigate the possible value of detailing agent behavior beyond simple rules, to the level of basic artificial intelligence for each agent. This project will yield a deeper understanding of multi-agent modeling. A modeling of a simple predator-prey interaction with implementation of advanced decision-making mechanisms for agents should yield different results depending on the level of intelligence each agent has. Clearly, implementing a scenario that investigates all artificial intelligence in agent-based modeling is beyond the scope of the resources available. As a result, this project will attempt to analyze the results of implementing varying levels of artificial intelligence for agents in a simple simulation between predator and prey. Multiple cases of the scenario will be set up, and the rules for each agent will be varied between cases. The cases will be compared to yield results concerning the effect of the artificial intelligence.

Screenshot of the simulation run with a random seed:
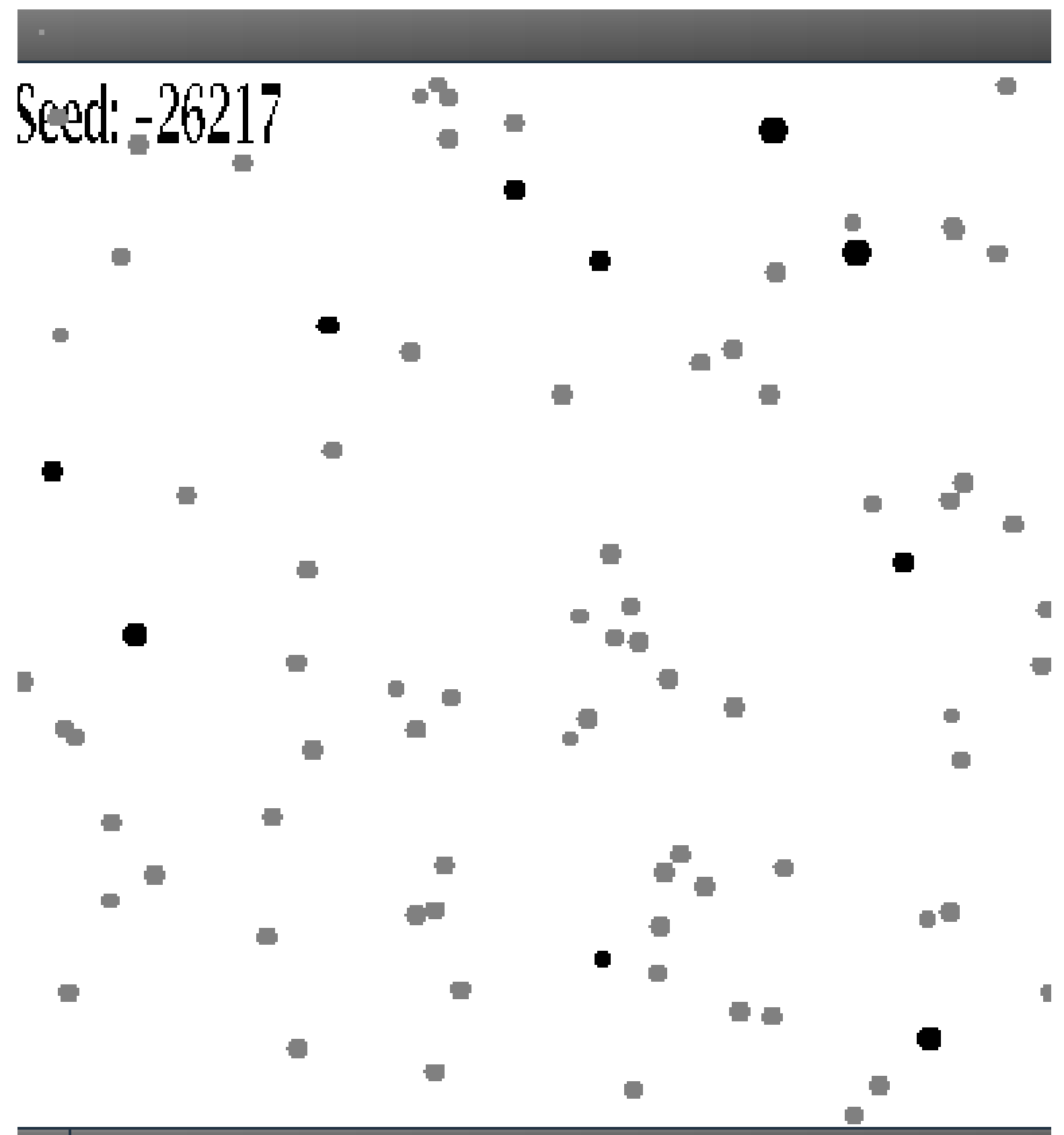
Screenshot of the simulation run twice with the same seed: