

Candidate Research/Programming Projects

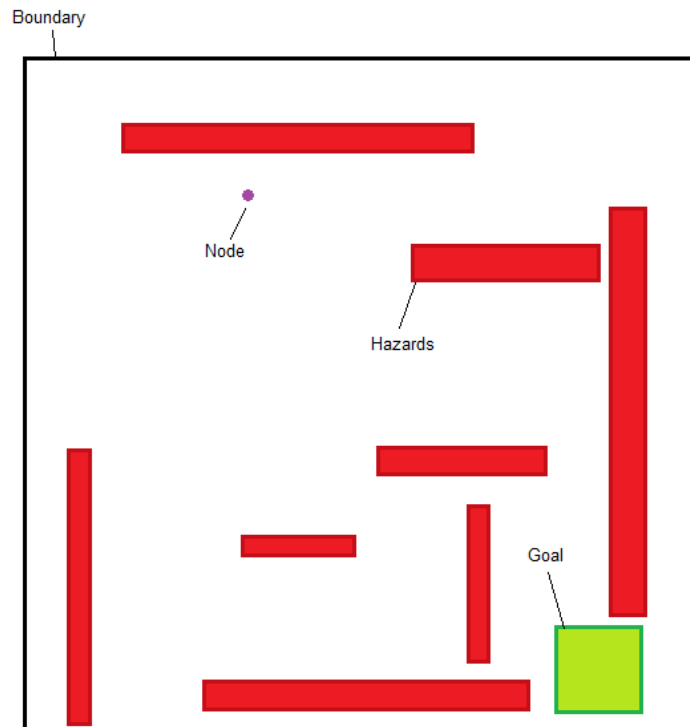
Proposal One: Self-Navigating AI

This project will be set in 2-dimensional plane. Within this pre-defined space, there will rest a single node whose goal is to navigate from a randomly-defined starting point (in the form of an x,y coordinate) to a randomly-defined goal space (think of a rectangle). There will also be randomly placed "hazard" spaces which will "kill" the node if it touches them. With the use of genetic algorithms and enough trials, this AI node will slowly navigate its way toward the goal area without being killed. The node's starting location will be entirely random – with the precondition that it cannot start within the goal space or any of the hazard spaces.

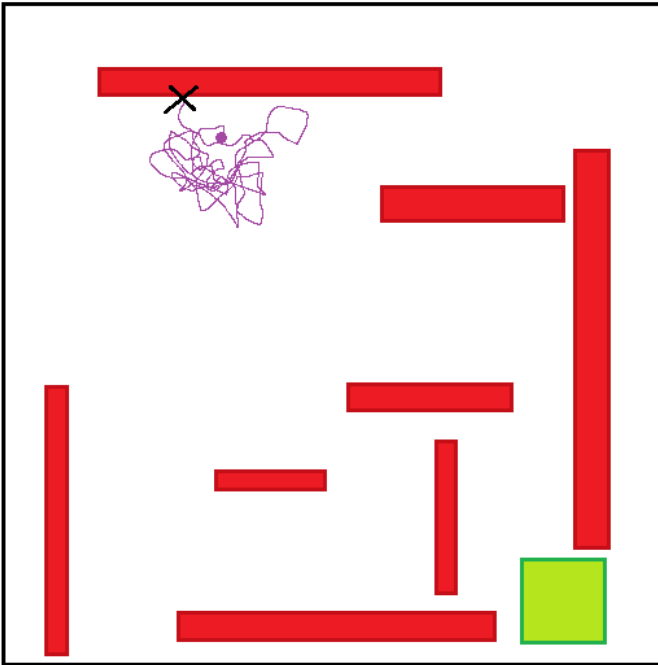
The AI will start off with no prior knowledge of where the goal space is, nor the existence of hazardous spaces. As it tries to reach the goal with each trial, the *fitness* state will be represented by how close the node has gotten to reaching the goal. The failure state occurs whenever the node touches a hazard space or leaves the world boundary.

After the node has managed to reach its goal, it may now run another series of trials which will attempt to *optimize* its navigation from the start to the end. The fitness metric in this case would be the *total distance* it travels to get to the goal area – the smaller this metric is, the better. After enough trials, the node should theoretically have navigated the area flawlessly.

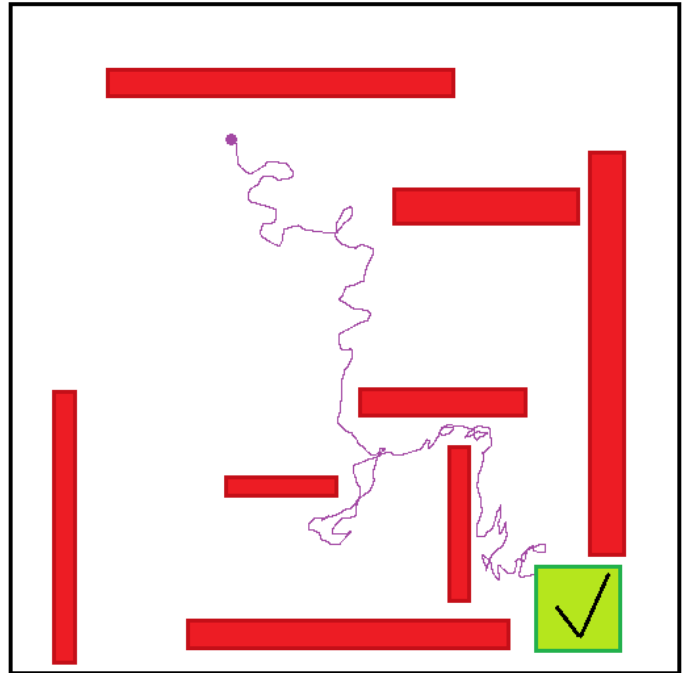
The program may be structured in a similar fashion to the RBG genetic algorithm in terms of the tasks completed, but on a larger scale, with two fitness metrics being calculated; distance from goal and distance travelled to it (one after the other).



Trial 1



Trial ???



Trial ∞

