EasyChair Preprint

№ 10110

Artificial Satisfaction - the Brother of Artificial Intelligence

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May 12, 2023

Artificial Satisfaction - The Brother of Artificial Intelligence

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Abstract

John McCarthy (September 4, 1927 – October 24, 2011) was an American computer scientist and cognitive scientist. The term "Artificial Intelligence" was coined by him (Wikipedia, 2020). Satish Gajawada (March 12, 1988 – Present) is an Indian Independent Inventor and Scientist. He coined the term "Artificial Satisfaction" in this article (Gajawada, S., and Hassan Mustafa, 2019a). A new field titled "Artificial Satisfaction" is introduced in this article. "Artificial Satisfaction" will be referred to as "The Brother of Artificial Intelligence" after the publication of this article. A new algorithm titled "Artificial Satisfaction Algorithm (ASA)" is designed and implemented in this work. For the sake of simplicity, Particle Swarm Optimization (PSO) Algorithm is modified with Artificial Satisfaction Concepts to create the "Artificial Satisfaction Algorithm (ASA)." PSO and ASA algorithms are applied on five benchmark functions. A comparision is made between the results obtained. The focus of this paper is more on defining and introducing "Artificial Satisfaction Field" to the rest of the world rather than on implementing complex algorithms from scratch.

Keywords: Intelligence, Artificial Intelligence, Satisfaction, Artificial Satisfaction, New Invention, New Creation, New Area of Research, Computer Science, Algorithm, Nature Inspired Computing, Bio-Inspired Computing, John McCarthy, Lotfi Zadeh

1. Definition of Artificial Satisfaction Field

According to the Cambridge English Dictionary, "Satisfaction" is a pleasant feeling that you get when you receive something you wanted or when you have done something you wanted to do (Cambridge, 2020). Artificial Satisfaction (AS) field algorithms are designed by taking "Satisfaction" as inspiration. Research Scientists develop AS field algorithms by imitating "Satisfaction." The simulation of satisfaction of humans to design and develop algorithms will be a part of the "Artificial Human Satisfaction" field. Artificial Satisfaction Field algorithms are created by mimicking the "Satisfaction" of all living beings. Hence "Artificial Human Satisfaction" is a sub-field of the "Artificial Satisfaction" field. Unlike Artificial Intelligence, the focus of this work is on the "Artificial Satisfaction" where consideration is given to the "Satisfaction" of all living beings and not just the satisfaction of humans.

2. Billions and Trillions of Opportunities in the new Artificial Satisfaction Field

There is an Excellent Future for Artificial Satisfaction (AS) Field Research Scientists. There are billions and trillions of opportunities in the Artificial Satisfaction field. Some of them are shown below:

1) International Institute of Artificial Satisfaction, Hyderabad, INDIA

2) Indian Institute of Technology Roorkee Artificial Satisfaction Labs, IIT Roorkee

3) Foundation of Artificial Satisfaction, New York, USA.

4) IEEE Artificial Satisfaction Society

5) ELSEVIER journals in Artificial Satisfaction

6) Applied Artificial Satisfaction – A New Subject

7) Advanced Artificial Satisfaction – A New Course

8) Invited Speech on "Artificial Satisfaction" in world-class Artificial Intelligence Conferences

9) A Special Issue on "Artificial Satisfaction" in a Springer published Journal

10) A Seminar on "Recent Advances in Artificial Satisfaction" at Technical Festivals in colleges

11) International Association of Artificial Satisfaction

12) Transactions on Artificial Satisfaction

13) International Journal of Artificial Satisfaction

14) International Conference on Artificial Satisfaction

15) www.ArtificialSatisfaction.com

16) B.Tech in Artificial Satisfaction

17) M.Tech in Artificial Satisfaction

18) Ph.D. in Artificial Satisfaction

19) PostDoc in Artificial Satisfaction

20) IBM the Artificial Satisfaction Labs

21) To become "Father of Artificial Satisfaction" field

3. Artificial Intelligence

The following is the definition of Artificial Intelligence according to Investopedia shown in double quotes as it is:

"Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving" (Investopedia, 2020).

