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Collection of Abstracts in Artificial Human Optimization Field

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Abstract

Collection of Abstracts is a new kind of research paper where the complete focus is to show abstracts published in a particular field. Collection of Abstracts is generally published in conferences as pre-conference proceedings book and given to the authors on the day of conference. This kind of research papers give valuable information to researchers like "what are the titles? What are the abstracts? Who are the authors working in the field?". The corresponding author of this paper published a paper titled "Entrepreneur : Artificial Human Optimization" where he collected 13 abstracts and shown them as it is in an attempt to propose a new field. This work was published in Transactions on Machine Learning and artificial Intelligence. Now, "Collection of Abstracts in Artificial Human Optimization Field" is the second research paper in the entire research industry, which is completely based on Abstracts of papers. The first 2 sections of this paper shows titles and abstracts of papers in Artificial Human Optimization Field. Third section shows corrections to previous work in Artificial Human Optimization Field.

Keywords: Artificial Humans; Global Optimization Techniques; Artificial Human Optimization; Nature Inspired Computing; Bio-Inspired Computing; Artificial Intelligence; Machine Learning; Genetic Algorithms; Particle Swarm Optimization; Differential Evolution; Ant Colony Optimization

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2. Abstracts

This section shows abstracts of papers in "Artificial Human Optimization" field whose titles are shown in previous section. Following are the abstracts:

1) Human behavior-based optimization: a novel metaheuristic approach to solve complex optimization problems.
Seyed-Alireza Ahmadi

Optimization techniques, specially 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.

2) Human Behavior Algorithms for Highly Efficient Global Optimization.
Da-Zheng Feng, Han-Zhe Feng and Hai-Qin Zhang

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 down hill) 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.

3) Human Behavior-Based Particle Swarm Optimization
Hao Liu, Gang Xu, Gui-yan Ding, and Yu-bo Sun

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 c1 and c2 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.

4) POSTDOC : THE HUMAN OPTIMIZATION
Satish Gajawada

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.

5) Focus Group: An Optimization Algorithm Inspired by Human Behavior
Edris Fattahi, Mahdi Bidar, Hamidreza Rashidy Kanan

This paper presents a novel optimization algorithm, namely focus group (FG) algorithm, for solving optimization problems. The proposed algorithm is inspired by the behavior of group members to share their ideas (solutions) about a specific subject and trying to improve the solutions based on the cooperation and discussion. In the proposed algorithm, all the members present their solutions about the subject and all the suggested solutions proportional to their fitness, leave impact on the other solutions and incline them towards themselves. While trying to improve the quality of the candidate solutions, they converge to the optimal solution. To improve the performance of the proposed algorithm, two genetic operators are incorporated into the algorithm. The proposed algorithm is evaluated using several constrained and unconstrained benchmark functions commonly used in the area of optimization. Experimental results, in comparison with different well-known evolutionary techniques, confirm the high performance of the proposed algorithm in dealing with the

optimization problems.

6) ENTREPRENEUR : Artificial Human Optimization
Satish Gajawada

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'.

7) Modification of particle swarm optimization with human simulated property
Ruo-Li Tang, Yan-Jun Fang

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.

8) Human cognition inspired particle swarm optimization algorithm
Muhammad Rizwan Tanweer, Suresh Sundaram

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.

9) Human-inspired algorithms for continuous function optimization
L. M. Zhang, C. Dahlmann and Y. Zhang

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.

10) Anarchic Society Optimization: A human-inspired method
A. Ahmadi-Javid

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.

11) The Human-Inspired Algorithm: A Hybrid Nature-Inspired Approach to Optimizing Continuous Functions with Constraints
Mingyi Zhang, Luna; Zhang, Yanqing

