
Evolving Niches Documentation

Release 0.1

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This (very incomplete) documentation covers the code used for a series of experiments in artificial life and soundscape formation over the course of my PhD. The results of the experiments are published in two papers:

- Kadish, D., Risi, S., & Beloff, L. (2019). An artificial life approach to studying niche differentiation in soundscape ecology. The 2019 Conference on Artificial Life, 52–59. https://doi.org/10.1162/isal_a_00140
- Kadish, D., & Risi, S. (2020). Adapting to a changing environment: Simulating the effects of noise on animal sonification. The 2020 Conference on Artificial Life, 687–695. https://doi.org/10.1162/isal_a_00320

This code covers the experimental runs and portions of the analysis that was done in creating the paper.

1.1 Analysis

1.2 Dataframe

1.2.1 Combine

1.2.2 Calculations

1.2.3 Spectrum

1.3 Evaluators

1.4 Genome

1.5 Messaging

1.6 Noise

1.7 Parallel

1.8 Population

1.9 Species

1.10 Stats

1.11 Visualize

1.11.1 Dataframe

1.11.2 Plot

1.11.3 Print

1.11.4 Set

EXPERIMENTS**2.1 One Species With Noise****2.2 Evolve Multi Species**

This is the code that was used for the ALife 2019 paper “An artificial life approach to studying niche differentiation in soundscape ecology”. Due to API changes it likely no longer works (it has not been updated) and is here for archival purposes only.

SCRIPTS

These are mostly one-time use scripts to fix errors in the generated dataset (for example, incorrect labelling of the generations). Hopefully, most of these have been corrected in the code and should no longer need to be used, but are here for posterity.

3.1 `fix_generations.py`

3.2 `run_calculations.py`

3.3 `run_renumber.py`

EXAMPLES

4.1 Experiment

Experiments can be run using the python scripts in `evolvingniches.runs`. `evolvingniches.runs.evolve_1_species_with_noise` is the module used in “Kadish, D., & Risi, S. (2020). Adapting to a changing environment: Simulating the effects of noise on animal sonification. The 2020 Conference on Artificial Life, 687–695. https://doi.org/10.1162/isal_a_00320”.

Its usage is documented in *One Species With Noise*, but can be invoked with default options as:

```
python -m evolvingniches.runs.evolve_1_species_with_noise
```

4.2 Config

`config.ini` sets preferences for logdna which isn't really used anymore, so it can pretty much be ignored.

4.3 Experiment Analysis using a Jupyter Notebook

Take a look at `examples/experiment_analysis_notebook.ipynb` for an example of analysis using a jupyter notebook. You need to have generated the data files first.

4.4 SLURM Job - Experiment

Job submission to a SLURM server.

4.5 SLURM Job - Combine Dataframes

Combining the datafiles on the SLURM server (my MacBook ran out of memory at some point).

INDICES AND TABLES

- `genindex`
- `modindex`
- `search`