Avisualization algorithm based multi-objective evolutionary programming

Fathy heraky metwaly El-kazzaz

Visualization is the process of transforming information into a visual form, enabling users to observe the information. We can say visualization is any technique for creating images, diagrams, or animations to communicate a message.Visualization is not the creation of visual images, but of mental images in the mind of the viewer. The goal is the creation of visual representations of large amounts of data that can be easily understood, even by viewers with limited technical knowledge. In visualizations, various attributes of the data set are mapped to visual attributes such as size, color, texture, or shape. Common examples of visualizations are bar charts, line graphs, maps, and organizational charts. In recent years, there has been an increasing interest in software visualization. The software visualization that created animations of programs and algorithms establishes a kind of interaction between humans and computers. At the same time, it facilitates the understanding between the students and the scientific theory because it provides a window interface that automatically displays program information.Multi-objective optimization (MO) is a branch of mathematical programming for modelling problems with multiple conflicting objectives. Multi-objective optimization problems (MOP) can -be solved using pareto optimization techniques including evolutionary multi objective optimization algorithms (EMOAs). Many real world applications involve multiple objective functions and can be addressed within a multi-objective optimization framework. Multi-objective optimization methods allow exploration of the attainable values of the objective functions and trade-offs between them without requesting preference information from the decision maker(s).iiThe transportation problem (TP) is a special type of linear programming, it will be considered as a minimum cost flow problem. That is, we want to transfer a quantity of products from plants to warehouses to minimize the transportation cost. Transportation problem usually involves an objective function or multiple objective functions this last type of problem is called multi-objective transportation -problem.This thesis presents the animation of the algorithm steps to solve multi objective optimization problem especially transportation problem to help students understand and realize more effectively and expect it’s behavior more efficiently. In addition to making comparison study for four methods (Pareto-based approach, interactive (II) approach, interactive fuzzy goal programming approach and fuzzy programming approach) used to resolve the multi-objective transportation problem, in order to collect all these solving techniques in one applet java program. Our

program provides an interface to allow users to enter the data and select a method from the approaches mentioned in this thesis to solve the multi-objective transportation problem. After that the program displays the steps of solving the problem on the screen through a sequence of views or frames. Each frame represents a number of steps. The user will have control over the process such that he or she can interact with the algorithm implmentation.