

Artificial Human Optimization – A New and Interesting Area of Research

Satish Gajawada

About Author

Satish Gajawada is the son of Prabhakar Gajawada and Bhagyamma Gajawada. Satish Gajawada is a kindspringer and received “Beautiful Spirit Award” from a kindspringer. He was selected as “Community Member Of The Week” out of 1 lakh kindspringers for a particular week. He also received many other awards from kindspringers like “Super Kindness Hero Award”.

Satish Gajawada is the author of "Economics Of Everything", "Artificial Human Optimization – An Introduction" and many other articles. Satish Gajawada understood the essence of all the books at a very short age. Satish Gajawada loves his mother very much. Satish Gajawada authored the quote - "Service to MOTHER is equivalent to Service to mankind". Satish Gajawada was educated by world class experts like Dr. Ankush Mittal, Dr. Durga Toshniwal, Dr. Kumkum Garg, Dr. Manoj Misra and many other teachers, friends and family members.

In December 2016, he proposed a new field titled "Artificial Human Optimization" which comes under Artificial Intelligence. This work was published in "Transactions on Machine Learning and Artificial Intelligence". He received a SALUTE and APPRECIATION from IEEE chair Dr. Eng. Sattar B. Sadkhan for his numerous achievements within the field of science. He completed his studies from world class institute “Indian Institute of Technology Roorkee (IIT Roorkee)”.

An Ocean of Opportunities in Artificial Human Optimization Field

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Note: The work in “Artificial Human Optimization” got “New and interesting area of research” as review from world class conference PAKDD 2018. The work in AHO field also got reviews like “very novel”, “very interesting” etc. from other world class experts.

ABSTRACT

Global Optimization Techniques like Genetic Algorithms, Particle Swarm Optimization, Ant Colony Optimization and other optimization techniques were used in literature to solve complex optimization problems. Many optimization algorithms were proposed in literature by taking the behavior of Birds, Ants, Fishes, Chromosomes etc. as inspiration. Recently, a new trend has begun in Evolutionary Computing Domain where optimization algorithms have been created by taking Human Behavior as inspiration. The focus of this paper is on optimization algorithms that were and are being created based on the behavior of Artificial Humans. In December 2016, a new field titled “Artificial Human Optimization” was proposed in literature. This paper is strongly meant to popularize “Artificial Human Optimization” field like never before by showing an Ocean of Opportunities that exists in this new and interesting area of research. A new field titled “Artificial Economics Optimization” is proposed at the end of paper.

Keywords: Artificial Intelligence, Machine Learning, Evolutionary Computing, Bio-Inspired Computing, Nature Inspired Computing, Genetic Algorithms, Particle Swarm Optimization, Ant Colony Optimization, Artificial Economics Optimization, Artificial Human Optimization

1 Introduction

Article [1] proposed a new field titled “Artificial Human Optimization (AHO)” by showing 13 abstracts of papers in this new and interesting area of research called as AHO field. Article [2] showed different reviews of experts for a particular work in AHO field. Article [3] proposed new optimization method titled “POSTDOC : The Human Optimization” which comes under AHO field. Article [4] popularized AHO field by “showing few opportunities in AHO field”, “proposing Multiple Strategy Human Optimization method”, “showing reviews for paper – POSTDOC: The Human Optimization”, “making corrections to earlier work”, “encouraging researchers to work in this new area” and “giving Artificial Human Optimization Award to researchers who worked in this new area”.

In this article, Section 2 shows reviews of papers in Artificial Human Optimization field. The reviews shown in article [4] are the reviews of a particular paper titled “POSTDOC: The Human Optimization”. In this article, reviews of other papers proposed in AHO field are shown.

Section 3 in this article shows many opportunities that exist in this new area of research. Section 4 shows “Doctor of Philosophy (PhD)” proposal in Artificial Human Optimization area.

In this article, Section 5 shows future work where a new field titled “Artificial Economics Optimization (AEO)” is defined. This section also shows some of the opportunities that exist in AEO area. Acknowledgements are shown in Section 6 of this Article.

2 Reviews

Review 1

We had a glance at your published article “POSTDOC : THE HUMAN OPTIMIZATION”. We found your article very **innovative, insightful and interesting**. We really value your **outstanding contribution** towards Scientific Community.

Review 2

The author have come up with **a new approach** of academia; Philosophy Of a Doctor (PoD) – A New Degree. I am not expert in this area and would suggest to send the work to some academic. I think this is not a suitable workshop for such work. It should be send to some academic workshop/conference/journal.

Review 3

Literature review: **very good**.

Experiments: None.

Overall a **good writing** but check if it is in the scope of the conference of PAKDD!

Review 4

The author, Satish Gajawada has proposed a new area Artificial Human Optimisation – An Introduction. The author has proposed an optimisation algorithm but there has been no application used to test the algorithm or the optimisation method on. More experiments are required. Also its not related to data mining and not in the scope of PAKDD or BDM.

Review 5

The author note" This article got recently published in “Transactions on Machine Learning and Artificial Intelligence”. I have copyrights with me. I am submitting this paper for re-publishing in your workshop in an attempt to popularize “Artificial Human Optimization” like never before." suggests that the work is already published so there is not point accept him for re-publication since the proceedings of this workshop will be published. **New and interesting area though**.

Review 6

We are very happy to inform you that your paper has been accepted (conditionally) for publication in journal. Our journal is a prestigious journal and it will be indexed in major indices ASAP. Please modify your paper based on reviewers comment, otherwise it will not be accepted for publication.

Type of paper : Research

Significance of the main idea(s) : Average

Originality : Average

Technical quality of the paper : Average

Awareness of related work : Average

Clarity of presentation : Average

Organization of the manuscript : Very Poor

References : Average

Paper Length : Average

How comfortable are you in reviewing this paper? : Confident

Overall comments and changes that MUST be made before Publication: The manuscript is not organized. The presentation is not clear.

Overall Recommendation: Marginally Accept.

Review 7

The Paper captioned “Ph.D: The Human Optimization” presented by the author has been reviewed in detail by the reviewers and found it a distinctive effort. Reviewers offer following remarks:

The paper is **strongly prepared** to provide technical grounds of the subject. The Introduction elucidates the essence of the proposed research. Besides, Literature Review carefully outlined with details focused on the current applicable methods.

The author intelligently developed the remaining part of the manuscript communicating the commitment and the pragmatic knowledge of the writer. The mathematical expressions were also strongly used to defend the current work. The methodology adopted showed proper evaluation and documentation. In this manner, it is acknowledged for publication as it is.

Review 8

The paper “Scientist: International Association of Artificial Human Optimization” developed generously that shows the technical grounds of the subject. The technical expertise has been greatly utilized in developing the paper under review. The Introduction endorsed systematically the extensive areas of the new study approach. Besides, Literature Review well explains and advocates the probe and gaps in this area of research. The author skillfully produced the rest of the manuscript exploring in depth this newly proposed area. Moreover, the optimization method is well devised and the reviewer’s comments on previous work are also commendable. In this manner, it is acknowledged for publication as it is.

Review 9

The Paper captioned “Hero: Transactions on Artificial Human Optimization” has been carefully reviewed by the authorities and declared it a well-composed paper. Reviewers offer following remarks:

The abstract focused on the rationale of the research in a logical way that seems to be a unique angles of the study. The Introduction of the paper well argued the true methodology of the research. Moreover, Literature review is carefully organized, covers the available methods with suitable details. Rest of the manuscript gradually covers the focused point of view that shows the applied knowledge of the authors. The paper also presents the relevant mathematical details with sufficient reference to the existing work. The methodology adopted showed proper evaluation and documentation. Therefore, it is accepted for publication as it is.

Review 10

The article contributes greatly on the areas of Artificial Intelligence. Researcher excellently worked on the area of study. Collectively, it is a great effort and the reviewers provided following comments about the manuscript. Abstract covers all the important aspects of the proposed methodology and well written in general. The essence of the presented approach is elaborated nicely in the Introduction section. Similarly, Literature review is organized well. Rest of the manuscript is also very well structured representing the dedication and knowledge of the researcher about the topic and skill on research. The manuscript shall be rated high on its technical quality. Therefore, manuscript shall be accepted for publication as it is.

