

Sujay Jakka

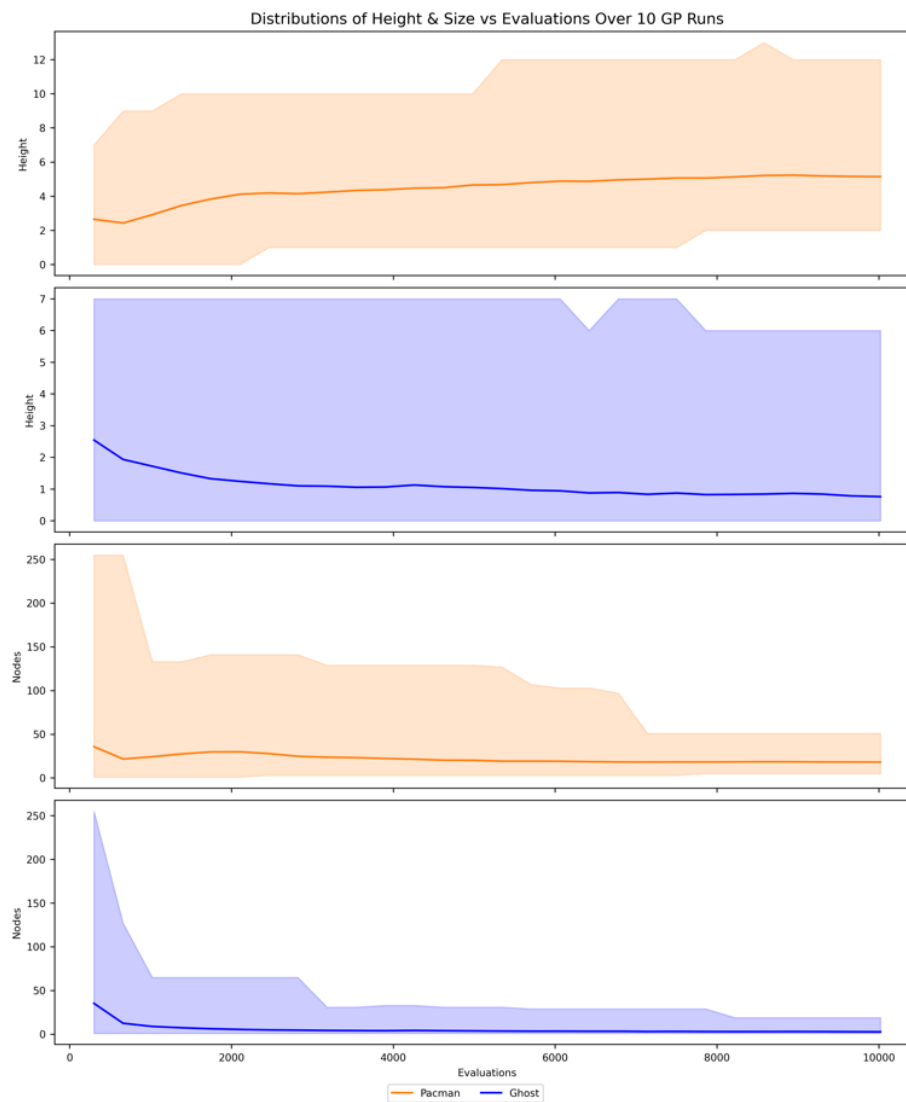
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COMP 5660 Fall 2024 Assignment 2c

