Advance in AI and Robotics Research Journal

Academixs Open Access Publishers

Letter to Editor

Letter No. 6 (ISVHAAI AI Society Letters)

Satish Gajawada

IIT Roorkee Alumnus

Corresponding Author:
Satish Gajawada, IIT Roorkee Alumnus.

Received Date: 20.07.2025 **Accepted Date:** 23.07.2025 **Published Date:** 28.07.2025

Abstract

The relation between Very Highly Advanced Artificial Intelligence (VHAAI) and International Society for Very Highly Advanced Artificial Intelligence (ISVHAAI) is that ISVHAAI AI Society uses VHAAI field to address various problems. In this Letter No. 6 of ISVHAAI Letters, a new algorithm titled "Scientist Swarm Optimization (SSO)" is designed.

Key Words: Artificial Intelligence, AI, Very Highly Advanced Artificial Intelligence, VHAAI, Scientists, Swarm, Scientist Swarm Optimization, Humans, Human Swarm Optimization, SSO, HSO

1. Introduction

One can find that Swarm Intelligence is an active and widely used area of research from articles [1] to [10]. A unique algorithm titled Scientist Swarm Optimization (SSO) has been designed in this letter. SSO is described in Section 2 followed by Conclusions and References respectively.

2. Scientist Swarm Optimization

Inspiration_Students_Matrix [i] [j] represents inspiration value of Student i towards Student j. Inspiration_Scientists_Matrix [i] [j] represents inspiration value of Scientist i towards Scientist j. Inspiration_Students_Scientists_Matrix [i] [j] represents inspiration value of Student i towards Scientist j. The three Inspiration Matrices are initialized in the beginning followed by the initialization of Scientists and Students population in the search space. Fitness values of Scientists and Students are calculated in line no. 5. Probability can be obtained by dividing fitness value of particle by sum of fitness values of all particles. Probability of a Scientist is calculated by dividing fitness value of Scientist by sum of fitness values of all Scientists. Probability of a Student is calculated by dividing fitness value of Student by sum of fitness values of all Students. Probabilities are calculated in lines 6 and 7. For each Scientist loop is started in line no. 8. In line no. 9 a random number R is generated. A Scientist "Target" is selected based on R and probabilities of Scientists. Movement Direction is obtained in line no. 11. A unit vector of magnitude 1 is obtained by dividing M_Direction with the magnitude of M_Direction. Line no. 13 shows position update equation. The Scientist moves along M_Direction and magnitude of this movement is Inspiration_Scientists_Matrix [Scientist] [Target] multiplied by Step value. Line no. 14 ends the Scientist Loop. The Student Loop begins at line no. 15 and ends in line no. 28. In even generations Students move towards Scientists. Line no. 21 shows postion update of Students in even generations. The Students in even generations moves along M_Direction and magnitude of this movement is Inspiration_Students_Scientists_Matrix [Student] [Target] multiplied by Step value. In odd generations Students move towards Students. Line no. 27 shows postion update of Students in odd generations. The Students in odd generations moves along M_Direction and magnitude of this movement is Inspiration_Students_Matrix [Student] [Target] multiplied by Step value.

Procedure: Scientist Swarm Optimization (SSO)

1. Initialize Inspiration_Students_Matrix
2. Initialize Inspiration_Scientists_Matrix
3. Initialize Inspiration_Students_Scientists_Matrix
4. Initialize Population of Scientists and Students
5. Calculate the fitness values of Scientists and Students
6. Calculate Probabilities of Scientists based on fitness values
7. Calculate Probabilities of Students based on fitness values
8. For each Scientist do:
9. Generate random number R
10. Select a Scientist "Target" based on R and Probabilities of Scientists
11. M_Direction = (Target - Scientist)
12. Convert M_Direction into Unit vector
13. Loc = Loc + M_Direction*Inspiration_Scientists_Matrix[Scientist][Target]*Step
14. End for each Scientist Loop
15. For each Student do:
16. If Student in even Generation:
17. Generate random number R
18. Select a Scientist "Target" based on R and Scientist Probabilities
19. M_Direction = (Target - Student)

20. Convert M_Direction into Unit vector
21. Loc = Loc + M_Direction*Inspiration_Students_Scientists_Matrix[Student][Target]*Step
22. If Student in odd Generation:
23. Generate random number R
24. Select a Student "Target" based on R and Student Probabilities
25. M_Direction = (Target - Student)
26. Convert M_Direction into Unit vector
27. Loc = Loc + M_Direction*Inspiration_Students_Matrix[Student][Target]*Step
28. End for each Student Loop

3. Conclusions

A novel algorithm titled "Scientist Swarm Optimization (SSO)" has been designed in this letter. There are 2 Swarms "Students" and "Scientists". There is a difference between the movement of Students and Scientists in search space. Students follow different strategies of movement in even and odd directions whereas Scientists follow same strategy for movement in all generations. The main point to be noted is that Students are Inspired to move towards Scientists. This is just the beginning of Scientist Swarm Optimization (SSO). One may explore in this direction and create novel and unique algorithms by taking inspiration from Scientists.

References

1. Kaur, K., & Kumar, Y. (2020, June). Swarm intelligence and its applications towards various computing: a systematic review. In 2020 International conference on intelligent engineering and management (ICIEM) (pp. 57-62). IEEE.
2. Chao, W. A. N. G., Zhang, S., Tianhang, M. A., Yuetong, X. I. A. O., Chen, M. Z., & Lei, W. A. N. G. (2025). Swarm intelligence: A survey of model classification and applications. Chinese Journal of Aeronautics, 38(3), 102982.
3. Xu, M., Cao, L., Lu, D., Hu, Z., & Yue, Y. (2023). Application of swarm intelligence optimization algorithms in image processing: A comprehensive review of analysis, synthesis, and optimization. Biomimetics, 8(2), 235.
4. Chopra, D., & Arora, P. (2022). Swarm intelligence in data science: challenges, opportunities and applications. Procedia Computer Science, 215, 104-111.
5. Zhu, Y. F., & Tang, X. M. (2010, October). Overview of swarm intelligence. In 2010 International Conference on Computer Application and System Modeling (ICCASM 2010) (Vol. 9, pp. V9-400). IEEE.
6. Chaudhari, B. (2022). Role of swarm intelligence algorithms on secured wireless network sensor environment-A comprehensive review. International Journal of Performability Engineering, 18(2), 92.
7. Shebin S, Mallikarjunaswamy S, 2014, Swarm Intelligence and its Applications, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) NCRTS – 2014 (Volume 2 – Issue 13).
8. Nguyen, L. V. (2024). Swarm intelligence-based multi-robotics: a comprehensive review. AppliedMath, 4(4), 1192-1210.
9. Zeb, A., Din, F., Fayaz, M., Mehmood, G., & Zamli, K. Z. (2023). A systematic literature review on robust swarm intelligence algorithms in search-based software engineering. Complexity, 2023(1), 4577581.
10. Abualigah, L., Falcone, D., & Forestiero, A. (2023). Swarm intelligence to face IoT challenges. Computational Intelligence and Neuroscience, 2023(1), 4254194.

Citation: Gajawada, S. (2025). Letter No. 6 (ISVHAAI AI Society Letters). *Adv. AI Robot. Res. J. vol 1*(1), 1-2.