Review 11

The Paper captioned “Artificial Human Optimization –An Introduction” has been wisely appraised by the authorities and declared it a well-conceived paper. Reviewers offer following remarks:

The abstract previews the author’s approach and improved theories of the study that definitely yet to be explored and never produced before. The research procedure as described in the Introduction is exemplary. Moreover, Literature review is best framed, focus the information on the potential approaches with applicable facts. Rest of the manuscript gradually covers the ideal point of view that shows the applied knowledge of the authors. The paper also presents the relevant mathematical details with sufficient reference to the existing work. The methodology adopted showed proper evaluation and documentation. Therefore, it is accepted for publication as it is.

Review 12

Information for the Contribution

1. Writing Skill and Quality (0-10): 8
2. Quality of content (0-10): 8
3. Fitness of title (0-10): 9
4. Significance for theory or practice (0-10): 9
5. Contribution and Originality (0-10): 9
6. Level of Innovation (0-10): 8
7. Quality of presentation (0-10): 8

8. Ripple effect to other authors (0-10): 10

9. Decisive overall recommendation (0-10): 9

In this paper the author clearly explains the research with effective method and good description. The topic is meaningful, and the research results are interesting to many specialized readers. So it's good work and acceptable.

Some more checkpoints for improving the quality of the final version (if need, author can pay attention to below checkpoints. It's not requirements but just comments for improving the paper)

- In abstract and Introduction, if need, the main goal can be say more clearly.
- The abstract can shows some information to understand the goal of this paper clearly, if need.
- The introduction can be emphasized the background and motivation more clear way.
- the results need reflect more clear explanation.
- Are there any not good phrases?, if so the authors need to pay attention to them.
- Are there any typos? If so, it need to be revised.
- Although paper is good from language point of view, but a little bit review towards sentences and/or grammars can turn it into beautiful paper.
- In conclusion, should elaborate why the study is important and the significance of the study more clearly.
- Overall, it's **very interesting** and the work proposed is useful, the paper is organized well and the presentation is clear.

3 Ocean of Opportunities

From previous section, it is clear that some world-class experts have accepted the fact that Artificial Human Optimization is very interesting area of research. As shown in Article [4], there are also set of world-class experts who are against to the idea of Artificial Human Optimization.

Artificial Human Optimization field is in its early stage. The field got created in December 2016. There are literally so many opportunities in AHO field. New research papers can be published by replacing the optimization algorithm (like Genetic Algorithms, Particle Swarm Optimization, Ant Colony Optimization etc.) used in the published paper with algorithms in AHO field. Satish Gajawada et al. published nearly 10 papers using algorithms based on optimization algorithms like GA, PSO and DE. In this section titles of papers based on algorithms in AHO field are shown. The below given research paper titles are not published yet. The below titles of papers are future opportunities for researchers interested to work in AHO field:

- 1) Optimal Clustering Method Based on algorithms under AHO field [6].
- 2) Projected Clustering Using HPSO algorithm [7].
- 3) HBBO Based Projected Clustering Method [8].
- 4) Projected Clustering HPSO and Classification [9].
- 5) A Method of Initialization for HPSO Based Clustering Technique [10].

- 6) Supervised Projected Clustering Method Based on HBA algorithms [11].
- 7) Design optimization of non linear tapers for high power gyrotrons using hybrid Human Behavior Algorithms and space mapping methods [12].
- 8) A Semi-Supervised Projected Clustering Method Using HBBO [13].
- 9) A framework for classification using Human Behavior Algorithms based clustering [14].

HBBO, HBA, HPSO in above paper titles are algorithms under Artificial Human Optimization field. Details of these algorithms are given in Article [4]. A total of 15 papers under AHO field are shown in [4].

The above new project titles / research papers to be published are just research opportunities based on Satish Gajawada et al. authors. Imagine the number of new projects that are possible based on previous papers of crores of researchers across the globe. There are millions of papers possible because there are so many papers published based on optimization algorithms like GA, PSO, DE and other optimization algorithms.

Besides new projects/papers there is possibility for so many associations, organizations and research labs across the globe. Few examples are shown below:

- 1) IIT Roorkee Artificial Human Optimization Labs
- 2) IEEE Artificial Human Optimization Society.
- 3) Indian Journal of Artificial Human Optimization.

There are so many possibilities to create new AHO associations, AHO journals, AHO conferences, AHO research labs and AHO societies etc.

Hence there is an Ocean of Opportunities in Artificial Human Optimization field.

4 Doctor of Philosophy Proposal

This proposal is meant for students who are interested to do “Doctor of Philosophy (PhD)” in Artificial Human Optimization.

“Optimization Algorithms based on Human behavior” is the title of the work.

Article [5] proposed HPSO algorithm which is the inspiration of this PhD proposal.

The description of HPSO algorithm is taken from Article [5] as it is and shown below in double quotes:

“HPSO is modified PSO, based on human behavior, which is proposed to improve the performance. In PSO, all particles only learn from the best particles Pbest and Gbest. Obviously, it is an ideal social condition. However, considering the human behavior, there exist some people who have bad habits or behaviors around us, at the same time, as we all known that these bad habits or behaviors will bring some effects on people around them. If we take warning from these bad habits or behaviors, it is beneficial to us. Conversely, if we learn from these bad habits or behaviors, it is harmful to us. Therefore, we must give an objective and rational view on these bad habits or behavior. In HPSO, we introduce the global worst particle, who is of the worst fitness in the entire population at each iteration. It is denoted as Gworst.”

We can add human behavior to existing algorithms like Genetic Algorithms, Ant Colony Optimization etc. and create algorithms like “Human Behavior Inspired Genetic Algorithms”.

In HPSO, Worst particle is introduced. Similarly we can add human behavior to existing algorithms. We can then see results without adding human behavior and results after adding Human behavior.

5 Future Work

“Artificial Economics Optimization” is a new field where algorithms are created by taking “Economics” as inspiration. Following are some of opportunities that exist in “Artificial Economics Optimization” field:

- 1) International Association of Artificial Economics Optimization (IAAEO)
- 2) Transactions on Artificial Economics Optimization (TAEO)
- 3) International Journal of Artificial Economics Optimization (IJAEO)
- 4) International Conference on Artificial Economics Optimization (ICAEO)
- 5) www.ArtificialEconomicsOptimization.com
- 6) B.Tech in Artificial Economics Optimization
- 7) M.Tech in Artificial Economics Optimization
- 8) PhD in Artificial Economics Optimization
- 9) PostDoc in Artificial Economics Optimization
- 10) Artificial Economics Optimization Labs
- 11) To become “Father of Artificial Economics Optimization” field

6 Acknowledgements

Thanks to the following members in Editorial Team of TMLAI for accepting and publishing innovative papers in Artificial Human Optimization field:

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Professor Wee SER

Professor Liang Yanchun

Professor Julia Johnson

Professor Farouk Yalaoui

Professor Jai N Singh

Dr Kyriakos G Vamvoudakis

Dr Zezhi Chen
Dr Luis Rodolfo Garcia
Dr Hafiz M. R. Khan
Dr Xiaocong Fan
Dr Chen Yanover
Dr Vandana Janeja
Dr Nikolaos Georgantas
Dr Zeyad Al-Zhour
Dr Zdenek Zdrahal
Dr Steve S. H. Ling
Dr Marianne Hoogeveen
Dr Hooshang Hemami
Dr Hiroyuki Utsunomiya

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- (7) Satish Gajawada, Durga Toshniwal, "Projected Clustering Using Particle Swarm Optimization," International Conference on Computer, Communication, Control and Information Technology (C3IT - 2012), Elsevier.
- (8) Satish Gajawada, Durga Toshniwal, "GAP: Genetic Algorithm Based Projected Clustering Method", 21st International Conference on Software Engineering and Data Engineering (SEDE 2012), USA.
- (9) Satish Gajawada, Durga Toshniwal, "Projected Clustering Particle Swarm Optimization and Classification", International Conference on Machine Learning and Computing (ICMLC-2012), Hong Kong.