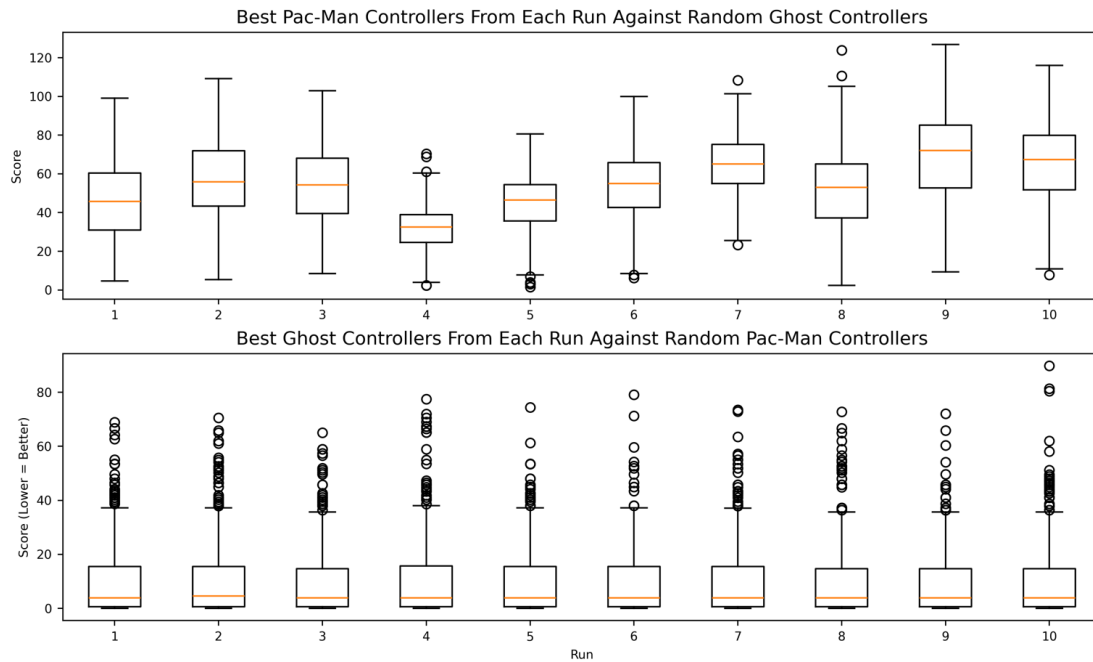
6 December 2024

Assignment 2c Report

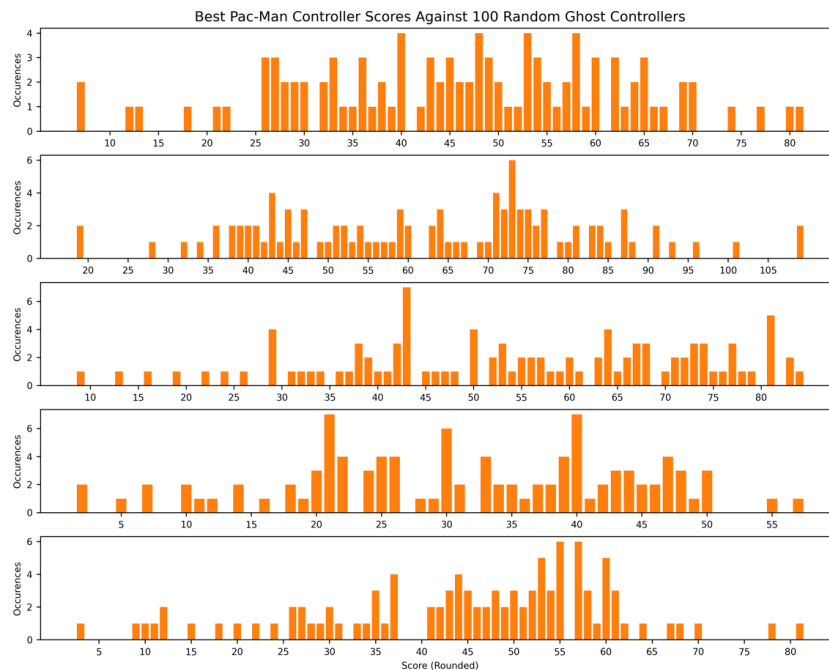
The plots below describe the distribution of tree size and tree height versus evaluations across both populations in all runs.