4. Literature Review

There are lakhs of researchers who are working in Artificial Intelligence. But there is no single researcher who worked in Artificial Satisfaction field to date. This work shows the World's First Artificial Satisfaction method. For the sake of completeness, articles (Al-Awami, A.T.; Zerguine, A.; Cheded, L.; Zidouri, A.; Saif, W., 2011), (Al-Shaikhi, A.A., Khan, A.H., Al-Awami, A.T. et al, 2019), (Anita, Yadav A., Kumar N., 2020), (C. Ciliberto, M. Herbster, A.D. Ialongo, M. Pontil, A. Rocchetto, S. Severini, L. Wossnig, 2018), (Deep, Kusum; Mebrahtu, Hadush, 2011), (Dileep, M. V., & Kamath, S., 2015), (Gajawada, S., 2016), (Gajawada, S., and Hassan Mustafa, 2019a), (Gajawada, S., & Hassan Mustafa., 2019b), (Gajawada, S., & Hassan Mustafa., 2020), (H Singh, MM Gupta, T Meitzler, ZG Hou, KK Garg, AMG Solo, LA Zadeh, 2013), (Imma Ribas, Ramon Companys, Xavier Tort-Martorell, 2015), (Kumar, S., Durga Toshniwal, 2016), (Martínek, J., Lenc, L. & Král, P, 2020), (M. Mitchell, 1998), (P Kumar, A Mittal, P Kumar, 2006), (S Chopra, R Mitra, V Kumar, 2007), (S Das, A Abraham, UK Chakraborty, A Konar, 2009), (S Dey, S Bhattacharyya, U Maulik, 2014), (Whitley, D, 1994), (W. Hong, K. Tang, A. Zhou, H. Ishibuchi, X. Yao, 2018) and (Zhang, L., Pang, Y., Su, Y. et al, 2008) show research articles under Artificial Intelligence field.

5. The Artificial Satisfaction Algorithm

This section explains Artificial Satisfaction Algorithm (ASA). Figure 1 shows ASA. Line number 1 initializes all the particles. Second line sets iterations to zero. In lines 4 to 11, the local best of each particle and global best of all particles are updated. The random numbers generated and SatisfactionProbability are used to group particles into either "Satisfied Beings" or "UnSatisfied Beings". Satisfied Beings have the potential to move in search space because of their satisfaction. Hence in lines, 14 to 17 position and velocity of Satisfied Particle are updated. On the other hand, UnSatisfied Beings cannot move in the search space themselves because of their

dissatisfaction. The random numbers generated and HelpOfSatisfiedPeopleProbability are used to classify UnSatisfied Beings into two groups. Either they will receive support from Satisfied Beings or not. Hence in lines 20 to 23, UnSatisfied Beings update position and velocity because they receive help from Satisfied Beings. As shown in line number 25, UnSatisfied Beings without receiving any help from Satisified Beings cannot move in search space. Line number 29 increments iterations variable by 1. The execution reaches back to line number 4 if the termination condition is false. The next iteration starts, and execution continues similar to the current iteration. If the termination condition is reached in line number 30, then execution stops, and the optimal value is returned.

1) All particles are initialized
2) generations (or iterations) = 0
3) **do**
4) **for** each particle i **do**
5) **If** (fitness_x_particle < particle_x_best_fitness) **then**
6) particle_x_best = input variable at fitness_x_particle
7) **end if**
8) **if** (particle_x_best_fitness < global_best_all_particles_fitness) **then**
9) global_best_all_particles = input variable at particle_x_best_fitness
10) **end if**
11) **end for**
12) **for** each particle i **do**
13) **if** (generate_random_number (0,1) < SatisfactionProbability) **then** // Satisfied Being
14) **for** each dimension d **do**
15) $velocity_{i,d}$ = weight*$velocity_{i,d}$ + $Constant_1$*generate_random_number(0,1)*($local\_best_{i,d}$ – $position_{i,d}$) + $Constant_2$*generate_random_number(0,1)*($global\_best_d$ – $position_{i,d}$)
16) $position_{i,d}$ = $position_{,d}$ + $velocity_{i,d}$
17) **end for**
18) **else** // UnSatisfied Being
19) **if** (random(0,1) < HelpOfSatisfiedPeopleProbability) **then** // UnSatisfied Being with Help
20) **for** each dimension d **do**
21) $velocity_{i,d}$ = weight*$velocity_{i,d}$ + $Constant_1$*generate_random_number(0,1)*($local\_best_{i,d}$ – $position_{i,d}$) + $Constant_2$*generate_random_number(0,1)*($global\_best_d$ – $position_{i,d}$)
22) $position_{i,d}$ = $position_{i,d}$ + $velocity_{i,d}$
23) **end for**
24) **else** // Unsatisfied Being without help does nothing
25)
26) **end if**
27) **end if**
28) **end for**
29) generations (iterations) = generations (iterations) + 1
30) **while** (termination_condition not reached is true)