The novel Human-Inspired Algorithm (HIA) uses a searching strategy based on people's intelligence to effectively find maximum or near maximum values of a continuous function with constraints. Initially, HIA evenly distributes points in equal subspaces of the whole search space and finds an elite subspace with the largest sum of function values. HIA uses the Genetic Algorithm (GA) to generate multiple sites from the elite subspace and the whole space and creates a hypercube with the best site as its center. HIA iteratively searches the hypercube and the whole space to generate a smaller elite hypercube until a termination criterion is met. Three popular benchmark problems in recent publications (such as IEEE Transactions on Evolutionary Computation and IEEE Transactions on Systems, Man, Cybernetics) and two popular benchmark problems at 2005 IEEE Congress on Evolutionary Computation are used for performance evaluation. HIA finds optimal solutions to the 5 benchmark problems. Under various conditions (population sizes, numbers of loops, and execution times), sufficient simulations indicate that HIA is more effective and more efficient than GA and the Bees Algorithm (BA). In the future, HIA will be improved, and a new HIA for discrete function optimization will be developed.

12) CEO: Different Reviews on PhD in Artificial Intelligence
Satish Gajawada

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

13) Artificial Human Optimization – An Introduction
Satish Gajawada

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

14) An Ocean of Opportunities in Artificial Human Optimization Field
Satish Gajawada

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.

15) 25 Reviews on Artificial Human Optimization Field for the First Time in Research Industry
Satish Gajawada

The author proposed a new field titled "Artificial Human Optimization" in December 2016 [1]. He authored the following five articles in Artificial Human Optimization field:
1) Entrepreneur: Artificial Human Optimization. Transactions on Machine Learning and Artificial Intelligence, Volume 4 No 6 December (2016); pp: 64-70 [1]. 2) "CEO: Different Reviews on PhD in Artificial Intelligence", Global Journal of Advanced Research, vol. 1, no.2, pp. 155-158, 2014 [2]. 3) "POSTDOC : The Human Optimization", Computer Science & Information Technology (CS & IT), CSCP, pp. 183-187, 2013 [3]. 4) "Artificial Human Optimization – An Introduction", Transactions on Machine Learning and Artificial Intelligence, Volume 6, No 2, pp: 1-9, April 2018 [4]. 5) "An Ocean of Opportunities in Artificial Human Optimization Field", Transactions on Machine Learning and Artificial Intelligence, Volume 6, No 3, June 2018 [5].

The complete reviews of all the above papers are shown in this paper for the first time in Research Industry. This paper is a new kind of research paper where the focus is completely on the reviews obtained for a particular new field. This work is the extension of work in [2]. Similar to this paper, the article [2] is completely focused on reviews obtained. The difference between article [2] and this paper lies in the fact that in this paper reviews are shown for all the papers of the author in Artificial Human Optimization field whereas article [2] shows reviews of single paper in Artificial Human optimization field.

16) A New Optimization Method Based on Adaptive Social Behavior: ASBO
Manoj Kumar Singh

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.

17) Human meta-cognition inspired collaborative search algorithm for optimization
M. R. Tanweer, S. Suresh, N. Sundararajan

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.

18) Self regulating particle swarm optimization algorithm
M.R. Tanweer, S. Suresh, N. Sundararajan

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.

19) Improved SRPSO algorithm for solving CEC 2015 computationally expensive numerical optimization problems
M. R. Tanweer, S. Suresh, N. Sundararajan

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.

20) Clustering of Text Document based on ASBO
Prakasha S, H R Shashidhar, Manoj Kumar Singh, G T Raju

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.

21) PID Controller Auto tuning using ASBO Technique
Sridhar N, Nagaraj Ramrao, Manoj Kumar Singh

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.

22) ASBO Based Compositional in Combinatorial Catalyst
Devika P. D, Dinesh P. A, Rama Krishna Prasad, Manoj Kumar Singh

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.

23) Seeker Optimization Algorithm
Chaohua Dai, Yunfang Zhu, Weirong Chen

A novel swarm intelligence paradigm called seeker optimization algorithm (SOA) for the real-parameter

optimization is proposed in this paper. The SOA is based on the concept of simulating the act of humans' intelligent search with their memory, experience, and uncertainty reasoning. In this sense, the individual of this population is called seeker or searcher just from which the new algorithm' name is derived. After given start point, search direction, search radius, and trust degree, every seeker moves to a new position (next solution) based on his social learning, cognitive learning, and uncertainty reasoning. The algorithm's performance was studied using several typically complex functions. In almost all cases studied, SOA is superior to continuous genetic algorithm (GA) and particle swarm optimization (PSO) in all optimization quality, robustness and efficiency.

