

User Guide for PopRacer

Running PopRacer

Load a terminal session

Change directory to the directory where PopRacer is located.

Type 'setup Poplog' to ensure Pop-11 is setup.

Type 'pop11 main.p'

This loads up 'PopRacer' up with default settings.

- Figure of Eight Track
- Standard Friction Coefficient of 0.002
- Neural Networks with 1 Layer of 7 Hidden Units.
- A simulation length of 2500 cycles.
- A quick train limit of 500 cycles.

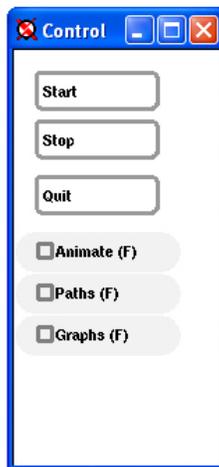
Using PopRacer

When you load PopRacer, you are presented with a command line interface.

Typing 'help' will list the available commands.

Starting the Simulation

You can simply type 'run' to start the simulation, this will present you with the Main Simulation Window (with a figure of eight track), three graphing windows and a control panel (shown below).



- To start the learning click the 'Start' button.
- PopRacer will now run the simulation using some randomly generated cars (without drawing the cars or paths). When at least two cars have learnt to navigate the track within 500 cycles of the simulation, they will then be animated.
- You can also toggle this during the learning process by clicking on 'Animate'.
- It is also possible to have the paths drawn as the cars move (which is a good compromise between speed and enabling you to see the learning process).
- The simulation will also begin to graph the average fitness and best fitness values for the current population of cars being trained.

Finally you can enable real-time graphing (by clicking 'Graphs') of the best cars velocity, which enables you to see how the cars slow down for bends and speed up on straights.

Once these cars are trained up you can then save the population to a file.

Saving Car/Genetic Algorithm Populations

It is easy to save a trained set of cars to a file, the procedure is below:

- Click Stop on the Control Panel.
- In the terminal type 'savecars' followed by a space and the file name.
- PopRacer will also ask in the terminal if you want to add any notes to the population file, type something in and press enter.
- The current car population will now be saved to a file.

Loading a Car/Genetic Algorithm Population

Once you have trained up a set of cars, you can test the cars on different tracks with different friction values.

You first have to quit the simulation by click 'Quit', and then reload the simulation. At the PopRacer command line type 'loadcars' followed by a space and the file name of previously saved population.

Tracks

You can now run these cars on different tracks; either a using a hard-coded or custom built one.

There are several harded coded several which can be selected at the PopRacer command line by typing 'settrack' followed by the name of the track which are listed below:

1. eight
2. straight
3. rally
4. silverstone
5. hamburg

Using the Track Editor

You can also design your own track using the track editor.

To load the track editor type 'createtrack' at the PopRacer command line. This will present you with a new window 'Track Editor'.

To create a track simply click points (using the left mouse button) on the window, when you are done use the PopRacer terminal to save the track by typing 'savetrack' followed by a space and the file name.

If you wish to start again click the right mouse button.

This track is now also in PopRacer's memory, so when you type 'run' the simulation will use the track you have designed (if you do not want this to happen use 'settrack' to change the track).

Loading a saved track

Now you have designed a track and saved it, you can load the track into PopRacer. This is done by simply type 'loadtrack' followed by a space and the file name at the PopRacer command line.

Other Settings and Commands

You can also specify many other settings such as the friction coefficient, structure of the neural networks and simulation length.

All these commands are found with an explanation by typing 'help' at the PopRacer command line.