A Parallelized Framework for Evolutionary Computation

Geoffrey Saxton Long (*260403840*)
McGill University, Quebec

Geoffrey.Long@mail.mcgill.ca

Abstract

Evolutionary algorithms are a common approach to problems with indeterminate strategies or lengthy computation times when exact results are not necessary. The goal of this project is to implement an extensible framework which allows for parallelization of an evolutionary algorithm. Although computation speed is a primary goal, I would also like to see the outcomes where "populations" of individuals are allowed to evolve in partial, or complete, isolation from one another. Each one of these populations would be implemented on a multithreaded Beowulf cluster, exposure to other populations would occur via MPI message passing. Within each cluster the populations would be evolved through different mutation, crossover, and fitness evaluation methods. This variance in operators would ensure that the populations diverge.

This framework will implement a genetic algorithm. Although the algorithm will be tested with the Travelling Salesperson Algorithm, it will be designed to work with a wide variety of problems. The overall performance of the framework will be evaluated on the results and speedup compared to the sequential version.