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Nature Plus Plus Inspired Computing -The Superset of Nature Inspired Computing

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Abstract

The term "Nature Plus Plus Inspired Computing" is coined by us in this article. The abbreviation for this new term is "N++IC." Just like the C++ programming language is a superset of C programming language, Nature Plus Plus Inspired Computing (N++IC) field is a superset of the Nature Inspired Computing (NIC) field. We defined and introduced "Nature Plus Plus Inspired Computing Field" in this work. Several interesting opportunities in N++IC Field are shown for Artificial Intelligence Field Scientists and Students. We show a literature review of the N++IC Field after showing the definition of Nature Inspired Computing (NIC) Field. The primary purpose of publishing this innovative article is to show a new path to NIC Field Scientists so that they can come up with various innovative algorithms from scratch. As the focus of this article is to introduce N++IC to researchers across the globe, we added N++IC Field concepts to the Particle Swarm Optimization algorithm and created the "Children Cycle Riding Algorithm (CCR Algorithm)." Finally, results obtained by CCR Algorithm are shown, followed by Conclusions.

Index terms— nature inspired computing, nature plus plus inspired computing, artificial intelligence, children, evolutionary computing

ature Inspired Computing (NIC) Algorithms take inspiration from Mother Nature. Nature Inspired Computing Algorithms are a subset of Nature Plus Plus Inspired Computing (N++IC) Field Algorithms. Hence an algorithm belonging to the NIC field also belongs to the N++IC field. If an algorithm takes inspiration from Artificial things in addition to inspiration taken from nature, then such algorithms belong to both NIC and N++IC fields. Also, there can be algorithms that can take inspiration completely from

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Artificial things, and there is no inspiration taken from nature, then such algorithms belong only to the N++IC field and not the NIC field. There are three types of algorithms. Algorithms that take inspiration from nature only. The second type of algorithms are such that they take inspiration only from artificial things. The third type of algorithms takes inspiration from both nature as well as artificial things. The first category of algorithms belongs to NIC. The second category of algorithms belongs only to the N++IC field and not the NIC field. The third category of algorithms belongs to both NIC and N++IC fields. All three types of algorithms belong to the N++IC field. In the N++IC field, we added one more type of algorithms in addition to NIC field algorithms. Hence NIC field is a subset of the N++IC field.

2 II. Interesting Opportunities in Nature Plus Plus Inspired Computing Field

3 Nature Inspired Computing

According to [1], the definition of NATURE INSPIRED COMPUTING is shown below in doublequotes as it is:

"The field of nature-inspired computing (NIC) is interdisciplinary in nature combining computing science with knowledge from different branches of sciences, e.g. physics, chemistry, biology, mathematics and engineering, that allows development of new computational tools such as algorithms, hardware, or wetware for problem-solving, synthesis of patterns, behaviours and organisms."IV.

4 Literature Review

There are many Research Scientists and Students who are working in the field of Nature Inspired Computing. You will easily find thousands of references for Nature Inspired Computing when you search on Google. In this paper, our focus is to define a new field titled Nature Plus Plus Inspired Computing (N++IC) and how it is related to Nature Inspired Computing (NIC). Hence for the sake of completeness, we just show [1] - [10] articles that come under NIC. As defined, NIC is a subset of N++IC, and hence all [1] - [10] articles also belong to the N++IC field.

5 V. Children Cycle Riding Algorithm

Figure 1 shows the Children Cycle Riding Algorithm (CCRA). In this section, we explain CCRA. In the beginning, the iteration counter is set to zero, and all Artificial Children are initialized. The search space is full of Artificial sharp stones, which may result in damaging the tyre of the Artificial Child's Cycle. Hence we have Cycle Tyre Damage Probability. After the damage of the cycle tyre, the child repairs his cycle tyre with probability Cycle Tyre Repaired Probability.

If a cycle tyre is damaged, then there are two possibilities. Either Artificial Child repairs his cycle tyre or not. If the cycle tyre is damaged and Artificial Child gets his cycle repaired, then Artificial Child can move in search space and hence updates Velocity and Position. If the cycle tyre is damaged and Artificial Child cannot repair his cycle tyre then Artificial Child is halted and does not update his Velocity and Position. On the other hand, if Artificial Child's Cycle tyre is not damaged, then he can move in search space and hence updates Velocity and Position. At the end of the iteration, the iteration counter is incremented. Now the control goes to line number 2. This process is continued until the termination condition is reached. Figure 1 is shown below: if (random(0,1) < CycleTyreDamageProbability) then 8)

if (random(0,1) < CycleTyreRepairedProbability) then 9)

Artificial Child updates Velocity

6 Results

The Human Poverty Particle Swarm Optimization (HPPSO) proposed in [11], and Children Cycle Riding Algorithm (CCRA) proposed in this article are MATHEMATICALLY EQUAL. In [11], it was shown that both HPPSO and PSO performed well on all benchmark functions. Hence due to Mathematical EQUALITY, both CCRA and PSO Algorithms performed well on all benchmark functions. VII.

7 Conclusions

"Nature Plus Plus Inspired Computing (N++IC)" field is designed and introduced in this work. The difference between the two fields NIC and the N++IC is clearly explained. Children Cycle Riding Algorithm (CCRA) is designed, and results show that CCRA performed as good as the Particle Swarm Optimization algorithm. Some interesting opportunities in the N++IC field are shown for NIC field Students and Research Scientists. Research Scientists and Students did a lot of research in the NIC field. There is a lot of scope in the direction where Algorithms are inspired by both nature and Artificial things. Also, there exists a lot of scope in the direction where Algorithms are inspired by Artificial things only. Children are natural, and cycle riding is Artificial. Hence CCRA is designed by taking inspiration from both nature and Artificial things. This paper is mainly published to introduce N++IC Field to the world. Hence we just added N++IC concepts to the Particle Swarm Optimization algorithm and created CCRA. As the new field is proposed in this article, the next step for Researchers is to create new N++IC field Algorithms from scratch.

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Figure 1:

Nature Plus Plus Inspired Computing -The Superset of Nature Inspired Computing
20. Advanced N++IC -A New subject
21. IBMSUR Award for a Professor in N++IC FIELD at IIT Hyderabad
III.

There are INTERESTING OPPORTUNITIES for NATURE INSPIRED COMPUTING (NIC) field Research Scientists in NATURE PLUS PLUS INSPIRED COMPUTING (N++IC) field. Some of them are shown below: 1. B.Tech Project in N++IC field, IIT Roorkee 2. M.Pakistan colleges 12. Microsoft R&D team on N++IC field 13. IBM R&D N++IC field Research Labs, IBM Hyderabad

14. YouTube videos on N++IC and NIC fields by Google R&D team, Google Delhi
15. Springer Journal on N++IC
16. Elsevier book on N++IC
17. IEEE N++IC Society, Japan
18. To become a Scientist in the N++IC field
19. A Course on N++IC by Coursera

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Figure 2:

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