Evodoodle Lab

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Creating a GitHub account

1. Go to https://github.com/
2. Click Sign up
3. Sign up with your **berkeley email**
4. Follow the prompts to create your personal account.
5. Pick your username carefully, you will likely not want to change it (but you can). Some recommendations:
    a. Use part of your real name so it is easier for people to know who you are
    b. Try and keep it short, you may have to type it a lot
    c. Keep everything lowercase. If you really want to separate words, use a hyphen (-) or an underscore (_)

GitHub Codespaces

1. Go to https://github.com/TheWangLab/espm154
2. Click the green "Code" button in the top right
3. Click "Open with Codespaces".
4. Wait for the codespace to load. This will take several minutes.
5. Open the “espm154_lab8” ipynb file
6. When you run a cell you will be prompted to pick a kernel: click “Python environment” and then the first item on the list which has a star next to it (conda)

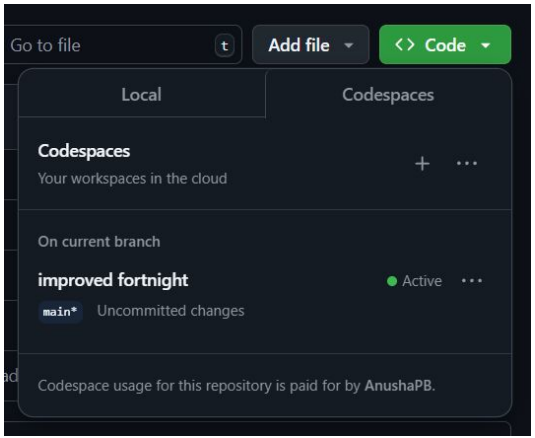
Tips:

1. If you hover over the plots, you can copy the image by clicking this icon: 
   This may be useful in answering the lab exercises and keeping track of the simulations.
2. You can download your notebook by right clicking on the file and selecting “Download” (you may have to click “Accept” on a pop-up first)

GitHub Codespaces

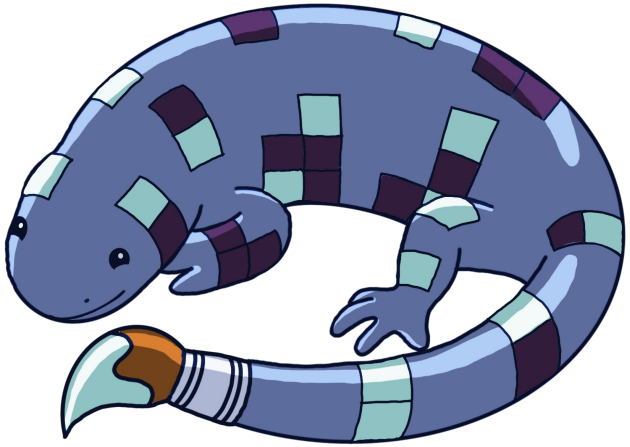
To reopen an existing codespace go to here:
https://github.com/TheWangLab/espm154

Click the code button again and click on the listed codespace (it will have a random name)



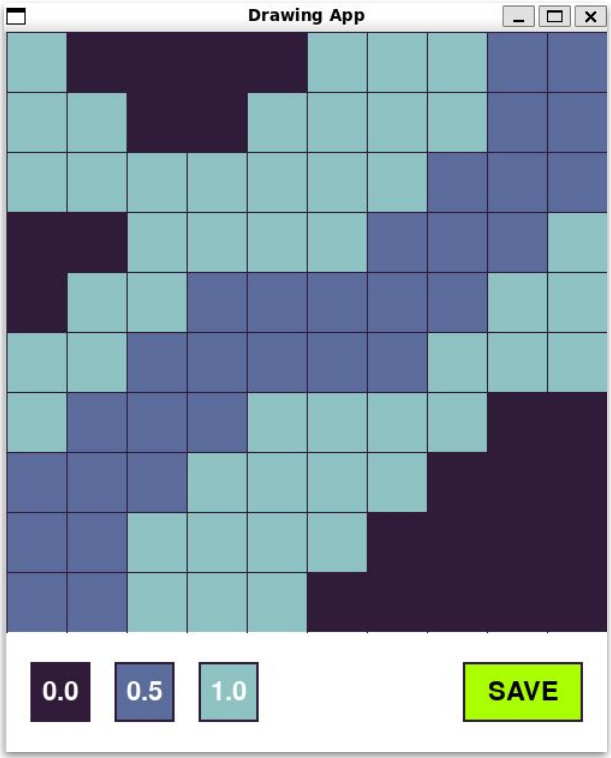
Part 1: Introduction to Evodoodle

Evolutionary simulations with Evodoodle



https://github.com/AnushaPB/evodoodle

Evolutionary simulations with Evodoodle



Evolutionary simulations with Evodoodle

Control over three landscape layers:

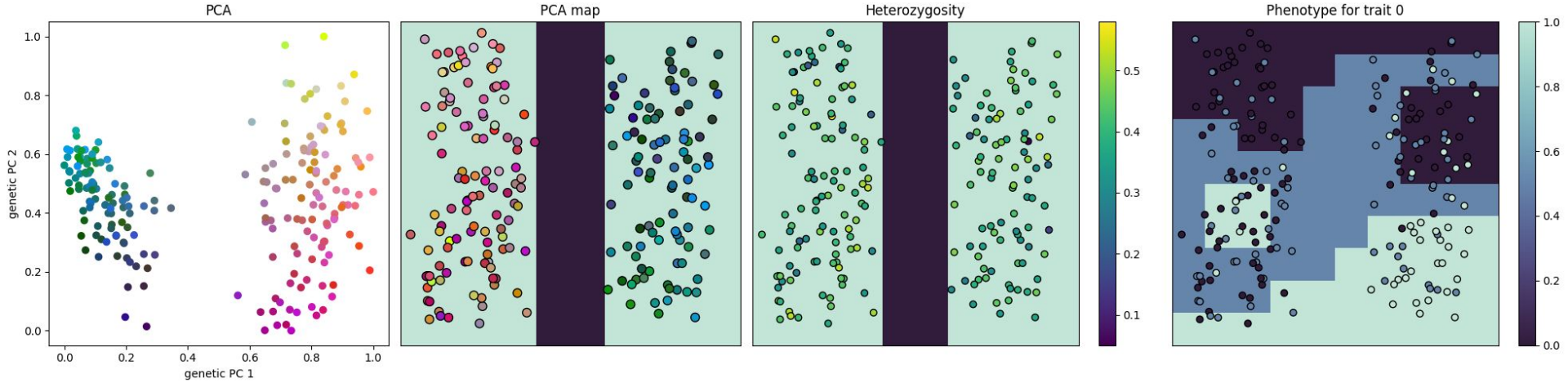
1. **Carrying capacity** - number of individuals that each landscape cell can support. This landscape is particularly useful for creating barriers by drawing areas that have a carrying capacity of zero.

2. **Connectivity** - how easily individuals can move through each cell.

3. **Environment** - the environmental gradient that our species will adapt to. The species has a single trait that is selected upon based on this environmental layer.

Evolutionary simulations with Evodoodle

New plots:



Part 2: Answering real-world questions with Evodoodle

Tips for creating your own simulations

1. You do not have to customize every landscape layer

2. To evaluate your results you should consider both neutral and adaptive processes (though sometimes only one will apply).

3. If you are interested in changes in heterozygosity, you may need to run your simulations for a longer period of time (300-500 generations or more).

As your run your simulations think about potential limitations of your simulations. How are your simulations different from what you would expect in the real world?

Exercise 1: Evaluating the effectiveness of wildlife corridors

A green bridge allows animals to cross the Autobahn A1 safely in Nettersheim, Rhineland-Palatinate, Germany. Jorg Greuel / Photodisc / Getty Images

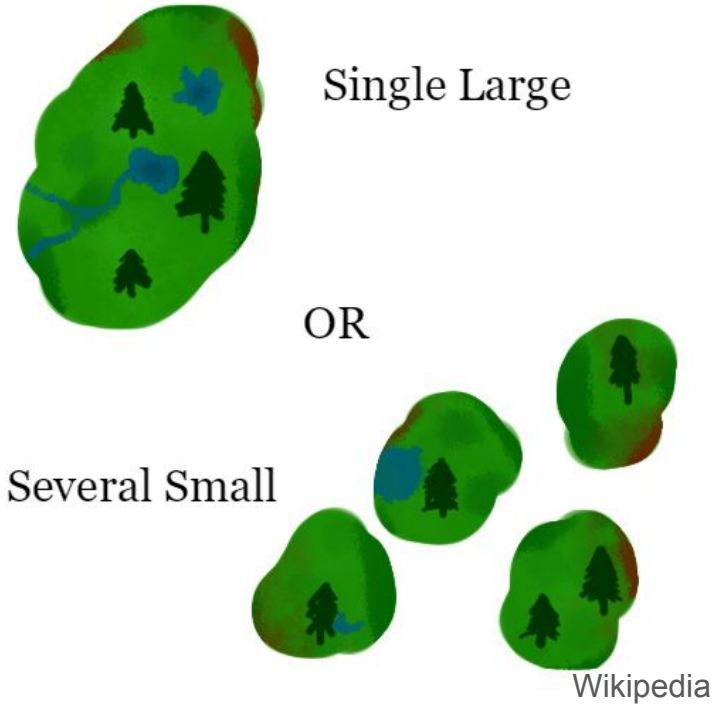
Why you can trust us

Exercise 1: Evaluating the effectiveness of wildlife corridors

To evaluate the effectiveness of wildlife corridors we will run three simulations:

1. A simulation with no barrier
2. A simulation with a barrier and no corridor
3. A simulation with a barrier and with a corridor

Exercise 2: Optimizing land preservation for conservation



Wikipedia

30x30 CALIFORNIA

Exercise 2: Optimizing land preservation for conservation

1. Consider what you are interested in: minimizing drift? conserving phenotypic diversity? maximizing genetic diversity?

2. Remember that they have a fixed amount of land they can buy; make sure that the total area preserved when simulating either option is the same. For example, you could aim to preserve 36 cells total in both simulations and just change the arrangement of those 36 cells.

3. If you make your preserved areas too small, you may end up with extinction; this will appear as an error when running your simulations.

4. To make things simpler, you may want to keep your preserves rectangular (i.e., not irregularly shaped)

Exercise 3: Optimizing land use for conservation

fri research

Exercise 3: Optimizing land use for conservation

Article

Winter distribution of woodland caribou in relation to clear-cut logging in west-central Alberta

Authors: Kirby G Smith, E Janet Ficht, David Hobson, Troy C Sorensen, and David Hervieux | AUTHORS INFO & AFFILIATIONS

Publication: Canadian Journal of Zoology • August 2000 • https://doi.org/10.1139/z00-094

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Exercise 4: Changing species parameters

Pick one of the exercises from before and change one of the species parameters to see how it may affect your results.