HiveMind

Overview

HiveMind is a project, trying to implement Artificial Intelligence into an ant hive simulation. The ant hive needs food, which is scattered all over a simulated world in order to stay alive and keep the simulation running. To collect food, the hive sends out searcher ants, which will look around the world, trying to find food. Those searcher ants have a stamina value that decreases every step the searcher ant takes, so at one point it needs to return to hive to fill up it's stamina value. If a searcher ant finds food or runs out of stamina, it will return the exact same route it took back to the hive. There the ant will transfer it's waypoint information to the hive, which then, depending on the situation if food was found, decides if it can send out collector ants to get more food without running out of food and also try to optimize the way so every other collector ant it will send out will take an optimized route. If the searcher ant didn't find any food, the hive refills it's stamina points and the searcher ant will continue it's search.

If, to this point, the project delivers sufficient and promising data, further features like enemy hives that act the same way but can also get food by stealing it from the other hive, will be implemented.

This project will be implemented via the Unity Engine. The main program code will be written in C#.

Features

- The Hive has two main resources, ants and food. If the Hive generates ants it costs food, so it needs to decide if it either generates more ants to find food or to save food and wait for returning ants, as the simulation will end if the hive doesn't have any more food.
- Searcher ants are searching the world for food via random generated routes.
- Searcher ants will remember waypoints of their route.
- Searcher ants have stamina points, which will decrease by every step taken. Searcher ants need to refill those stamina points at the hive before they run out.
- The Hive collects all waypoint data from returning searcher ants, deciding either to forget the route, if no food was found, and to refill the searcher ant's stamina or to optimize the route a searcher ant delivered because it found food and thereby sending out collector ants.

Requirements

- Knowledge of Agents and Environments

Evaluation Criteria

- How efficient is the hive with the route optimization and the decision making for sending out ants / saving food to survive.