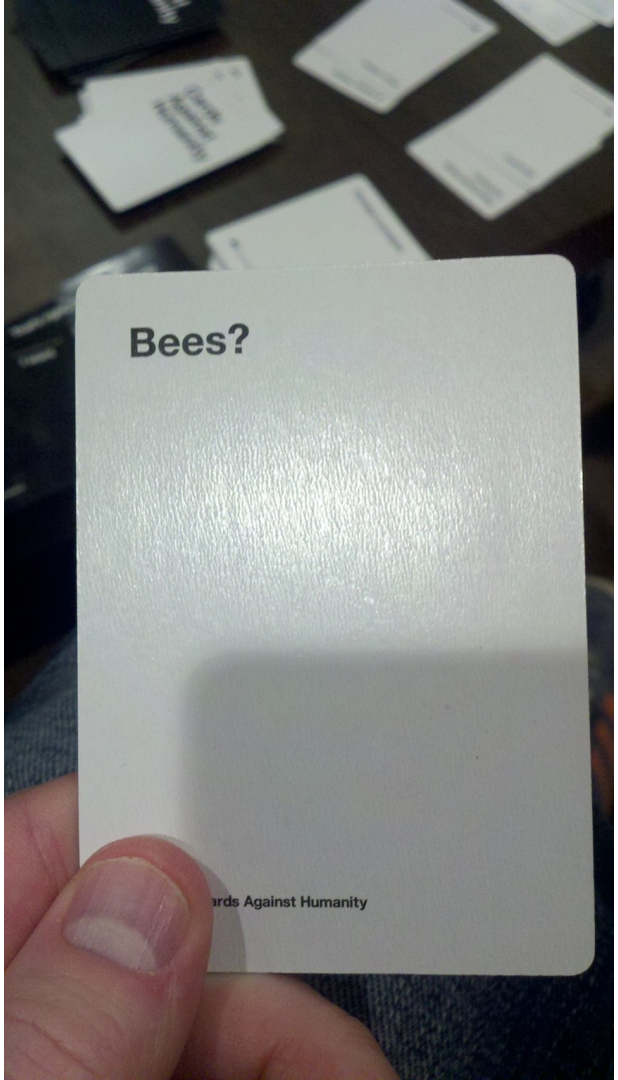
Yensen and the DahImanators

Final Project Summary


Bees?
rds Against Humanity

Quick Summary

We will be examining the effect that pesticides have on the bees while they fill the hive with nectar from flower patches, as well as the effectiveness and ability to communicate between different bee types. Each bee will try to maximize the amount of nectar it gathers, and the desired emergent behavior is the optimization of both the overall health of the bees and the time which it takes to fill the hive.

Wise and naive bees will work to collect nectar from flower patches to fill a hive. Pesticides will be sprayed on flower patches that will damage the bees health. The goal is to fill the hive in the least time possible with nectar while maximizing the overall health of the bees.

Agent Design

Bee Stats Set By User

- Number of wise bees
- Number of naive bees
- Communication range (proportional to bee health)
- Nectar holding capacity

Intrinsic Bee Things

- Health starts at 100%
- Location of flower patch it is going to or just came from
- Time it visited a patch

Agent Design

Naive Bee

- No additional traits
- Totally *basic* bee

Wise Bee

- Can communicate if patch it visited is sprayed by a pesticide to other wise bees and to hive

Pesticide Sprayer

- User Settings
  - How often the pesticide is sprayed
  - How long it lasts **at full potency, doesn't "wear off"**

Environment

Flower patches

- Quantity determined by user
- Placed randomly
- Stats:
  - Total amount of nectar set by user, decreases as bees visit

Hive

- Capacity (total amount of nectar bees can store)

Pesticides

- Not visible until an affected flower patch visited

Desired Emergent Behavior

Minimize time to fill the hive with nectar

Maximize health of bees who are gathering nectar

Introduction of pesticides and random position of flowers introduce challenges that must be met through social interaction and communication

Hypotheses

1. Running the system for a finite period of time with no wise bee agents and n naive bee agents will result in high nectar levels but low overall health. Running the system with n wise bees and no naive bee agents will result in a higher health than the prior run, but lower nectar levels.

2. Running the system to program termination - either a beehive 100% full of nectar or all bees have died - with zero wise bee agents and n naive agents will result in a shorter termination time than running the system with zero naive agents and n wise bees.

Hypotheses

3. The optimal system in which the beehive is filled the fastest and total agent health is maximized will have a mixture of wise and naive bee agents.

4. Increasing any of the pesticide sprayer statistics without changing any bee agent statistics will result in equivalent or lower hive nectar levels when running the system for a finite period of time. In contrast, increasing the number of flower patches without changing bee agent statistics will result in equivalent or higher nectar levels when running the system for a finite period of time.