24) Teaching–learning-based optimization: A novel method for constrained mechanical design optimization problems
R.V.Rao, V.J.Savsani, D.P.Vakharia

A new efficient optimization method, called 'Teaching–Learning-Based Optimization (TLBO)', is proposed in this paper for the optimization of mechanical design problems. This method works on the effect of influence of a teacher on learners. Like other nature-inspired algorithms, TLBO is also a population-based method and uses a population of solutions to proceed to the global solution. The population is considered as a group of learners or a class of learners. The process of TLBO is divided into two parts: the first part consists of the 'Teacher Phase' and the second part consists of the 'Learner Phase'. 'Teacher Phase' means learning from the teacher and 'Learner Phase' means learning by the interaction between learners. The basic philosophy of the TLBO method is explained in detail. To check the effectiveness of the method it is tested on five different constrained benchmark test functions with different characteristics, four different benchmark mechanical design problems and six mechanical design optimization problems which have real world applications. The effectiveness of the TLBO method is compared with the other population-based optimization algorithms based on the best solution, average solution, convergence rate and computational effort. Results show that TLBO is more effective and efficient than the other optimization methods for the mechanical design optimization problems considered. This novel optimization method can be easily extended to other engineering design optimization problems.

25) Imperialist competitive algorithm: An algorithm for optimization inspired by imperialistic competition
Esmaeil Atashpaz-Gargari; Caro Lucas

This paper proposes an algorithm for optimization inspired by the imperialistic competition. Like other evolutionary ones, the proposed algorithm starts with an initial population. Population individuals called country are in two types: colonies and imperialists that all together form some empires. Imperialistic competition among these empires forms the basis of the proposed evolutionary algorithm. During this competition, weak empires collapse and powerful ones take possession of their colonies. Imperialistic competition hopefully converges to a state in which there exist only one empire and its colonies are in the same position and have the same cost as the imperialist. Applying the proposed algorithm to some of benchmark cost functions, shows its ability in dealing with different types of optimization problems.

26) Group Counseling Optimization: A Novel Approach
M. A. Eita, M. M. Fahmy

A new population-based search algorithm, which we call Group Counseling Optimizer (GCO), is presented. It mimics the group counseling behavior of humans in solving their problems. The algorithm

is tested using seven known benchmark functions: Sphere, Rosenbrock, Griewank, Rastrigin, Ackley, Weierstrass, and Schwefel functions. A comparison is made with the recently published comprehensive learning particle swarm optimizer (CLPSO). The results demonstrate the efficiency and robustness of the proposed algorithm.

27) A Simple Human Learning Optimization Algorithm
Ling Wang, Haoqi Ni, Ruixin Yang, Minrui Fei, Wei Ye

This paper presents a novel Simple Human Learning Optimization (SHLO) algorithm, which is inspired by human learning mechanisms. Three learning operators are developed to generate new solutions and search for the optima by mimicking the learning behaviors of human. The 0-1 knapsack problems are adopted as benchmark problems to validate the performance of SHLO, and the results are compared with those of binary particle swarm optimization (BPSO), modified binary differential evolution (MBDE), binary fruit fly optimization algorithm (bFOA) and adaptive binary harmony search algorithm (ABHS). The experimental results demonstrate that SHLO significantly outperforms BPSO, MBDE, bFOA and ABHS. Considering the ease of implementation and the excellence of global search ability, SHLO is a promising optimization tool.

28) A novel optimization algorithm inspired by the creative thinking process
Xiang Feng, Ru Zou, Huiqun Yu

Creative thinking, which plays an essential role in the progress of human society, has an outstanding problem-solving ability. This paper presents a novel creativity-oriented optimization model (COOM) and algorithm (COOA) inspired by the creative thinking process. At first, COOM is constructed by simplifying the procedure of creative thinking while retaining its main characteristics. And then, COOA is presented for continuous optimization problems. It is a realization of COOM. As a new nature-inspired algorithm, COOA is different from other similar algorithms in terms of the basic principle, mathematical formalization and properties. Features of the COOM and the corresponding algorithm include a powerful processing ability for the complex problems, namely high-dimensional, highly nonlinear and random problems. The proposed approach also has the advantages in terms of the higher intelligence, effectiveness, parallelism and lower computation complexity. The properties of COOA, including convergence and parallelism, are discussed in detail. The numerous simulations on the CEC-2013 real-parameter optimization benchmark functions' problems have shown the effectiveness and parallelism of the proposed approach.

