
Rabbit Population ABM

Release 1

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1.1 agentframework module

class agentframework.**Agent** (*env, agents, x, y*)

Bases: object

An Agent takes a random walk through a two-dimensional environment.

environment

The environment in which the Agent is moving. A list of equal-length lists of integers.

env_height

The height of the environment.

env_width

The width of the environment.

y

Integer. The Agent's y-coordinate within the environment.

x

Integer. The Agent's x-coordinate within the environment.

distance_between (*agent*)

Find Euclidean distance between this Agent and another Agent.

Parameters *agent* – Another Agent.

eat ()

Define an agent's eating of resource from environment.

move ()

Move agent with random unit-sized step in each of two dimensions.

class agentframework.**Environment** (*file*)

Bases: object

Transforms a CSV file into a 2-d environment with which an agent can interact.

env

A list of equal-length lists of integers representing grass in a field.

class `agentframework.Fox` (*env, agents, x, y*)

Bases: `agentframework.Agent`

TODO: A Fox is an Agent that hunts rabbits and eats them.

class `agentframework.Rabbit` (*env, agents, x, y, lifespan*)

Bases: `agentframework.Agent`

A Rabbit is an Agent that eats grass, reproduces, ages, and dies.

die ()

When a Rabbit dies, it is removed from the list of living Rabbits.

eat ()

A Rabbit eats just like an Agent, but dies if it runs out of energy.

get_older ()

Rabbits age; and when their age exceeds their lifespan, they die.

mate (*range*)

Mature female rabbits become pregnant whenever male is in range, and then give birth after ten steps.

Parameters *range* – Integer. Distance within which Rabbits mate.

move ()

Rabbit moves just like an Agent, but uses energy to do so.

1.2 gui module

`gui.run` ()

Runs the Graphical User Interface.

`gui.update` (*frame_number*)

Updates the visualization for matplotlib.

1.3 read_cmd module

This module reads parameters for the model from the command line, and defines the default parameters if none are specified.

`read_cmd.parameters` (*cmd_line_input*)

Read parameters defined from command line, or return with defaults if no explicit parameters set.

Parameters *cmd_line_input* – List of strings read from command line by `sys.argv`.

Return: Tuple (num_of_agents, lifespan, neighbourhood, num_of_iterations, animate)

1.4 run_model module

An agent-based model demonstrating population dynamics of mating rabbits.

This file is intended to be the main script run from the command line.

`run_model.create_rabbits` (*environment, num_of_rabbits, coordinates, lifespan*)

Make new Rabbits, and return them in a list.

Parameters

- **environment** – A list of equal-length lists of integers representing quantities of grass in a field.
- **num_of_rabbits** – An integer specifying how many rabbits will be created.
- **coordinates** – A list of dicts including “x” and “y” values.
- **lifespan** – An integer specifying at what age these new rabbits will die.

Return: A list of Rabbits.

`run_model.my_timer` (*process*)

Decorator function to time the process.

`run_model.rabbits_interact` (*rabbits, neighbourhood=10*)

Shuffle the rabbits and then make them interact.

Parameters

- **rabbits** – List of Rabbits.
- **neighbourhood** – Integer representing distance at which Rabbits will mate.

`run_model.run_model` ()

`run_model.save_data` (*environment, rabbits*)

Saves data generated by running the model.

Write environment to CSV file, and Agent data to text file, and test data to CSV file.

Parameters

- **environment** – A list of equal-length lists of integers representing quantities of grass in a field.
- **rabbits** – List of Rabbits.

1.5 visualize module

`visualize.show_plot` (*environment, rabbits, neighbourhood, num_of_iterations*)

Shows animated plot of rabbits’ movements.

Parameters

- **environment** – A list of equal-length lists of integers representing quantities of grass in a field.
- **rabbits** – List of Rabbits.
- **neighbourhood** – Integer representing distance at which Rabbits will mate.
- **num_of_iterations** – Integer. Maximum repetitions of agent interactions.

1.6 web_scraper module

`web_scraper.scrape` (*src*)

Scrape x and y values from online table found online.

Parameters `src` – String representing URL.

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