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 comparison 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. 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


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 Satisfied 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} +
16)                 Constant_1*generate_random_number(0,1)*(local_best_{i,d} – position_{i,d})
17)                 + Constant_2*generate_random_number(0,1)*(global_best_{d} – position_{i,d})
18)             position_{i,d} = position_{i,d} + velocity_{i,d}
19)         end for
20)     else // UnSatisfied Being
21)         if ( random(0,1) < HelpOfSatisfiedPeopleProbability ) then // UnSatisfied Being with Help
22)             for each dimension d do
23)                 velocity_{i,d} = weight*velocity_{i,d} +
24)                     Constant_1*generate_random_number(0,1)*(local_best_{i,d} – position_{i,d})
25)                     + Constant_2*generate_random_number(0,1)*(global_best_{d} – position_{i,d})
26)             position_{i,d} = position_{i,d} + velocity_{i,d}
27)         end for
28)     else // Unsatisfied Being without help does nothing
29)     end if
30)    end for
31)  end for
32) generations (iterations) = generations (iterations) + 1
33) 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
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.
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.

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References


Gajawada, S., and Hassan Mustafa (2019a): Novel Artificial Human Optimization Field Algorithms - The