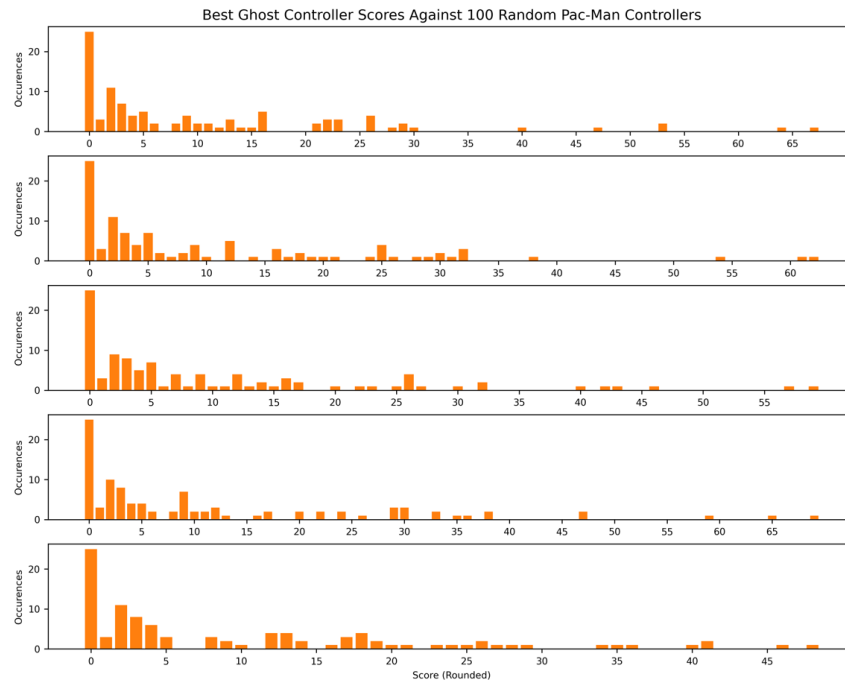
Furthermore, the following Box Plots shows the performance of the five best-base-fitness Pac-Man and Ghost controllers from the end of each run against a common set of 100 randomly-generated Ghost controllers or Pac-Man controllers respectively.



Additionally, the histograms below show the distribution of scores for the best-base-fitness Pac-Man controllers from the first half of the runs against 100 random Ghost controllers.



Similarly, the following histograms show the distribution of scores for the best-base-fitness Ghost controllers from the second half of the runs against 100 random Pac-Man controllers.



After watching the game of the best Pac-Man controller that performed the best against the 100 random Ghost controllers against the best Ghost controller that performed the best against 100 random Pac-Man controllers, it was very lackluster. Pac-Man did a reasonably good job of going for the pills and fruits however the controller played way too aggressive for most of the game. There were many instances where it consumed a pill or a fruit that was right next to a Ghost. However, at one point of the game the Pac-Man controller uncharacteristically stayed in a barren area where there was no fruits or pills for too long. During that part of the game the controller was a little more timid, avoiding going to an area where there were more pills even though there were not any ghosts near that area. Additionally, I believe the Ghost controller performed worse than the Pac-Man controller. The ghosts just kept cycling through different positions in the same area and did not exhibit any real intelligence. It did not try to chase Pac-

Man or even guard the pills or fruits it was next to. If I was to do this experiment again, I would try to increase the selection pressure to hopefully come across more intelligent controllers. A lot of the actions exhibited by the controllers, especially the Ghost controller looked random. Lastly the following is the config I used.

[shared_configs]

depth_limit = 7

prob_of_full_method = 0.50

constant_range = (-35, 35)

[fitness_kwargs]

pac_parsimony_coefficient = 1/10

ghost_parsimony_coefficient = 1/10

sample_size = 6

experiment = green

[pac_ea]

mu = 50

num_children = 10

mutation_rate = 0.1

parent_selection = k_tournament_with_replacement

survival_selection = k_tournament_without_replacement

individual_class = TreeGenotype

[pac_parent_selection_kwargs]

k = 5

[pac_survival_selection_kwargs]

k = 5

[ghost_ea]

mu = 30

num_children = 5

mutation_rate = 0.2

parent_selection = k_tournament_with_replacement

survival_selection = k_tournament_without_replacement

individual_class = TreeGenotype

[ghost_parent_selection_kwargs]

k = 3

[ghost_survival_selection_kwargs]

k = 3
