GE LOCAL COMMENTS

# Reviewer 1

## 1. Comment

The technique of simulated annealing is inadequately described, despite being quite critical to the paper's whole concept. A clear description of simulated annealing would be extremely helpful.

## Response

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## 2. Comment

There are many tables of numbers in the results section, and they can be difficult to interpret. Perhaps some comments on those numbers, pointing out what is notable and important, combined with shading or emphasis of specific areas of the tables, would help the reader to interpret them.

## Response

## 3. Comment

Some of the graphs are also a bit hard to read. In particular, when the points are all clustered in one area as in Figure 4, it can be hard to read. The authors might consider whether a zoomed-in view of the denser part of the plot, or a log scale on the Y axis, could be a useful additional view for the reader.

## Response

## 4. Comment

The authors might also consider whether some kind of graphical representations might help the readers to understand the problems and the solutions they are discussing. In many papers on optimization, example functions of two variables are shown as 3D surfaces, enabling readers to visualize issues such as local minima, the progress of algorithms as they approach optimality, and similar issues. As this is often done as I said, they may be able to find some existing figures for which they could obtain permission to include in the paper, as opposed to doing the work to make up their own.

## Response

## 5. Comment

Please ensure that all acronyms are defined at the time of first usage. As an example, the acronym BNF is used in the introduction without having been previously defined. There are also some spelling/typing errors, such as on the X axis of Figure 3, where a letter is omitted from the word "Classification". In addition, there are a few places where the grammar is slightly awkward.

## Response

Done.

The paper has been checked using the freeely available tools of ispell and grammar check.

# Reviewer 2

## 1. Comment

In fact, this study belongs to a very classic research domain: neural architecture search. In this field, numerous studies have utilized metaheuristic algorithms to optimize parameters of neural networks. However, the literature review in this study is not comprehensive.

## Response

**(LITERATURE REVIEW ON Neural Network Construction)**

## 2. Comment

The author has employed a hybrid of genetic algorithms and simulated annealing mechanisms, both of which are quite classical. The choice of these two algorithms needs further explanation. Additionally, the combination of algorithms is a well-established technique to overcome local optima issues. Therefore, the author needs to devote more space to elucidating the innovative aspects of this approach.

## Response

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## 3. Comment

Although there is an improvement in performance with the author's method, metaheuristic algorithms are known to be highly computationally intensive. Therefore, it is necessary for the author to provide an analysis of time complexity or a comparative account of actual computation times to ensure that the performance gains justify the computational costs.

## Response

**(TIME COMPLEXITY)**

## 4. Comment

The machine learning algorithms used by the author are too classic, which might reduce the credibility of the proposed technique's applicability to new neural networks. The author needs to offer more discussion on this aspect.

## Response

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# Reviewer 3

## 1. Comment

Since the authors propose a new optimization technique (i.e., an extension of the conventional Grammatical Evolution approach), the technique should also be tested on (a) benchmark optimization problems/test functions for optimization or (b) real-world optimization problems.

## Response

## 2. Comment

Please include comparative analysis on the execution time taken by the proposed approach versus the conventional approach.

## Response

## 3. Comment

Please include discussions on the potential for the proposed technique to be employed for multi-objective, multi-constraint, nonlinear, nonconvex  problems as well as problems with noisy/uncertain decision parameters.

## Response

## 4. Comment

Please include justifications on the reason for using simulated annealing and not other evolutionary techniques - e.g. genetic algorithm, differential evolution, swarm-based optimizer,..., etc.

## Response

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## 5. Comment

Please include limitations of the proposed approach (i.e., trade-offs compared with conventional techniques).

## Response

## 6. Comment

Please check and correct overall quality of English in the manuscript - e.g. correct 'In current work...' in the abstract.

## Response

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