Why Estimation Algorithm of First Passage Time Transition Probabilities Concerns Genetic Algorithms Without Bit Mutation?

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Abstract

Concerning genetic algorithm without bit mutation such absorbing Markov Chain, our aim is proposition modern algorithm to secure experiential and impractical results concerning first passage time transition probabilities estimation with regard to transient states.

Keywords: Genetic Algorithms without Bit Mutation; First Passage Time.

1. Introduction

Genetic algorithms **without** bit mutation such absorbing Markov Chains have been demonstrated by El-Nady et al. [1].

Concerning genetic algorithms **with** bit mutation, estimation algorithm of first passage time transition probabilities has been suggested by Abou El-Enien [2].

Concerning genetic algorithms **without** bit mutation, estimation algorithm of recurrence time transition probabilities with regard to transient states has been proposed by Abou El-Enien [3].

2. The problem Formulation

Proposition 2.1. Concerning each *B* = $(b_s = v \,|\, b_{s-1} = a) \;\forall\; s \geq 1$

such that $b_0, b_1, b_2, \ldots\ldots$ are outcome functions and *a, v* are any transient outcomes bearable sequence (see

[4]), we count appeared times number and deem probability.

3. Theorem

Concerning each *B*, if we stratify any genetic algorithm without bit mutation then we reign probability *T*, where

$$T = \frac{(b_s = v \,|\, b_{s-1} = a)\, appeared\ \ times\ \ number}{appeared\ \ times\ \ number\ of\ \ any\ \ state\ \ given\ \ state\ v}$$

, and first passage time transition probabilities with regard to **transient states** ≤ 1.

4. Theorem proof

1- We effect genetic algorithms without bit mutation on each transient state with regard to *e*-iterations, where *e* is a large number.

2- Concerning each *B*, we count appeared times number and deem probability.

5. The proposed algorithm

Via use MATLAB 7.5, we outfitted our programs. The suggestion name in connection with algorithm is Abou El-Enien First Passage Time Transition Probabilities Estimation (**Abou El-Enien FPTTPE**):

1. Feed in number of bits.

2. Secure unique chromosomes.

3. Feed in number of chromosomes.

4. Secure number of states.

5. Make all possible combinations of unique chromosomes states.

6. Afford each state a number.

7. Effect genetic algorithms without bit mutation on each transient state with regard to *e*-iterations.

8. Count concerning each *B* appeared times number.

9. Deem *T* for each *B*.

10. Secure first passage time transition probabilities.

6. Numerical example

Use example 6.1 in [1] for ,

$g(z) = z \cdot \sin(10\Pi \cdot z) + 1, z \in [-1, 2]$

crossover probability = 0.6, bits number = 5 and chromosomes number = 2, we deem $T(15|14)$ = **1** for the chain, *e* = **10000** iterations, (14, 15, 15, 15, 15, 15, 15, 15,....., 15), $T(3|1)$ = **1** for (1, 3, 3, 3, 3, 3,....., 3), $T(0|4)$ =**1** for (4, 0, 0, 0, 0, 0, 0, 0, 0,....., 0), and $T(3|7)$ = **0.5** for (11, 7, 7, 3, 3, 3, 3, 3,....., 3).

7. Conclusions

The suggestion method is Abou El-Enien FPTTPE to estimate first passage time transition probabilities with regard to transient states concerning any Markov Chain and we reign Abou El-Enien FPTTPE theorem, but the great importance of the theorem that first passage time transition probabilities with regard to **transient** states **less than or equal one** by the surely experimental results and not less than one.

References

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