- (10) Satish Gajawada, Durga Toshniwal, "A Method of Initialization for Genetic Algorithm Based Clustering Technique," International Conference on Computer Science and Information Technology (ICCSIT 2012), interscience, Guwahati.
- (11) Satish Gajawada, Durga Toshniwal, "SPPS: Supervised Projected Clustering Method Based on Particle Swarm Optimization", International Journal of Machine Learning and Computing (IJMLC), vol 2, no 3, 2012.
- (12) Satish Gajawada, Nischey Grover, M.V. Kartikeyan, "Design optimization of non linear tapers for high power gyrotrons using hybrid space mapping techniques", 12th IEEE International Vacuum Electronics Conference (IVEC 2011), IEEE.
- (13) Satish Gajawada, Durga Toshniwal, "VINAYAKA: A Semi-Supervised Projected Clustering Method Using Differential Evolution," International Journal of Software Engineering and Applications (IJSEA), 2012.
- (14) Satish Gajawada, Durga Toshniwal, "A framework for classification using genetic algorithm based clustering", The International Conference on Intelligent Systems Design and Applications (ISDA), 2012, IEEE.

Author:

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Below are some publications of author:

Satish Gajawada, Durga Toshniwal, Nagamma Patil and Kumkum Garg, "Optimal Clustering Method Based on Genetic Algorithm," International Conference on Soft Computing for Problem Solving (SocPros - 2011), Springer.

Satish Gajawada, Durga Toshniwal, "Hybrid Cluster Validation Techniques," International Conference on Computer Science, Engineering & Applications (ICCSEA - 2012), Springer.

Satish Gajawada, Durga Toshniwal, "Projected Clustering Using Particle Swarm Optimization," International Conference on Computer, Communication, Control and Information Technology (C3IT - 2012), Elsevier.

Satish Gajawada, Durga Toshniwal, "GAP: Genetic Algorithm Based Projected Clustering Method", 21st International Conference on Software Engineering and Data Engineering (SEDE 2012), USA.

Satish Gajawada, Durga Toshniwal, "Projected Clustering Particle Swarm Optimization and Classification", International Conference on Machine Learning and Computing (ICMLC-2012), Hong Kong.

Satish Gajawada, Durga Toshniwal, "VINAYAKA: A Semi-Supervised Projected Clustering Method Using Differential Evolution," International Journal of Software Engineering and Applications (IJSEA), 2012.

Satish Gajawada, Durga Toshniwal, "A framework for classification using genetic algorithm based clustering", The International Conference on Intelligent Systems Design and Applications (ISDA), 2012, IEEE.

You can read all the work of the author at - <https://iitr-in.academia.edu/SatishGajawada>

Artificial Human Optimization – An Introduction

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ABSTRACT

The goal of this article is :

- 1) To popularize "Artificial Human Optimization" field
- 2) To show opportunities that exist in "Artificial Human Optimization" field.
- 3) To Design an optimization method based on Artificial Humans
- 4) To show reviews of papers in "Artificial Human Optimization" field
- 5) To make corrections to my previous work in "Artificial Human Optimization" field
- 6) To encourage researchers across the globe to work in "Artificial Human Optimization" field
- 7) To give Artificial Human Optimization award to researchers who contributed to this new field

KEYWORDS: Artificial Intelligence, Machine Learning, Global Optimization Techniques, Genetic Algorithms, Particle Swarm Optimization, Ant Colony Optimization, Artificial Fish Swarm Optimization, Firefly Optimization Algorithm, Flower Pollination Algorithm, Artificial Human Optimization

1 Introduction

Recently a new field titled "Artificial Human Optimization" has been proposed in literature [1]. In this paper the focus is completely on "Artificial Human Optimization" field.

Rest of the paper is organized as follows:

- 1) Section 2: This section shows corrections to earlier work in Artificial Human Optimization field
- 2) Section 3: This section shows design of new optimization method based on Artificial Humans. "Multiple Strategy Human Optimization" is the title of this new method.
- 3) Section 4: This section shows reviews of experts in Artificial Human Optimization field.
- 4) Section 5: This section encourages future researchers to work in Artificial Human Optimization field.
- 5) Section 6: To show opportunities that exist in "Artificial Human Optimization" field.
- 6) Section 7: To show details related to the "Founder of Artificial Human Optimization" field.
- 7) Section 8: This section shows list of researchers who worked in Artificial Human Optimization field and got Artificial Human Optimization Award (which is given by the founder of Artificial Human Optimization).

2 Corrections to Earlier Work

13 abstracts of papers in Artificial Human Optimization field are shown in [1]. In [1] it was given that 2012 was the year in which first paper in the field was proposed. But the first optimization method based on Artificial Humans was proposed in 2009 [2]. The abstracts of papers missed in [1] are shown below:

The abstract given in [2] is shown below as it is:

“The Human-Inspired Algorithm (HIA) is a new algorithm that uses a given population (a group of candidate solutions) to improve the search for optimal solutions to continuous functions in different optimization applications such as non-linear programming. HIA imitates the intelligent search strategies of mountain climbers who use modern techniques (such as binoculars and cell phones) to effectively find the highest mountain in a given region. Different from Genetic Algorithms (GAs) and Bees Algorithms (BAs), HIA divides a whole search space into multiple equal subspaces, evenly assigns the population in the subspaces, finds an elite subspace with the largest sum of function values, and uses more climbers (candidate solutions) to explore the elite subspace and fewer ones to explore the rest of the whole search space. BAs use random search in local neighborhood search, whereas HIA uses GAs in local neighborhood search to obtain better results. HIA locates a point with the largest function value among the elite sites and creates a hypercube with the point as its center. The assigned climbers in the hypercube and the elite subspace continue to search for the optimal solution iteratively. In each loop, the hypercube and the elite subspace become smaller to have a larger chance to pinpoint the optimal solution. Simulation results for three continuous functions with constraints and three continuous functions with box constraints can indicate that HIA is more efficient than GAs and BAs. Finally, conclusions and future works are given.”

The abstract given in [3] is shown below as it is:

“This paper introduces Anarchic Society Optimization (ASO), which is inspired by a social grouping in which members behave anarchically to improve their situations. The basis of ASO is a group of individuals who are fickle, adventurous, dislike stability, and frequently behave irrationally, moving toward inferior positions they have visited during the exploration phase. The level of anarchic behavior among members intensifies as the level of difference among members' situations increases. Using these anarchic members, ASO explores the solution space perfectly and avoids falling into local optimum traps. First we present a unified framework for ASO, which can easily be used for both continuous and discrete problems. Then, we show that Particle Swarm Optimization (PSO), for which a general introduction was initially implemented for continuous optimization problems, is a special case of this framework. To evaluate the performance of ASO for discrete optimization, we develop an ASO algorithm for a challenging scheduling problem. The numerical results show that the proposed ASO algorithm significantly outperforms other effective algorithms in the literature. Our study indicates that developing an ASO algorithm is basically straightforward for any problem to which a PSO or Genetic algorithm has been applied. Finally, it is shown that under mild conditions an ASO algorithm converges to a global optimum with probability one.”

3 Proposed Method

Please read “Terminology” section in paper [4] to understand the below explanation of proposed method: In initialization stage Locations of Humans, Guidance Locations of Humans, Love Array and Step are initialized. There are 2 generations inside the while loop shown in Figure 1. As shown in [4] computation of Generation x (Gen x) is done. The only difference is that a new method is designed for updating

Guidance Locations of Humans. Circle Best is the best fitness value among all fitness values of Guidance Locations of particular Human. Complete Best is the best fitness value among all fitness values of Guidance Locations of all Humans. Probabilities are assigned to Circle Best and Complete Best based on their fitness values. Probabilities are calculated from fitness values of Circle Best and Complete Best in the same way probabilities are calculated in [4]. A random number is generated to select either Circle Best or Complete Best. A particular Guidance Location moves towards the selected and this movement is similar to movement of Humans described in [4]. The difference is that Guidance Locations move towards the selected by the value of Step. The same strategy is used to update all Guidance Locations of all Humans. In Generation $x+1$, Guidance Locations are updated in the same way Guidance Locations are updated in Generation x (Gen x). The difference between Gen x and Gen $x+1$ lies in the movement of humans. In Gen x , humans move towards Guidance Locations of higher fitness values with higher probability. But in Gen $x+1$, humans move away from lower fitness values with higher probability. Functions Update Gen $x()$ and Update Gen $x+1()$ are shown in Figure 1. These functions update Guidance Locations, Love Array and Step values.

```

main(){
    Initialization();
    while(Termination_Condition_Reached not equal to true){
        Generation x : Human moves towards higher fitness Guidance Locations.
        Update Gen x().
        Generation x+1 : Human moves away from lower fitness values.
        Update Gen x+1().
    }
}

```

Figure 1. Multiple Strategy Human Optimization

4 Reviews

Review 1 given in [5] is shown below as it is:

“This paper studies a so-called human optimization method which falls into the research topic of optimization. The proposed method was presented on the first page followed by some discussions. The paper clearly makes no novel contribution to the state of the art on optimization algorithms and techniques. Thus, because of this lack of new contribution, the paper is not appropriate for the conference.”