29) Immigrant Population Search Algorithm for Solving Constrained Optimization Problems
Hamid Reza Kamali, Ahmad Sadegheih, Mohammad Ali Vahdat-Zad, Hassan Khademi-Zare

This article introduces the Immigrant Population Search Algorithm (IPSA) inspired by the pattern of human population migration to find better habitats. The algorithm is viewed as a new optimization method for solving constrained optimization problems, and it belongs to the set of population-based algorithms that are proposed for combinatorial optimization. In this algorithm, the life environment is the solution space of the problem. Every point of this space is a solution for the problem, which may be feasible or infeasible, and the quality of life at that point is the value of fitness function for that solution. Each population group tries to investigate feasible and better habitats. In other words, it tries to optimize the problem. After the algorithm steps are described, the efficiency of the algorithm is compared to that of three other metaheuristic algorithms that are used to optimize some mathematic problems. The results show that the proposed algorithm performs better than the other three methods.

30) Democracy-inspired particle swarm optimizer with the concept of peer groups
Ritambhar Burman, Soumyadeep Chakrabarti, Swagatam Das

This article proposes to integrate the concept of governance in human society with the nature-inspired particle swarm optimization (PSO) algorithm. A population-based iterative global optimization algorithm, called Democracy-inspired particle swarm optimization with the concept of peer groups (DPG-PSO) has been developed for solving multidimensional, non-linear, non-convex, and multimodal optimization problems by exploiting the concept of the new peer-influenced topology. Here the particles, each of which model a candidate solution of the problem under consideration, are given a choice to follow two possible leaders who have been selected on the basis of a voting mechanism. The leader and the opposition have their influences proportional to the total number of votes polled in their favor. A detailed empirical study comprising tuning of DPG-PSO parameters and its optimizing mechanism has been presented in the paper. The algorithm is tested in a standard benchmark suite consisting of unimodal, multimodal, shifted and rotated functions. DPG-PSO is found to statistically outperform seven other well-known PSO variants in terms of final accuracy and robustness over majority of the test cases, thus, proving itself as an efficient algorithm.

31) Social Emotional Optimization Algorithm for Nonlinear Constrained Optimization Problems
Yuechun Xu, Zhihua Cui, Jianchao Zeng

Nonlinear programming problem is one important branch in operational research, and has been successfully applied to various real-life problems. In this paper, a new approach called Social emotional optimization algorithm (SEOA) is used to solve this problem which is a new swarm intelligent technique by simulating the human behavior guided by emotion. Simulation results show that the social emotional optimization algorithm proposed in this paper is effective and efficiency for the nonlinear constrained programming problems.

32) Human opinion dynamics: An inspiration to solve complex optimization problems
Rishemjit Kaur, Ritesh Kumar, Amol P. Bhondekar and Pawan Kapur

Human interactions give rise to the formation of different kinds of opinions in a society. The study of formations and dynamics of opinions has been one of the most important areas in social physics. The opinion dynamics and associated social structure leads to decision making or so called opinion consensus. Opinion formation is a process of collective intelligence evolving from the integrative tendencies of social influence with the disintegrative effects of individualisation, and therefore could be exploited for developing search strategies. Here, we demonstrate that human opinion dynamics can be utilised to solve complex mathematical optimization problems. The results have been compared with a standard algorithm inspired from bird flocking behaviour and the comparison proves the efficacy of the proposed approach in general. Our investigation may open new avenues towards understanding the collective decision making.

3. Corrections to previous work in Artificial Human Optimization Field

According to article [13] it was given that the first paper in the field was proposed in 2009. But the first paper in this new field was proposed in 2006 [23]. This is the small correction to the previous work in Artificial Human Optimization Field.

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