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Lord Rama Devotees Algorithm: A New Human-Inspired Metaheuristic Optimization Algorithm

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Research Article

Volume 1 Issue 1

Received Date: October 09, 2023

Published Date: November 03, 2023

DOI: 10.23880/art-16000105

Abstract

Several Human-Inspired Metaheuristic Optimization Algorithms were proposed in literature. But the concept of Devotees-Inspired Metaheuristic Optimization Algorithms is not yet explored. In this article, Lord Rama Devotees Algorithm (LRDA) is proposed which is a new Devotees-Inspired Metaheuristic Optimization Algorithm.

Keywords: Optimization Algorithms; Metaheuristics; Humans; Human-Inspired Metaheuristics; Devotees; Devotees Inspired Metaheuristics; Lord Rama; Lord Rama Devotees Algorithm

Introduction

Articles [1-11] proposed various Human-Inspired Optimization Algorithms. But the concepts like “Devotion”, “Devotees” are not yet explored. This article is based on this research gap. Section 2 shows “Lord Rama Devotees Algorithm (LRDA)”.

Lord Rama Devotees Algorithm

The population consists of Lord Rama Devotees and non-devotees. Based on random number generated and Lord Rama Devotee Probability, the human is classified into either Lord Rama Devotee or non-devotee. Lord Rama Devotee is not affected by success or failure and he moves in search space without any halt. So velocity and position are always updated as shown in line number 15 and 16 irrespective of anything. But this is not the case for non-devotee. Based on random number generated and Non Devotee Success Probability, non-devotee is classified to facing either success or failure. Non-devotee will not update velocity and position and moves into halted state when he faces failure as shown in line number 25. He updates velocity and position when he faces success as shown in line number 21 and 22. Hence failure or success is not a matter for Lord Rama Devotee. But non-devotee will stop progress when he faces failure.

Procedure

1. Lord Rama Devotees Algorithm (LRDA)
2. Initialize all devotees
3. iterations = 0
4. do
5. for each devotee i do
6. If (f(xi) < f (p best i)) then
7. P best i = xi
8. end if
9. if (f (p best i) < f (g best)) then
10. g best = p best i
11. end if
12. end for
13. for each devotee i do
14. if (random(0,1) < Lord Rama Devotee Probability) then // Lord Rama devotee

15. for each dimension d do
16. vi, d = w*vi, d + C1*Random(0,1)*(p best i, d – xi, d) + C2*Random(0,1)*(g best d – xi, d)
17. xi, d = xi, d + vi, d
18. end for
19. else // Non devotee
20. if (random(0,1) < Non Devotee Success Probability) then
21. for each dimension d do
22. vi, d = w*vi, d + C1*Random(0,1)*(p best i, d – xi, d) + C2*Random(0,1)*(g best d – xi, d)
23. xi, d = xi, d + vi, d
24. end for
25. else // Non devotee with failure
26. // non-devotee with failure does not update position and velocity
27. end if
28. end if
29. end for
30. iterations = iterations + 1
31. while (termination condition is false)

Results

Human Bhagavad Gita Particle Swarm Optimization (HBGPSO) proposed in Gajawada, et al. [7] and Lord Rama Devotees Algorithm (LRDA) proposed in this article is mathematically equivalent. According to Gajawada, et al. [7], HBGPSO performed as well as PSO. Hence Lord Rama Devotees Algorithm (LRDA) performed as well as PSO as it is mathematically equivalent to HBGPSO.

Conclusion

In this article, a new metaheuristic optimization algorithm titled "Lord Rama Devotees Algorithm (LRDA)" is proposed. Results show that proposed LRDA algorithm performed as well as PSO algorithm. In this article, PSO is modified with the concept of "devotion", "devotees" to get LRDA algorithm. Hence LRDA algorithm is a Hybrid-PSO Algorithm. This article is a starting point of "Devotees-Inspired Metaheuristic Optimization Algorithms". Hence it is ideal for future research scientists to create algorithms like LRDA from scratch instead of modifying existing algorithms like PSO as done in this article.

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