Review 2 given in [5] is shown below as it is:

“Based on the review of your abstract, the following editorial comments should be taken into consideration:

Please submit an abstract. Change font type. Remove PhD from the title.

Please follow the abstract guidelines”.

Review 3 given in [5] is shown below as it is:

“Nothing to evaluate.”

Review 4 given in [5] is shown below as it is:

“Funny paper, especially the notion of "love array" :)”

Review 5 given in [5] is shown below as it is:

“This is not a research paper. It should not have been submitted for review.

Rationale and results are completely lacking. I do not even think there is a research idea in there.”

Review 6 given in [5] is shown below as it is:

“General conclusion is ‘Accept without reservation’.

Further comments of the evaluator are below:

The title should be changed to be more comprehensive. The clarity and relevance of the problem is well stated. How is the problem scientifically analyzed through the text? the main propositions of the paper are crystal clear. The conclusion part should also contain more details expressing if other researches in the field support the results. The text needs to be re-considered by a native English speaker to edit the errors. It is recommended that the author adds more sources since the year 2012. The research method should be explained in more details.”

Review 7 given in [5] is shown below as it is:

“General conclusion is ‘Accept without reservation’.

Further comments of the evaluator are below:

The title is well in accord with the body of the text. The clarity and relevance of the problem is well stated. How is the problem scientifically analyzed through the text? Reasoning of main propositions are satisfying. In conclusion part, It is needed to support the result of the research by other recent researches. The English language needs little modification in abstract part. The references are good but it is recommended that the author uses more references from the recent years. The author needs to make the main goals crystal clear.”

Review 8 given in [5] is shown below as it is:

“Paper has been ACCEPTED.

Specific behavior of the human has to be specified for the model.

Few Examples/scenarios where this could be applied has to be explained.

The time complexity of the optimization algorithm has to be demonstrated over the brute force method.

Initialization of Guidance location and generalized form of updating the guidance location/love array should be explained in detail with appropriate formula.

Paper is very abstract about the idea discussed.”

Review 9 given in [5] is shown below as it is:

“Main advantages of the work:

1. Rather conceptual work pondering another interesting approach to optimization problem solution. Goals are clearly stated and the new algorithm is provided and explained.

Main disadvantages of the work:

1. Qualitative comparison to other optimization algorithms is not provided. Why proposed algorithm could be thought as specifically modeling human optimization is not fully explicated.
2. It is not clearly stated whether Guidance Locations and Love array are local or global, i.e. are they vectors or matrices? Seems like the latter.

Decision: this paper should be accepted for participation in the conference”.

Review 10 given in [5] is shown below as it is:

“Main advantages of the work:

2. New method for the creation of innovative optimization algorithms is proposed in the work.
3. The function Update Locations of Humans in optimization algorithm explained in depth.
4. An overview of existing works on the same topic is provided.
5. Calculations of the fitness values of guidance locations of the Human are analyzed.

Main disadvantages of the work:

1. It is not demonstrated how PhD method have been applied for solving complex optimization problems.
2. It is not clear either there are some software implementation of Human Optimization that confirm practical feasibility of the method.

Decision: this paper should be accepted for participation in the conference.”

Review 11 given in [5] is shown below as it is:

“Review 11 a: A very interesting paper.

Review 11 b: I have to admit that I had a hard time grasping the key concepts revealed in this manuscript. The author has set a very ambitious goal. But I am still searching for the elements that will make this goal a reality. The proposed algorithm is simply too abstract to be of substantial value.”

5 Encouragement to Future Researchers

From section 4 it is clear that some experts are against to Optimization methods based on Artificial Humans whereas other experts are supporting Artificial Human Optimization field. The author of this paper received review “Very Interesting work” from IEEE TAAI 2013 conference for a work in Artificial Human Optimization field. Now there are already more than 15 papers published in this field. There is scope for many PhD’s and PostDoc’s in Artificial Human Optimization field.

For the sake of encouraging researchers, 15 titles of papers published in Artificial Human Optimization field are shown below. 13 abstracts are already shown in [1]. Titles of papers shown in [1] are given in double quotes:

- “(1) Manoj Kumar Singh,” A New Optimization Method Based on Adaptive Social Behavior: ASBO”, AISC 174, pp. 823–831. Springer, 2012.”

- “(2) Satish Gajawada, “POSTDOC : The Human Optimization”, Computer Science & Information Technology (CS & IT), CSCP, pp. 183-187, 2013.”
- “(3) Liu H, Xu G, Ding GY, Sun YB, “Human behavior-based particle swarm optimization”, The Scientific World Journal, 2014.”
- “(4) Da-Zheng Feng, Han-Zhe Feng, Hai-Qin Zhang, “Human Behavior Algorithms for Highly Efficient Global Optimization”, <https://arxiv.org/abs/1507.04718>, 2015.”
- “(5) Seyed-Alireza Ahmadi, “Human behavior-based optimization: a novel metaheuristic approach to solve complex optimization problems”, Neural Computing and Applications, 2016.”
- “(6) Ruo-Li Tang, Yan-Jun Fang, "Modification of particle swarm optimization with human simulated property", Neurocomputing, Volume 153, Pages 319–331, 2015.”
- “(7) Muhammad Rizwan Tanweer, Suresh Sundaram, "Human cognition inspired particle swarm optimization algorithm", 2014 IEEE Ninth International Conference on Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP), 2014.”
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- (14) L. M. Zhang, C. Dahlmann and Y. Zhang. Human-inspired algorithms for continuous function optimization. In IEEE International Conference on Intelligent Computing and Intelligent Systems, 2009, vol. 1, pp. 318-321.
- (15) A. Ahmadi-Javid, "Anarchic Society Optimization: A human-inspired method", Proc. 2011 IEEE Congr. Evol. Comput., pp. 2586-2592, 2011.

6 Opportunities in Artificial Human Optimization Field

Following are some of the opportunities that exist in Artificial Human Optimization field:

- 1) International Association of Artificial Human Optimization (IAAHO)
- 2) Transactions on Artificial Human Optimization (TAHO)

- 3) International Journal of Artificial Human Optimization (IJAHO)
- 4) International Conference on Artificial Human Optimization (ICAHO)
- 5) www.ArtificialHumanOptimization.com
- 6) B.Tech in Artificial Human Optimization
- 7) M.Tech in Artificial Human Optimization
- 8) PhD in Artificial Human Optimization
- 9) PostDoc in Artificial Human Optimization
- 10) Artificial Human Optimization Labs
- 11) To become "Father of Artificial Human Optimization" field

7 Founder of Artificial Human Optimization Field

In December 2016, Satish Gajawada proposed a new field titled "Artificial Human Optimization" which comes under Artificial Intelligence. This work was published in "Transactions on Machine Learning and Artificial Intelligence".

8 Artificial Human Optimization Awards

The following list of researchers are awarded "Artificial Human Optimization Award" for their valuable contribution to AHO field:

- 1) Manoj Kumar Singh
- 2) Liu H
- 3) Xu G
- 4) Ding GY
- 5) Sun YB
- 6) Da-Zheng Feng
- 7) Han-Zhe Feng
- 8) Hai-Qin Zhang
- 9) Seyed-Alireza Ahmadi
- 10) Ruo-Li Tang
- 11) Yan-Jun Fang
- 12) Muhammad Rizwan Tanweer
- 13) Suresh Sundaram
- 14) N. Sundararajan
- 15) Prakasha S
- 16) H R Shashidhar
- 17) G T Raju
- 18) Sridhar N
- 19) Nagaraj Ramrao
- 20) Devika P. D
- 21) Dinesh P. A
- 22) Rama Krishna Prasad
- 23) L. M. Zhang
- 24) C. Dahlmann
- 25) Y. Zhang
- 26) A. Ahmadi-Javid

ACKNOWLEDGEMENTS

Thank you to everyone who directly or indirectly helped me to reach the stage where I am now.

