

# An Approach of Artificial Intelligence with Genetic Algorithm

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## ABSTRACT

In the field of artificial intelligence, a genetic algorithm is a search heuristic that mimics the process of natural selection. The genetic algorithm is Search and optimization techniques that generate solutions to optimization difficulties using technology following the natural evolution. It is an artificial intelligence a type of evolutionary computer algorithm in which symbols representing possible solutions are "bred." Also in general software, genetic algorithms are used for research of artificial life, cellular automata, and neural networks.

## 1. INTRODUCTION

Genetic algorithm were first depicted by John Holland in the 1960s and then after more development occurred by Holland and his students and colleagues at the University of Michigan in the 1960s and 1970s. Whereas his goal was to understand the phenomenon of "adaptation" as it occurs in nature and to adapt from An Introduction to Genetic Algorithms, Chapter 1. MIT Press, forthcoming. Develop ways in which the mechanisms of natural adaptation might be imported into computer systems. Computer programs that "evolve" in ways that resemble natural selection can solve complex problems even their creators do not fully understand. (By John H. Holland). One of the greatest hurdles in software design is selection of elements naturally, have to specify all the features of a problem in advance, & then the program should deal with them. We can "breed" programs that will solve our problems, even though no person can fully understand their structure, by harnessing the mechanisms of evolution

## 2. THE ALGORITHM

Genetic algorithm, which is normally combination of two process. If we enlisted it, 1st of is-selection of individual for the production of next

generation and on the other side, 2nd one is, manipulation of the selected individual to form the next generation by using crossover and mutation technology. If any of the organism fails some test of fitness, such as recognizing a predator and fleeing, it will stop existing. Similarly, the scientist of computer science, have faced trouble to sort out poorly performing algorithms. If any program is designed to sort number in ascending order, one have to check whether each entry of the program's output is larger than the preceding one.

To breed better crops, people made employee, a combination of crossbreeding and selection for breed. However, for translating these procedures in computer program for us, main problem is the construction of "genetic code". Which will represent the structure of programs. Just like DNA represent the structure of living being. In the genetic algorithm process is as follows:

Step 1: Determine the number of chromosomes, generation, and mutation rate and crossover rate value.

Step 2: Generate chromosome-chromosome number of the population, and the initialization value of the genes chromosome-chromosome with a random value

Step 3: Process steps 4-7 until the number of generations is met

Step 4: Evaluation of fitness value of chromosomes by calculating objective function

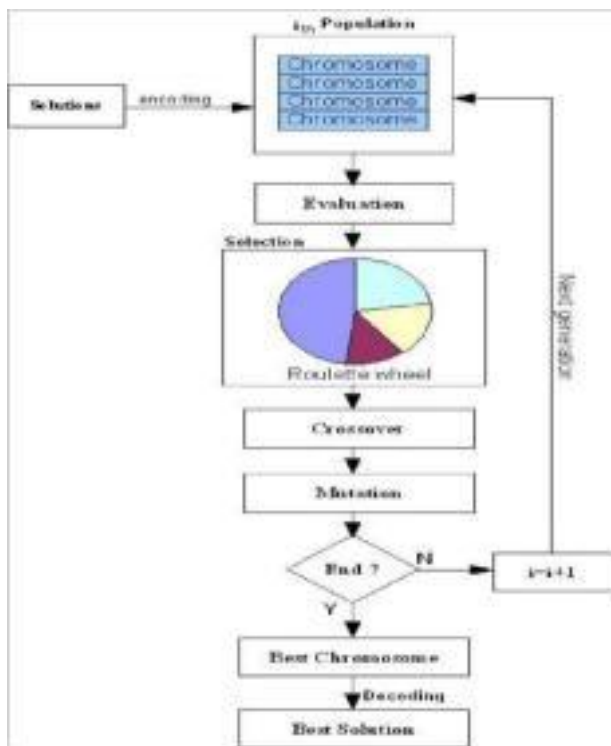
Step 5: Chromosomes selection

Step 5: Crossover

Step 6: Mutation

Step 7: New Chromosomes (Offspring)

Step 8: Solution (Best Chromosomes) The flowchart of algorithm can be seen in Figure.



### 3. Enhancement of GA

We can enhance the capabilities of genetic algorithm by a new technique. A genetic algorithm is normally viewed as a global search method that can capture the global view of a problem domain. Using different ways of techniques, we can improve its performance. The overall search capacity can be enhanced by combined the genetic algorithm as a global search method with a problem specific method. To enhancement the solution quality or efficiency this can be used. In the case of highly constrained problems, this performance can also be improved by ensuring production of feasible solution.

#### 1) Improving solution quality:-

The Local search methods and genetic algorithms both are two complementary tools, where a local search algorithm can locate high accuracy optima. & the ability of genetic algorithm is to capture the global view of search space. Local search on a genetic algorithm's population can introduce diversity and also it can enable fair representation of various search area in order to fight premature convergence.

#### 2) improve efficiency:-

In this search space, the efficiency of a local search for reaching a local optimum

integrates the efficiency of genetic algorithm in isolating the most promising basins. That's why, incorporating a local search into a genetic algorithm, results an efficient algorithm. Calculating the time, needed to reach the global solution, and the memory space needs to process the population, the efficiency of the search can be enhanced.

### 4. APPLICATION OF GENETIC ALGORITHM

If we are talking about the hardest part of executing a genetic algorithm, then it is coming up with a fitness function, after establishing classes in place. Even sometime, have to adjust some of the population constant such as initial population size, mutation, crossover, to support the convergence and population diversity

Below function, is the main function execution, to executing the algorithm through generation after generation and writing them to console. Executing the Genetic Algorithm from the Main Function.

```

static void Main(string[] args)
{
    Population TestPopulation = new Population();
    TestPopulation.WriteNextGeneration();
    for (int i = 0; i < 100; i++)
    {
        TestPopulation.NextGeneration();
        TestPopulation.WriteNextGeneration();
    }
    Console.ReadLine();
}
    
```

#### 4.1. Simple Example of Genetic Algorithm

Example on c:-

GA is a program to crossing to a required point through a given set of data. This program is written to show the coincide to a population consisting of fittest member:-

```

#include<conio.h>
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
    
```

```
void initialize(int *a)
{
int i;
for(i=0;i<4;i++)
{
    a[i] = rand()%64;
}
printf("\n\tThe present generation
is:"); for(i=0;i<4;i++)
{
    printf(" %d ",a[i]);
}
}
```

## CONCLUSION

The idea of genetic algorithm is in fact a new evolution in computer programming, which is based on natural selection system. It search out the optimum & perfect solution to any problem. A set of test functions including unimodal and multimodal benchmark functions is employed for optimization. It solved step by step to a problem & produce a batter solution for the next generation. By this paper, it has been tried the utmost utility of genetic algorithm in present era.

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