Figure 1: Artificial Satisfaction Algorithm (ASA)

6. Results

The benchmark functions are taken from article (Gajawada, S., and Hassan Mustafa, 2019a). The ASA and PSO are applied on 5 benchmark functions shown in figure 2 to figure 6.

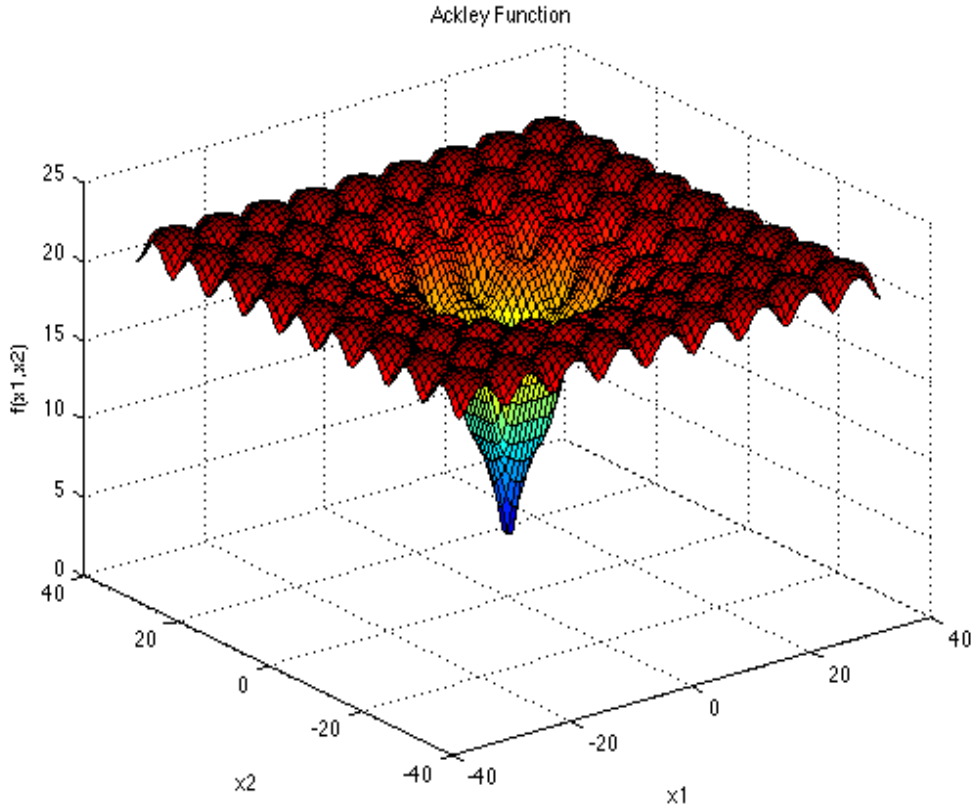

Figure 2. Ackley Function

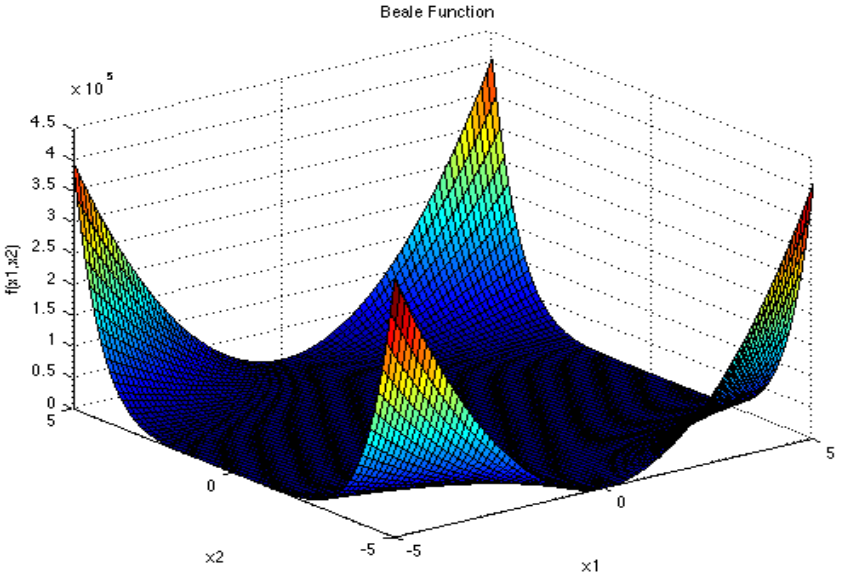

Figure 3. Beale Function

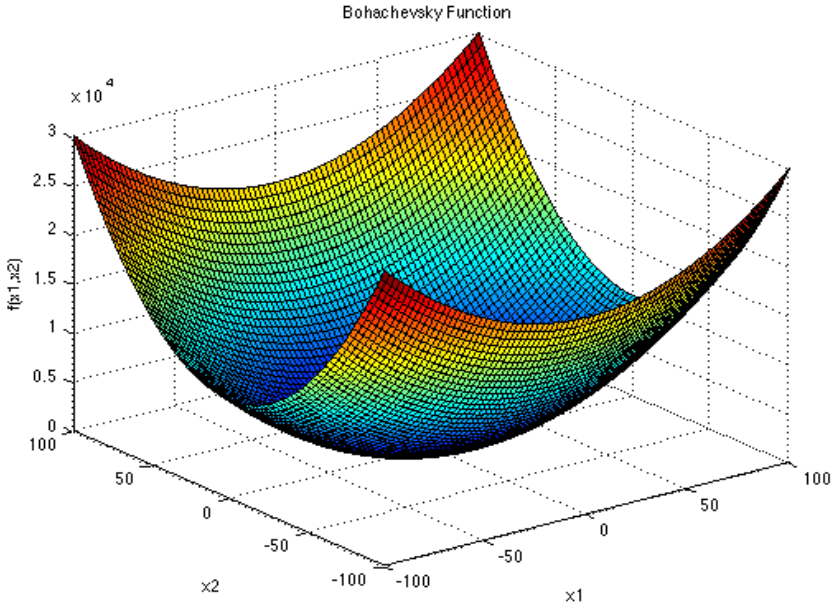

Figure 4. Bohachevsky Function

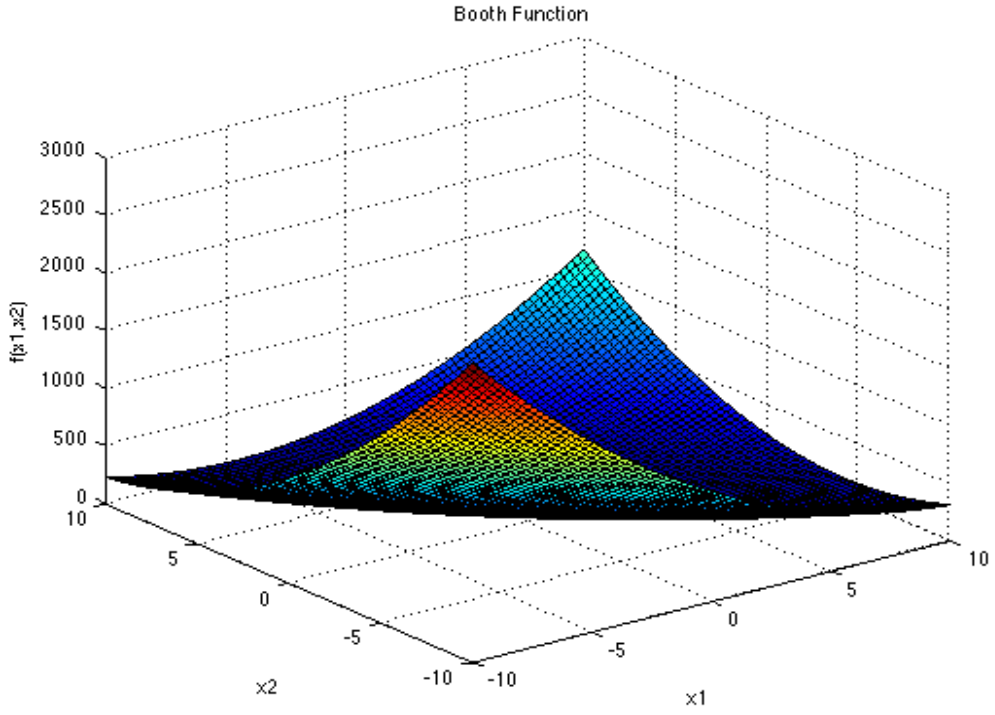

Figure 5. Booth Function

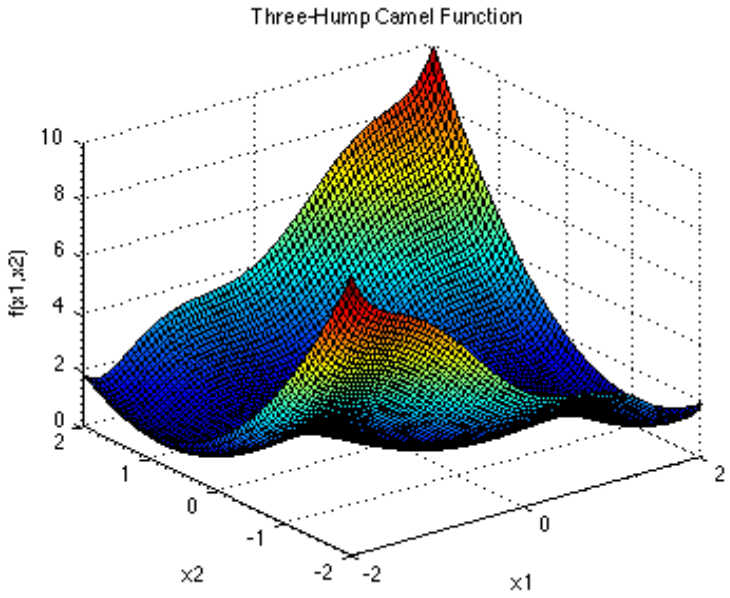

Figure 6. Three-Hump Camel Function

Table 1 shows the results obtained. Green represents performed well. Red represents not performed well. Blue represents performed between well and not well. From Table 1, we can see