9 Conclusion

This paper shows how to contribute to new field titled “Artificial Human Optimization”. There are many opportunities in Artificial Human Optimization field. There is scope for many PhD's and PostDoc's in Artificial Human Optimization field.

MOTIVATION

Great leaders dont tell you what to do, they show you how it's done -- from internet.

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- [2] L. M. Zhang, C. Dahlmann and Y. Zhang. Human-inspired algorithms for continuous function optimization. In IEEE International Conference on Intelligent Computing and Intelligent Systems, 2009, vol. 1, pp. 318-321.
- [3] A. Ahmadi-Javid, "Anarchic Society Optimization: A human-inspired method", Proc. 2011 IEEE Congr. Evol. Comput., pp. 2586-2592, 2011.
- [4] Satish Gajawada, “POSTDOC : The Human Optimization”, Computer Science & Information Technology (CS & IT), CSCP, pp. 183-187, 2013.
- [5] Satish Gajawada, “CEO: Different Reviews on PhD in Artificial Intelligence”, Global Journal of Advanced Research, vol. 1, no.2, pp. 155-158, 2014.

AUTHOR

In December 2016, Satish Gajawada proposed a new field titled "Artificial Human Optimization" which comes under Artificial Intelligence. This work was published in "Transactions on Machine Learning and Artificial Intelligence". He received a SALUTE and APPRECIATION from IEEE chair Dr. Eng. Sattar B. Sadkhan for his numerous achievements within the field of science. He completed his studies from world class institute “Indian Institute of Technology Roorkee (IIT Roorkee)”. Below are some publications of author:

Satish Gajawada, Durga Toshniwal, Nagamma Patil and Kumkum Garg, “Optimal Clustering Method Based on Genetic Algorithm,” International Conference on Soft Computing for Problem Solving (SocPros - 2011), Springer.

Satish Gajawada, Durga Toshniwal, “Hybrid Cluster Validation Techniques,” International Conference on Computer Science, Engineering & Applications (ICCSEA - 2012), Springer.

Satish Gajawada, Durga Toshniwal, "Projected Clustering Using Particle Swarm Optimization," International Conference on Computer, Communication, Control and Information Technology (C3IT - 2012), Elsevier.

Satish Gajawada, Durga Toshniwal, "GAP: Genetic Algorithm Based Projected Clustering Method", 21st International Conference on Software Engineering and Data Engineering (SEDE 2012), USA.

Satish Gajawada, Durga Toshniwal, "Projected Clustering Particle Swarm Optimization and Classification", International Conference on Machine Learning and Computing (ICMLC-2012), Hong Kong.

Satish Gajawada, Durga Toshniwal, "VINAYAKA: A Semi-Supervised Projected Clustering Method Using Differential Evolution," International Journal of Software Engineering and Applications (IJSEA), 2012.

Satish Gajawada, Durga Toshniwal, "A framework for classification using genetic algorithm based clustering", The International Conference on Intelligent Systems Design and Applications (ISDA), 2012, IEEE.

You can read all the work of the author at - <https://iitr-in.academia.edu/SatishGajawada>

Entrepreneur: Artificial Human Optimization

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ABSTRACT

A new field titled 'Artificial Human Optimization' is introduced in this paper. All optimization methods which were proposed based on Artificial Humans will come under this new field. Less than 20 papers were published in this field so far. The goal of this paper is to introduce 'Artificial Human Optimization' and to show abstracts of papers published in this new field. The nick name given to this work is 'ENTREPRENEUR'.

Index Terms— Optimization, Artificial Humans, Genetic Algorithm, Particle Swarm Optimization, Optimization methods based on Humans

1 Introduction

Very less amount of work has been done based on Artificial Humans when compared to optimization methods based on other beings like ants, birds, bees, fishes etc. Genetic Algorithm was proposed in 1970s. But the first optimization method based on humans was proposed in 2012. There is lot of scope to explore and create optimization methods based on Humans. Hence a new field titled 'Artificial Human Optimization' is introduced in this paper.

2 Abstracts of Papers

This section shows abstracts of papers published in 'Artificial Human Optimization' field.

The abstract given in [1] is shown below as it is:

"The interactions and influence taking place in the society could be a source of rich inspiration for the development of novel computational methods. In this paper a new optimization method called "Adaptive social behavior optimization (ASBO)" derived from abstract inherent characteristics of competition, influence and self-confidence which are involved behind making a successful social life especially with human society is presented. The characteristics of dynamic leadership and dynamic logical neighbors along with experienced self capability are taken as fundamental social factors to define the growth of individual and in result of whole society. For each entity of a society, characteristics and affect of these three factors are not being constant for whole life span, rather than function of time and present status. To define this dynamic characteristic under a social life, in ASBO, help of self-adaptive mutation strategy is opted. To establish the applicability of proposed method various benchmark optimization problems are taken to obtain the global solutions. Performance comparison between ASBO and various variation of PSO, which is another well established optimization method based on swarm social behavior, is also

presented. Proposed method is simple, more generalized and free from parameters setting in working and very efficient from performance perspectives to achieve the global solution”.

The abstract given in [2] is shown below as it is:

“This paper is dedicated to everyone who is interested in the Artificial Intelligence. John Henry Holland proposed Genetic Algorithm in the early 1970s. Ant Colony Optimization was proposed by Marco Dorigo in 1992. Particle Swarm Optimization was introduced by Kennedy and Eberhart in 1995. Storn and Price introduced Differential Evolution in 1996. K.M. Passino introduced Bacterial Foraging Optimization Algorithm in 2002. In 2003, X.L. Li proposed

Artificial Fish Swarm Algorithm. Artificial Bee Colony algorithm was introduced by Karaboga in 2005. In the past, researchers have explored behavior of chromosomes, birds, fishes, ants, bacteria, bees and so on to create excellent optimization methods for solving complex optimization problems. In this paper, Satish Gajawada proposed The Human Optimization. Humans progressed like anything. They help each other. There are so many plus points in Humans. In fact all optimization algorithms based on other beings are created by Humans. There is so much to explore in behavior of Human for creating awesome optimization algorithms. Artificial Fishes, birds, ants, bees etc have solved optimization problems. Similarly, optimization method based on Humans is expected to solve complex problems. This paper sets the trend for all optimization algorithms that come in future based on Humans”.

The abstract given in [3] is shown below as it is:

“Particle swarm optimization (PSO) has attracted many researchers interested in dealing with various optimization problems, owing to its easy implementation, few tuned parameters, and acceptable performance. However, the algorithm is easy to trap in the local optima because of rapid losing of the population diversity. Therefore, improving the performance of PSO and decreasing the dependence on parameters are two important research hot points. In this paper, we present a human behavior-based PSO, which is called HPSO. There are two remarkable differences between PSO and HPSO. First, the global worst particle was introduced into the velocity equation of PSO, which is endowed with random weight which obeys the standard normal distribution; this strategy is conducive to trade off exploration and exploitation ability of PSO. Second, we eliminate the two acceleration coefficients c_1 and c_2 in the standard PSO (SPSO) to reduce the parameters sensitivity of solved problems. Experimental results on 28 benchmark functions, which consist of unimodal, multimodal, rotated, and shifted high-dimensional functions, demonstrate the high performance of the proposed algorithm in terms of convergence accuracy and speed with lower computation cost”.

The abstract given in [4] is shown below as it is:

“The global optimization have the very extensive applications in econometrics, science and engineering. However, the global optimization for non-convex objective functions is particularly difficult since most of the existing global optimization methods depend on the local linear search algorithms that easily traps into a local point, or the random search strategies that may frequently not produce good off-springs. According to human behavior, a one-dimensional global search method in the global optimization should adopt alternating descent and ascent (up-hill and downhill) strategies. This paper proposes the human behavior algorithms (HBA) based on alternating descent and ascent approaches along a direction or multiple different directions. Very fortunately, the proposed HBA make a global optimization method

have high possibility for finding a global minimum point. Several benchmark experiments test that our HBA are highly effective for solving some benchmark optimization problems”.

