

BASIC PRINCIPLES OF GENETIC ALGORITHMS

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ABSTRACT: Genetic Algorithms were developed scientist John Holland based on the theory of natural selection which takes population of 'solutions' and use these solutions to multiply and take the best characteristics of their predecessors. Fitness value of thus produced progeny is calculated and further breeding is done for millions of generations and the best offspring can be selected as the solution to the problem i.e. timetable optimization, CPU scheduling etc. This paper reviews the genetic algorithm its benefits, applications and various steps need to be applied to use genetic algorithm or problem solving.



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I. INTRODUCTION

GA developed by John Holland's in 1960 and further studied by De Jong's, Goldberg, Davis, Koza, Mitchell, an many more, have been proposed as a general model of adaptive processes. John Holland's book "Adaptation in natural and artificial systems" as well as De Jong's book "Adaptation of the behaviour of a class of genetic adaptive systems," are seen as the foundation of Genetic Algorithms. Genetic algorithms are stochastic algorithms which are based on natural phenomenon. A genetic algorithm is an optimization tool used to solve optimization problems. Optimization problems attempt to find the best solution for a given problem that has several parameters with associated constraints. Genetic Algorithms are based on the evolutionary ideas of natural selection and genetics. Genetic algorithms are a part of evolutionary computing, inspired by Darwin's theory of evolution - "Survival of the fittest". Genetic Algorithms is an optimization technique which takes large, potentially huge population and finds optimal solution. Genetic algorithms are based on the concept of biological evolution [5].The interaction between genetic algorithms and the real problems are due to the need for optimization. It usually has a space of very large dimensions, in which each point represents a potential solution to the problem. In this world of solutions, only a few, if not only one, fully satisfy the list of constraints that give shape to the problem. The main theme of GA is robustness i.e. the balance between the efficiency and efficacy which is necessary for survival in different environments.

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