IES 2018 (author)

| Submission 18 | IES 2018 | News | EasyChair |

IES 2018 Submission 18

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Paper 18	
Title:	Novelty Search-based Bat Algorithm: Adjusting Distance among Solutions for Multimodal Optimization
Paper:	📁 (Nov 18, 06:14 GMT)
Author keywords:	swarm intelligence bat algorithm novelty search multimodal function
EasyChair keyphrases:	novelty search based bat (140), population size (140), search based bat algorithm (140), local optimum (130), search mechanism (120), global optimum (100), many local optimum (95), found peak (90), rastrigin function (70), novelty search (70), pulse emission rate (63), pulse rate ri (63), bat algorithm (60), uniform random (50), solution xloc (50), peak ratio (50), multimodal function (50), multimodal optimization (50), population size increase (47), griewank function (40), global search (40), solution update (40), convergence speed (40), fitness value (40), sparse area (40)
Abstract:	This paper proposes the novelty search-based bat algorithm (NSBA), which aims to search new solutions which have not yet searched to find as many local optima as possible in multimodal optimization. In detail, this paper focuses on bat algorithm (BA) which copes with the trade-off between exploration and exploitation in the process of the solution search and extends it by introducing novelty search for keeping the distance among solutions. Through simulations of the comparisons between NSBA and BA in the test-bed multimodal functions, the following implications have been revealed: (1) NSBA finds more number of local optima than BA in both Griewank and Rastrigin Functions; (2) the number of local optima in NSBA increases as the number of populations increases, while that in BA does not change even though the number of populations increases in both functions.
Submitted:	Oct 12, 14:44 GMT
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Reviews

Review 1

Overall evaluation:

3: (strong accept)
This paper proposes a metaheuristic solution called NSBA for global search.
Compared with the standard BA model, NSBA shows that it is an excellent solution as a global search by deaccelerating the convergence speed of the local solution. In addition, this paper discusses very interesting arguments such as not being able to completely prevent convergence to the best solution.

The following is a comment.

1. Please clarify your claim whether the result of this paper improved the search of the problem that the BA model is not good, or the improvement of BA was performed for any global search problems.

Review 2

Overall evaluation:

0: (borderline paper)
The authors propose a novel bat algorithm implemented with novelty search.
The algorithm is compared with the original bat algorithm on Griewank and Rastrigin functions. The results seem good, however, it is only compared with the original one. I think it is not surprising because your algorithm has been tuned to solve those kinds of problems on the functions. Lots of novelty search have been proposed so far. It should be compared with them. The description of the method is not clear for me. The questions are as follows. Please modify the descriptions to make them clear in the revised version.

> 4th line from the top in the left column on page 2
> bat i flies to the target (the bat which finds the best solution.)

Firstly, it should be clear what variables or parameters the bats have.
It looks the bat has the position and the current best solution in the solution space. I am not sure if they are different or just same. Actually the sentence says the bat changes the position to the bat's position that finds the best solution. However, the equations (1)-(3) and descriptions say that they are approaching to the global best solution. I am bit confused.

"In eq. (6)" at the middle of the same column.
(6) would be (4).

all equations in section "Bat Algorithm" and "Proposed Algorithm"
I think it would be better to describe the equations and descriptions based on the multiple dimensions.

Line 7 from the top in the left on page 3

where ....
Incomplete sentence.

At the beginning of Section "Proposed method"
The sparseness is defined but the value does not appear later even in the proposed method. Why do the author define this? The value is not used in the proposed method?