The abstract given in [5] is shown below as it is:

“Optimization techniques, especially evolutionary algorithms, have been widely used for solving various scientific and engineering optimization problems because of their flexibility and simplicity. In this paper, a novel metaheuristic optimization method, namely human behavior-based optimization (HBBO), is presented. Despite many of the optimization algorithms that use nature as the principal source of inspiration, HBBO uses the human behavior as the main source of inspiration. In this paper, first some human behaviors that are needed to understand the algorithm are discussed and after that it is shown that how it can be used for solving the practical optimization problems. HBBO is capable of solving many types of optimization problems such as high-dimensional multimodal functions, which have multiple local minima, and unimodal functions. In order to demonstrate the performance of HBBO, the proposed algorithm has been tested on a set of well-known benchmark functions and compared with other optimization algorithms. The results have been shown that this algorithm outperforms other optimization algorithms in terms of algorithm reliability, result accuracy and convergence speed”.

The abstract given in [6] is shown below as it is:

“This study proposes the Human-brain Simulated Particle Swarm Optimization (HSPSO) and its Further Improved algorithm (HSPSO-FI), in order to improve the evolutionary performance of PSO and PSO-variants. Inspired by human simulated properties, modifications proposed in this article are as follows: Firstly, accumulating historical cognition by the deep extended memory; Secondly, introducing a new learning method of cognition and a new updating strategy of velocity; Finally, defining and analyzing the "forgetting function", "forgetting factor" and "extended memory depth". Evidence from simulations indicates that the extended memory and new velocity choosing and updating strategies can give the moving direction to each particle more intelligently and help them avoid trapping into local optimum effectively, and the novel algorithms have a better performance in convergence speed and optimization accuracy on the test of several benchmark functions”.

The abstract given in [7] is shown below as it is:

“This paper presents a human cognition inspired particle swarm optimization algorithm, and is referred as Cognition Inspired Particle Swarm Optimization (CIPSO). As suggested by the human learning psychology, the particles control the cognition based on their global performance and also the social cognition does not influence one-self directly based on his current knowledge. Hence, in the proposed CIPSO, the particle with global best explores more by only using cognitive component with increasing inertia and self-cognition, where as other particles use explore and exploit using self with entire dimension selection and random social cognition with randomly selected dimensions for updating velocities. The performance of the proposed CIPSO is evaluated using 10 benchmark test functions as suggested in CEC2005 [3]. The performance is also compared with different variants of PSO algorithms reported in the literature. The results clearly indicate that human cognition inspired PSO performs better for most functions than other PSO algorithms reported in the literature”.

The abstract given in [8] is shown below as it is:

“This paper presents a human meta-cognition inspired search based optimization algorithm, referred to as a Human Meta-cognition inspired Collaborative Search algorithm for optimization problems (HMICSO). Meta-cognition enables self-regulation and collaboration for effective learning and problem solving skills. Meta-cognition has been successfully applied in machine learning algorithms for providing better solutions. Taking an inspiration from this, we present a human meta-cognition inspired, population based collaborative search algorithm for optimization problems. In this algorithm, a group of people will move in a certain direction and choose an appropriate strategy for their new direction and position to lead them towards the optimum solution. The performance of the proposed HMICSO is evaluated using 4 benchmark test functions from the CEC2005 [23] competition. The performance is also compared with other existing search based optimization algorithms reported in the literature. The results clearly indicate better performance of HMICSO algorithm over other existing search based optimization algorithms”.

The abstract given in [9] is shown below as it is:

“In this paper, we propose a new particle swarm optimization algorithm incorporating the best human learning strategies for finding the optimum solution, referred to as a Self Regulating Particle Swarm Optimization (SRPSO) algorithm. Studies in human cognitive psychology have indicated that the best planners regulate their strategies with respect to the current state and their perception of the best experiences from others. Using these ideas, we propose two learning strategies for the PSO algorithm. The first one uses a self-regulating inertia weight and the second uses the self-perception on the global search direction. The self-regulating inertia weight is employed by the best particle for better exploration and the self-perception of the global search direction is employed by the rest of the particles for intelligent exploitation of the solution space. SRPSO algorithm has been evaluated using the 25 benchmark functions from CEC2005 and a real-world problem for a radar system design. The results have been compared with six state-of-the-art PSO variants like Bare Bones PSO (BBPSO), Comprehensive Learning PSO (CLPSO), etc. The two proposed learning strategies help SRPSO to achieve faster convergence and provide better solutions in most of the problems. Further, a statistical analysis on performance evaluation of the different algorithms on CEC2005 problems indicates that SRPSO is better than other algorithms with a 95% confidence level”.

The abstract given in [10] is shown below as it is:

“This paper presents an improved version of the recently proposed Self Regulating Particle Swarm Optimization (SRPSO) algorithm referred to as improved Self Regulating Particle Swarm Optimization (iSRPSO) algorithm. In the iSRPSO algorithm, the last two least performing particles are observed with different perception and they adopt a different learning strategy for velocity update. These particles get a directional update from the best particle and the next top three better performing particles for divergence of their search directions towards better solutions. This provides direction and momentum to these least performing particles and enhances their awareness of the search space. Performance of iSRPSO has been compared with SRPSO on a unimodal and a multimodal benchmark function from CEC2005 where a significant performance improvement closer to the optimum solution has been observed. Further, the performance of iSRPSO has been investigated using both the 10D and 30D CEC2015 bound constrained single-objective computationally expensive numerical optimization problems. The performance of iSRPSO on 10D problems have been compared with both the PSO and SRPSO algorithms where the solutions of iSRPSO are closer to the true optimum value compared to the other two algorithms”.

The abstract given in [11] is shown below as it is:

“Clustering concept is a very powerful and useful technique in data mining. Various ways this can be utilized from application perspective. Clustering of similar topic from text documents is an important task in organizing information, search engine results obtaining from user query, enhancing web crawling and information retrieval. Generally partitional clustering algorithms are reported performing well on document clustering like family of k-means. In this case clustering problem can be consider as an optimization process of grouping documents into k clusters so that a particular criterion function is minimized or maximized. Existing algorithms for k-means clustering converge to different local minima based on the initializations and creation of empty clusters as a clustering solution. To solve this problem, we applied the newly developed optimization method based on human social behavior called adaptive social behavior optimization (ASBO), which contains simplicity in computational model and deliver global solution. Proposed method is compared with the result of another well established swarm social optimization method namely particle swarm optimization (PSO) and frequently applied K-means algorithm. Performance criteria is very critical in deciding the quality of clusters hence two mostly dominating criteria which are well accepted by research community, F-measure and purity of cluster evaluated with proposed results in all cases. Vector space model applied to represent the documents mathematically. Our experimental results demonstrated that our proposed methods can significantly improve the performance of document clustering in terms of accuracy and robustness without increasing the execution time much”.

The abstract given in [12] is shown below as it is:

“Despite the popularity and usability of proportional–integral-derivative (PID) controllers in industrial applications, still its auto tuning is a challenge for researchers in terms of applied algorithmic efficiency and optimal definition of performance index. With a belief, compare to other species society, at present human society is more properly organized and developed; a new optimization method based on human social behavior called adaptive social behavior optimization (ASBO) has applied in this paper to auto tune the PID controller parameters in regards to achieving the global solution. A robust fitness function as performance index has also designed to get better exploration for optimal tuning in terms of various performance parameters. Experiments have given, with a number of systems having different types of characteristics and complexity like quadrotor, automatic voltage regulator (AVR) and DC motor systems etc. To understand the relative benefits of the proposed method, performance comparison with the number of other frequently applied algorithms in literatures like Genetic algorithm (GA) and its variant called self organize genetic algorithm (SOGA), Differential Evolution (DE), an extension of probabilistic distribution based Chaotic estimation of distribution algorithms (CEDA), Chaotic optimization and Convex-Concave optimization have presented with various practically applied fitness criteria’s in practice. Proposed method of auto tuning has shown the generalized applicability for PID controller design with different types of systems in optimum manner”.