that all cells are green in color which means the PSO algorithm and developed ASA performed well on all benchmark functions.

Table 1. Obtained Result

Benchmark Function / Algorithm	Artificial Satisfaction Algorithm (ASA)	PSO Algorithm
Ackley Function		
Beale Function		
Bohachevsky Function		
Booth Function		
Three-Hump Camel Function		

7. Conclusions

A new field titled "Artificial Satisfaction" is defined and introduced in this article. The World's First algorithm under the Artificial Satisfaction field is designed and developed in this article. Results show that proposed ASA and PSO algorithms performed well on all benchmark functions. There is a difference between three recently introduced new research fields titled "Artificial Human Optimization (AHO)" (Gajawada, S., 2016), "Artificial Soul Optimization (ASO)"(Gajawada, S., & Hassan Mustafa., 2019b), "Artificial God Optimization (AGO)"(Gajawada, S., & Hassan Mustafa, 2020) and "Artificial Satisfaction". AHO, ASO, and AGO are three new fields under Artificial Intelligence. But the "Artificial Satisfaction" field is a separate field like "Artificial Intelligence" and not a sub-field of Artificial Intelligence. There are billions and trillions of opportunities under the Artificial Satisfaction field. The FUTURE will be very bright for Artificial Satisfaction Field Research Scientists and Students.

Acknowledgments

Thanks to everyone (and everything) who directly or indirectly helped us to reach the stage where we are now today.

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