FS2017

COEVOLUTION ANALYSIS

COMP SCI 5401 FS2017 ASSIGNMENT 2C

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Assignment 2c

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Methodology

This CoEA implemented is a single-population coevolution and tree based genetic programming search for the optimal iterated prisoner dilemma problem. For each new generation, the algorithm first generates all new children without calculating any of the new fitness's until each of the children are created. Once all the children are created, the algorithm calculated the fitness for each of the newly created children. It does this by randomly selecting a user-configurable amount of other individuals from a pool containing the population and all of the newly created children. This selection process is uniform random. The newly created child then plays the IPD simulation for a user configurable amount of iterations. The fitness against this opponent is inversely proportional to the amount of time the newly created child spent in jail as a result of its strategy. This process is repeated for each of the randomly selected opponents, and the newly created child's fitness is an average of its fitness's from each opponent.

Experimental Setup

For this experiment, the fitness is compared to the co-evolutionary fitness sampling percentage to see which sampling percentage provides the best fitness. The measured fitness values are 10%, 25%, and 50%. The results of these experiments will then be statistically analyzed against each other to see which of the sampling percentage values produces the most optimal individuals. The analysis will be done first by using an f-test to determine if the two samplings have equal variances. Then a t-test will be used to determine which sampling level yields the better solutions. These tests will use an alpha level of 5%.

Results

Discussion

Conclusion