The abstract given in [13] is shown below as it is:

“The application of different engineering fields in the discovery and development of new materials, especially of new catalyst, is changing the conventional research methodology in materials science. For Heterogeneous catalysts, their catalytic activity and selectivity are dependant on chemical composition, micro structure and reaction conditions. Therefore, it is worth to do the research over the composition of

the catalyst and the reaction conditions that will boost its performance. This paper proposes a computational intelligence approach based on adaptive social behavior optimization (ASBO) for catalyst composition optimization to enhance the resulting yield or achieving objective maximal. The proposed approach is especially useful in the combinatorial catalysis optimization wherein the fitness function is unknown, in result cost and time can be drastically reduced with intelligent search method instead of applying real time chemical reaction. Challenge of handling higher dimensionality and achieving a global solution can be fulfilled by ASBO which is based on human behavior under social structure which makes human as a most successful species in nature. Two different mathematical models of the catalyst composition problem, which contains the optimal complexity and represents practical scenarios have taken to explore the quality of solution. Particle swarm optimization (PSO) which is considered as a successful heuristic method among others has also been applied to get the comparative performance analysis in detail”.

3 Conclusion

All the optimization methods which were proposed based on Artificial Humans will come under new field titled ‘Artificial Human Optimization’ which is introduced in this paper. 13 abstracts of papers which come under this new field are shown in this paper. The first paper in ‘Artificial Human Optimization’ was proposed in 2012. This paper shows how to propose a new field which has less number of papers published under it.

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CEO: Different Reviews on PhD in Artificial Intelligence

Satish Gajawada
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ABSTRACT

Thanks to everyone who helped me to reach the stage where I am now. Recently, a new optimization method, 'PhD: The Human Optimization' has been proposed in the Artificial Intelligence field. This paper gives different reviews of different experts on 'PhD' in Artificial Intelligence. The nick name of this work is 'CEO'.

Keywords: Different; Reviews; PhD; Artificial Intelligence; The Human Optimization.

1. Introduction

There are various papers in literature in which new algorithms were proposed. For example in [1] Vinayaka was proposed. But there are no papers which give several reviews of different experts for the same algorithm proposed. This paper is an attempt in this direction.

2. Different Reviews

This section gives various reviews of several experts for the recently proposed 'PhD' method in [2].

The abstract of PhD method proposed in [2] is "This paper is dedicated to everyone who is interested in the Artificial Intelligence. In the past, researchers have explored behavior of chromosomes, birds, fishes, ants, bacteria, bees and so on to create excellent optimization methods for solving complex optimization problems. The author proposed the Human Optimization in this paper. Humans progressed like anything. They help each other. There are so many plus points in Humans. In fact all optimization algorithms based on other beings are created by Humans. There is so much to explore in behavior of Human for creating awesome optimization algorithms. Artificial Fishes, birds, ants, bees etc have solved optimization problems. Similarly, optimization method based on Humans is expected to solve complex problems. This paper sets the trend for all optimization algorithms that come in future based on Humans."

A Review 1

This paper studies a so-called human optimization method which falls into the research topic of optimization. The proposed method was presented on the first page followed by some discussions. The paper clearly makes no



novel contribution to the state of the art on optimization algorithms and techniques. Thus, because of this lack of new contribution, the paper is not appropriate for the conference.

B Review 2

Based on the review of your abstract, the following editorial comments should be taken into consideration: Please submit an abstract. Change font type. Remove PhD from the title. Please follow the abstract guidelines.

C Review 3

Nothing to evaluate.

D Review 4

Funny paper, especially the notion of "love array" :)

E Review 5

This is not a research paper. It should not have been submitted for review. Rationale and results are completely lacking. I do not even think there is a research idea in there.

F Review 6

General conclusion is 'Accept without reservation'.

Further comments of the evaluator are below:

The title should be changed to be more comprehensive. The clarity and relevance of the problem is well stated. How is the problem scientifically analyzed through the text? the main propositions of the paper are crystal clear. The conclusion part should also contain more details expressing if other researches in the field support the results. The text needs to be re-considered by a native English speaker to edit the errors. It is recommended that the author adds more sources since the year 2012. the research method should be explained in more details.

G Review 7

General conclusion is 'Accept without reservation'.

Further comments of the evaluator are below:

The title is well in accord with the body of the text. The clarity and relevance of the problem is well stated. How is the problem scientifically analyzed through the text? Reasoning of main propositions are satisfying. In conclusion part, It is needed to support the result of the research by other recent researches. The English language needs little modification in abstract part. The references are good but it is recommended that the author uses more references from the recent years. The author needs to make the main goals crystal clear.

H Review 8

Paper has been ACCEPTED.

Specific behavior of the human has to be specified for the model.

Few Examples/scenarios where this could be applied has to be explained.

The time complexity of the optimization algorithm has to be demonstrated over the brute force method.

Initialization of Guidance location and generalized form of updating the guidance location/love array should be explained in detail with appropriate formula.

Paper is very abstract about the idea discussed.



I Review 9

Main advantages of the work:

1. Rather conceptual work pondering another interesting approach to optimization problem solution. Goals are clearly stated and the new algorithm is provided and explained.

Main disadvantages of the work:

1. Qualitative comparison to other optimization algorithms is not provided. Why proposed algorithm could be thought as specifically modeling human optimization is not fully explicated.
2. It is not clearly stated whether Guidance Locations and Love array are local or global, i.e. are they vectors or matrices? Seems like the latter.

Decision: this paper should be accepted for participation in the conference

J Review 10

Main advantages of the work:

1. New method for the creation of innovative optimization algorithms is proposed in the work.
2. The function Update Locations of Humans in optimization algorithm explained in depth.
3. An overview of existing works on the same topic is provided.
4. Calculations of the fitness values of guidance locations of the Human are analyzed.

Main disadvantages of the work:

1. It is not demonstrated how PhD method have been applied for solving complex optimization problems.
2. It is not clear either there are some software implementation of Human Optimization that confirm practical feasibility of the method.

Decision: this paper should be accepted for participation in the conference

K Review 11

Review 11 a: A very interesting paper.

Review 11 b: I have to admit that I had a hard time grasping the key concepts revealed in this manuscript. The author has set a very ambitious goal. But I am still searching for the elements that will make this goal a reality. The proposed algorithm is simply too abstract to be of substantial value.



Table 1. Different Review results of PhD.

| Review | Accepted/Rejected |
|-----------|-------------------|
| Review 1 | Rejected |
| Review 2 | Accepted |
| Review 3 | Rejected |
| Review 4 | Rejected |
| Review 5 | Rejected |
| Review 6 | Accepted |
| Review 7 | Accepted |
| Review 8 | Accepted |
| Review 9 | Accepted |
| Review 10 | Accepted |
| Review 11 | Accepted |

Table 1. above shows the status (accepted/rejected) of PhD in different reviews from several experts.

3. Conclusion

It has been observed from some reviews that PhD method is rejected whereas from other reviews PhD method is accepted. It can be observed from few reviews that PhD method is funny and there is no research and nothing to evaluate while from other reviews it can be observed that PhD method is innovative and interesting. Thanks to all researchers who are giving efforts in the Artificial Intelligence field.

4. REFERENCES

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POSTDOC : THE HUMAN OPTIMIZATION

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ABSTRACT

This paper is dedicated to everyone who is interested in the Artificial Intelligence. John Henry Holland proposed Genetic Algorithm in the early 1970s. Ant Colony Optimization was proposed by Marco Dorigo in 1992. Particle Swarm Optimization was introduced by Kennedy and Eberhart in 1995. Storn and Price introduced Differential Evolution in 1996. K.M. Passino introduced Bacterial Foraging Optimization Algorithm in 2002. In 2003, X.L. Li proposed Artificial Fish Swarm Algorithm. Artificial Bee Colony algorithm was introduced by Karaboga in 2005. In the past, researchers have explored behavior of chromosomes, birds, fishes, ants, bacteria, bees and so on to create excellent optimization methods for solving complex optimization problems. In this paper, Satish Gajawada proposed The Human Optimization. Humans progressed like anything. They help each other. There are so many plus points in Humans. In fact all optimization algorithms based on other beings are created by Humans. There is so much to explore in behavior of Human for creating awesome optimization algorithms. Artificial Fishes, birds, ants, bees etc have solved optimization problems. Similarly, optimization method based on Humans is expected to solve complex problems. This paper sets the trend for all optimization algorithms that come in future based on Humans.

