IIT Bombay

Investigation of Genetic algorithms and their efficiency in evolving strategies of Game theory, Real valued function Optimization and the famous traveling-salesman problem and a documented GA library that can be used to solve NP-hard problems by user.

FEATURES

- Generic classes are made that can be used for solving any NP-Hard problem.
- Genetic algorithm instilled in the generic class so that the user can solve his problem without any prior knowledge of GA.
- Strategies are evolved based on the iterated tournaments that can be framed by the user. GA evaluates all possible strategies and returns the best strategy that is possible.
- Any real-valued function can be optimized by the class written in the program. This relieves the use of high-level calculus(and calculations!!) to find the maxima and minima of functions.
- An enthusiastic Game theorist can use the class written in the program to test his own strategies or to find the best strategy for a tournament of his own rules.

CODING AND THE ALGORITHM

- The whole program is written in java and consists of four java files of which one is the abstract generic class
- The GA used allows the user to solve both "Ordered" and "Un-Ordered" Chromosome problems thus adding to it's generic quality.
- The crossover-methods include both single-point crossover and double-point crossover according to the demands of the problem. The mutation methods include both random-mutation and interchange-mutation. The GA uses roulette-wheel selection to select the parents for a crossover.

RESULTS

- The Strategies evolved coincide almost(8 in 10 cases) with the TIT-FOR-TAT strategy which is supposed to be the best strategy(Axelrod,1987).
- The function optimizer returns the global maxima(or just near it) of any real-valued function.
- The traveling salesman problem returns the value in a small range of the ideal value.

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