**Introduction**

Multiobjective Optimization is an important research field which is used in science, engineering and economy. Multiobjective Optimization is concerned with decision making for multi-criteria problems involving multiple objective functions. The multiple objective functions often result in conflict if each objective function is optimized separately, therefore it is important to optimize all the objective functions simultaneously. The Multiobjective optimization is formulated as follows:

where is the number of variables, represents the objectives functions, and is the set of feasible solutions. A solution is said to be a feasible solution if there are no exist any solution such that .

Multiobjective Optimization grew out of economic equilibrium, welfare theories, game theory and mathematics. Stadler discussed in [[1](#_ENREF_1), [2](#_ENREF_2)] a brief discussion for the terms and definitions of multiobjective and also a brief literature review.

Since the multiobjective optimization contains many objective functions, there is no single global solution that could optimize each objective function. So it is necessary to find a set of points all fit a predetermined definition of an optimum. The predominant concept in defining an optimal point was first introduced by Pareto [[3](#_ENREF_3)] which is defined as follows:

**Definition1.** *For a point it is said to be a Pareto optimal (Pareto front) if and only if there does not exist anther point such that and for at least one function.*

The point is a Pareto optimal if there is no other point that improves at least one objective function without determinate to anther function.

Often algorithms and methods provide solutions that may not be a Pareto optimal, but it may satisfy other criteria making them more significant for a particular problem. The points producing these solutions are said to be weakly Pareto which are defined as follows:

**Definition2.** *For a point it is said to be a weakly Pareto optimal if and only if there does not exist anther point such that .*

The point is weakly Pareto optimal point if there is no other point that improves all of the objective functions simultaneously. Pareto optimal points are weakly Pareto optimal, but weakly Pareto points are not Pareto optimal.

Various categories of multiobjective optimization has been studied, one of the most important optimization problems is the combinatorial optimization problem. Combinatorial optimization is a famous NP-hard problem even for combinatorial optimization problems for which a polynomial algorithms for single objective problem.

**Problem Statement**

The problem of multiobjective optimization is very important research topic due its wide range of application in real world. The problem of finding multiple Pareto optimal solutions could not be determined efficiently in many cases. Although it is possible to find all the Pareto points theoretically, they are often of exponential size. However, approximation does not represents a secondary choice for the decision maker. Indeed, there are many real life problems for which it is quite hard for the decision maker to have all the information to completely formulate the problem. The multiobjective optimization problem has usually no unique perfect solution but instead a series of alternative solutions (Pareto front) which represents possible trade-off among conflicting objectives. All of the optimal solutions to the multiple objective functions from a Pareto front located in the objective function space. The target of the optimization is to find an approximation of the Pareto front when a priori information about preferences is unknown. In order to obtain accurate Pareto front of multiple objective optimization problem, various algorithms have been proposed in the past few decades such as Multiobjective Evolutionary Algorithms (MOEA), Multiobjective Genetic Algorithms (MOGA), Multiobjective Particle Swarm Algorithms (MOPSA), Artificial Immune System (AIS), Group Search Optimizer and Quantum inspired Algorithms.

Another approach which is also very important and resulted in accurate results is learning automata. Learning Automata is a very useful approach used to build self-adaptive systems which change its behavior from pervious knowledge and tend to ultimate goal. The feasibility of using a learning system for solving problems has been discussed by many researches all over the world. For example …

**Research Objectives**

The main aim of this proposal is

**Proposed Solution**

References

[1] W. Stadler, Initiators of Multicriteria Optimization, in: J. Jahn, W. Krabs (Eds.) Recent Advances and Historical Development of Vector Optimization, Springer Berlin Heidelberg, 1987, pp. 3-47.

[2] W. Stadler, Multicriteria Optimization in Engineering and in the Sciences, Springer, 1988.

[3] V. Pareto, Manuale di Economica Politica, Societa Editrice Libraria. Milan; translated into English by A.S. Schwier as Manual of Political Economy, 1906.