KEYWORDS

Optimization methods, Humans, Genetic Algorithm, Particle Swarm Optimization, Differential Evolution, The Human Optimization

1. INTRODUCTION

Many optimization algorithms have been proposed in literature based on the behavior of several living beings like Birds, Ants, Fishes and so on. The proposed algorithms were applied for solving various complex optimization problems. In papers [1-4] optimization algorithms have been applied for solving clustering problem. These new algorithms are just some of several algorithms proposed by a corresponding author who is approximately 25 years young. Recently in [5] a new paradigm titled Smile Computing has been proposed. Similarly, one can find excellence (kindness, intelligence etc) of Humans all across the globe. Humans have progressed from a point of very few new algorithms every year to so many publications comprising of several new algorithms every few months. Hence there is something powerful in the way Humans live, love, help each other, motivate each other and so on with knowing or without knowing, with selflessness or with selfishness and so on. Hence in this paper The Human Optimization is proposed based on excellent beings called as Humans. Besides good features, it is also possible to mimic the features of Human which are not good. If one gets -100 as the next location at one step

of the algorithm then opt for +100 which is opposite of what we obtained by imitating bad features of Human. Hence it is possible to go in optimal direction even from the results of imitating behaviors of Human which are not good. In this way, there is scope to find optimal solution by combining strength of all the features of Humans. One can design an innovative optimization algorithm by combining bad and good behaviors of Human. It is sure that the day has come to mimic the behavior of Humans who have so many awesome features to create powerful optimization algorithms. This paper sets this trend.

2. MATERIALS AND METHODS

Projected Clustering Particle Swarm Optimization has been applied in the pre-processing step to classification in [6]. In [7], VINAYAKA was developed which comes under the category of Semi-supervised clustering methods. This method is based on Differential Evolution. Huge amount of effort has been made so far to develop optimization methods based on living beings like Ants, Bees, Birds and so on. These methods have been applied for solving complex optimization problems. But the concept of love, sacrifice, kindness of other Humans and various other things that Human experiences in his life are yet to be used for creating innovative optimization methods. This paper is an attempt in this direction. Figure 1 shows the pseudo code of proposed “The Human Optimization” method. The nick name of this algorithm is “PostDoc”. The terminology used in the proposed PostDoc method is explained after the Figure. 1.

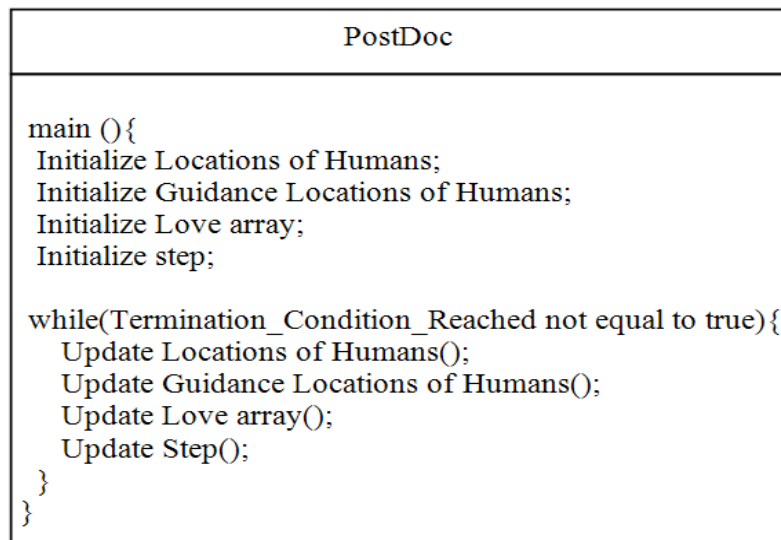


Figure 1. The Human Optimization Method (PostDoc)

2.1. Terminology

This sub-section explains the terminology used in the proposed method.

Humans: These are the entities which search for solution in the search space. These entities imitate Humans in the real world.

Location of Human: It is the location of that particular Human in search space. Hence it is a particular point in the search space.

Guidance Locations of a Human: Each Human has N guidance locations where N is the number

of Humans in the search space. N-1 guidance locations are meant for remaining N-1 Humans (one for each). The remaining one guidance location is for the Human himself. Hence each Human gets N Guidance Locations which are used to update Location of Human.

Fitness value of Human: This is the value of the fitness function at that particular location of the Human.

Fitness value of Guidance Location of Human: This is the value of fitness function at the Guidance Location of Human.

Step: This value is used while updating the locations of Humans in the search space.

Love array: Love array contains Love values. The movement of Human towards the guidance locations set by other Humans and one guidance location set by Human himself is based on these Love values in the Love array. The more the Love value the faster the Human moves towards selected Guidance Location.

3. RESULTS AND DISCUSSION

This section gives detailed discussion related to proposed method.

In the beginning all variables are initialized. The initialization is achieved by the following statements in the pseudo code:

```
Initialize Locations of Humans;
Initialize Guidance Locations of Humans;
Initialize Love array;
Initialize step;
```

In each iteration, the Locations of Humans are updated. Then Guidance Locations of Humans, Love array and Step are updated. The iteration process continues until a termination condition has been reached. The iteration part of the pseudo code is shown below:

```
while(Termination_Condition_Reached not equal to true){
    Update Locations of Humans();
    Update Guidance Locations of Humans();
    Update Love array();
    Update Step();
}
```

The function Update Locations of Humans can be implemented as explained below:

Calculate the fitness values of guidance locations of the Human. Calculate probability of particular guidance location of a Human by dividing fitness value of Guidance location with sum of fitness values of all guidance locations of that particular Human. Use Mixed Linear Congruential Random Number Generator [8] to generate uniformly distributed random numbers. Based on the probability of guidance location and random number generated, select a particular guidance location of Human. Say there are two guidance locations with probability 0.4 and 0.6. Use random number generator to generate numbers 1 to 100. If you get the random number between 1 to 40 then select first guidance location of Human else select other guidance location. The love array contains love value corresponding to the selected guidance location and the Human. The location of Human is updated as shown below:

$\text{Location} = \text{Location} + (\text{Love value}) * (\text{Step});$

Connect location of Human and Selected Guidance Location with a straight line. The Human moves towards the selected guidance location and the distance moved on this line is equal to $(\text{Love value}) * (\text{Step})$. Hence each guidance location has certain probability to be selected by the Human based on its fitness value. Once guidance location is selected, the Human moves towards the guidance location. The more the Love value between Human and Guidance Location the faster The Human moves towards the guidance Location. The same procedure is used for updating Locations of all the Humans.

The simple strategy to update Guidance Locations of Humans is to update them randomly. One more strategy is to consider all Guidance Locations of Humans as vectors in Differential Evolution and update Guidance Locations using Differential Evolution. Randomly select some values in Love array and modify Love values to imitate the fact that Love between Humans and their Guidance Locations may change with time. The Step value can be changed in Update Step function.

If there are N Humans then there will be N locations one for each Human. The idea of Guidance Locations is that each Human plays some role (either directly or indirectly) in the movement of other Human. If Human A is responsible for Human B to move to the position (20, 30) on X-Y axis search space then this feature of Humans is imitated by using Guidance Locations. Then Human A sets Guidance Location for Human B as (20, 30). If Love value between Human and particular Guidance Location is 0 then Guidance Location has no impact on the position of Human.

Each Human has N Guidance Locations. N-1 Guidance Locations are set by remaining N-1 Humans for this particular Human. The remaining Guidance Location is set by Human for himself.

The result of this paper is the design of optimization algorithm based on Humans. The strength of other optimization algorithms like Differential Evolution can be used to update Guidance Locations of Humans. Hence a unique algorithm has been designed. Giving effort in this direction might yield fruitful results.

4. CONCLUSIONS

In this paper, a new direction is opened for the creation of innovative optimization algorithms. The Human Optimization method (also known as PostDoc method) has been proposed. The concept of Love and how each Human plays role in the movement of other Humans is imitated in this method. Optimization algorithms based on other beings like birds, Ants and so on proved their strength. Hence optimization methods based on intelligent, excellent and kind Humans are expected to prove their strength like other optimization methods in literature. Implementation of PostDoc method proposed in this paper and analysis of obtained results will be part of future work.

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