

Project 4 Proposal

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Project : Solve Sudoku using Genetic Algorithm.

For this project, I would like to create an application to solve a Sudoku problem using the Genetic Algorithm. Sudoku is a classic puzzle game in which there are typically 9 grids. The grids must be filled with number 1-9. The numbers must be repeated exactly once in the row and column and the grid. This makes Sudoku an exciting problem where we have to find using various methods to actually solve the problem. Genetic Algorithm seems to be an acceptable approach to solve the Sudoku problem as the grid / row / column can be represented as a permutation string. The Sudoku is partially (if not fully for easy problems) solved using the 'Naked' Singles and 'Hidden' Singles method initially. The remaining values are randomly permuted accordingly and filled. The crossover is carried out over as the crossover in between two individuals using uniform crossover in between grids. This particularly has the advantage of satisfying the constraint that the grid doesn't invalidate the grid having only number 1-9 also the position for setting 'given numbers' (numbers given for the Sudoku puzzle) and predetermined number(numbers calculated for Sudoku puzzle using 'Naked' Singles and 'Predetermined' Singles method). The mutation operation is carried out by finding the list of possible values in the grid, shuffling them and then placing them in the squares. The selection between individuals is done using Tournament Selection. The fitness of the individual is calculated using the sum value for each row and subtracting it with value 45. Similar operation is done for the column value as well. The individual selections thus go through to refine those individuals who have sum resulting in 'less conflicts'. I am currently looking for different mutation as well as fitness function alternatives to make the evolution process better. I am trying to find a better approach to tackle over the problem of the GA finding a local optimum. In conclusion, I am trying to find an approach that can solve the Sudoku problem under given time constraints using Genetic Algorithm.