



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Hive Simulation

Stefan Gugler, Elias Huwyler, Fabian Tschopp

December 15, 2013

Outline

Advanced model: Environment simulation

- Model overview

- Agents: Assigning jobs

- Foragers' distribution across flower patches

- Agents: Scout bees

- Scouts' random walk

- Agents: Forager bees

- Path optimization

- Agents: Returning to the hive

Advanced model: Environment simulation

Model overview

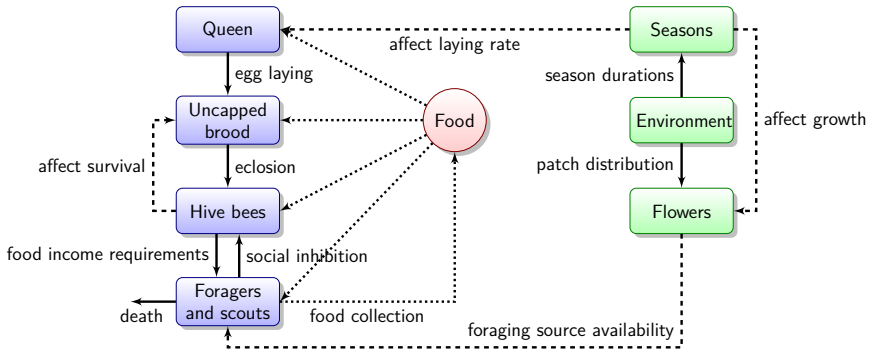


Figure 1: *Honey bee social dynamics and environmental influences covered by our advanced model.*

Agents: Assigning jobs

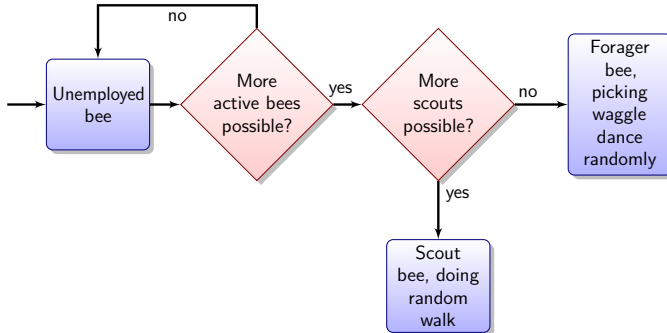


Figure 2: *Assigning jobs to unemployed bees. Scouts and foragers are possible.*

Foragers' distribution across flower patches

Agents: Scout bees

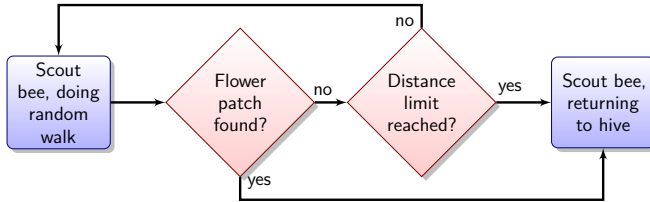


Figure 3: *Scouting behaviour until a flower patch is found or the maximum distance is reached.*

Scouts' random walk

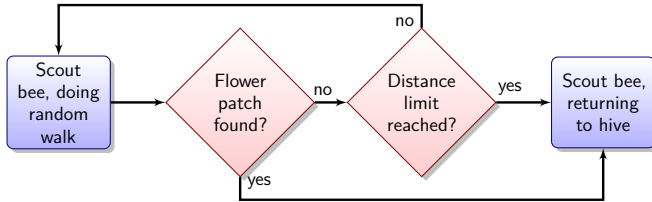


Figure 4: *Scouting behaviour until a flower patch is found or the maximum distance is reached.*

Agents: Forager bees

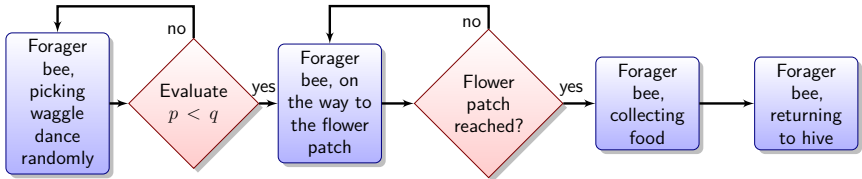


Figure 5: *Foraging behaviour.*

Path optimization

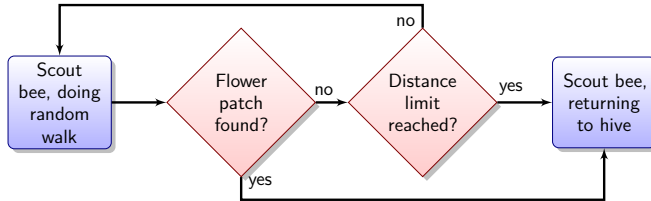


Figure 6: *Scouting behaviour until a flower patch is found or the maximum distance is reached.*

Agents: Returning to the hive

Placeholder
—
Image

The background of the slide features a honeycomb pattern of yellow hexagons with black outlines. A horizontal band of dark green, semi-transparent material covers the middle section of the image.

Questions?