

UPDATES

Paper Title : **A New Metric for the Analysis of Swarms using Potential Fields**
Original Manuscript ID : **Access-2018-10071**
Resubmitted following update : **Access-2018-16728**

Reviewer(s)' Comments to Author:

Reviewer: 1

Recommendation: Reject (update and resubmit encouraged)

Comments:

Detailed suggestions/comments:

1. There are quite a few language misuse cases (e.g, lines 40-44 and 51-57 of introduction, 28-29 of introduction, 2nd column, section VI, lines 42-43 etc.) The authors are urged to give a careful pass to the text in terms of grammar/syntax/language.

Response :

Previous submission had grammatical errors due to it being an early edit. A machine synchronisation failure resulted in the wrong version being submitted.

Actions:

Paper proof read and corrected grammatically.

2. The contributions are limited. It is recommended that more analysis in terms of comparing the two metrics is provided, for example, by applying it to more cases other than the filling one. There are quite a few suggestions in the future works section. The reviewer feels that with a bit more analysis of the suggested metric and a more involved comparison, a better publication would result.

Response:

Context and application of the metric have been revised and improved to highlight the difference in the metrics approach to measuring the changes in a swarm.

Actions:

Paper introduction updated to highlight application.

Application section now highlights the use of metric and the difference between magnitude-based and distance-based metrics.

The related work section highlights the research into magnitude-based analysis and where this metric fits within that research.

The paper now clarifies that the new metric is not an algorithm but a metric that is applied to algorithms that use field effects to coordinate a swarm.

Future work section highlights that the new metric should be capable of analysing algorithms that change the field effects of swarms and is the subject of additional research.

Additional Questions:

Does the paper contribute to the body of knowledge?: The paper's contribution to the body of knowledge is, to the reviewer's opinion, limited. Although an interesting metric is proposed, more properties of the metric and a more in depth analysis could better highlight its significance.

Response:

New section of Related Work added.

Actions:

*Highlights the limited amount of previous work in the area of magnitude based analysis of swarms.
Clarifies the types of metrics currently used.
Highlights the work being built upon.*

Is the paper technically sound?: The paper appears to be technically sound.

Is the subject matter presented in a comprehensive manner?: The subject is presented in a decent way. There is logical flow in the paper although it feels that the paper is incomplete. More details are offered below.

Are the references provided applicable and sufficient?: The references are applicable, and to a degree ok in terms of quantity, however, it feels that the paper would benefit from a dedicated related works section where more relevant researches are discussed (there is plenty of space for that).

Response:

Agreed. Previous work needs to be highlighted more clearly.

Actions:

New section of Related Work added.

Reviewer: 2

Recommendation: Reject (do not encourage resubmit)

Comments:

In this paper, the authors mainly examine "distance between agents" metric and introduce an entirely new metric based upon the magnitude of the cohesion and repulsion vectors between agents. In comparing and contrasting the two metrics, they find that the cohesion/repulsion metric offers a number of advantages over the distance metric.

It is very hard to understand their main contribution and uniqueness.

Response:

Contributions and uniqueness are now highlighted throughout.

Actions:

Revised introduction highlighting the contribution.

Related Work section highlights current dependency on distance-based metrics.

Uniqueness highlighted in the application section showing how the new metric can be used. Additional potential applications highlighted in the Future work section.

Besides, there is no comparison with other popular algorithms.

Response:

Context of the metric has been emphasised.

Actions:

Paper title changed to reflect the metrics application to algorithms more appropriately.

Introduction updated to highlight the purpose of the metric.

Clarification: The new metric is not an algorithm but a mechanism to analyse the effects of algorithms.

Additional Questions:

Does the paper contribute to the body of knowledge?: Yes.

Response:

We are a little confused. The feedback states that the paper contributes to the body of knowledge but then states it is not technically sound (see below).

Is the paper technically sound?: No.

Response:

The technical aspects of the paper are sound. There is limited amount of research into metrics to measure the global configuration of a swarm. Most of the research is in the area of coordination, reconnaissance and foraging etc. This paper focuses on measuring the effects of modelling algorithms by using them as an "input" to a metric. A previous comment eludes to an issue of comparison to algorithms. This paper is about a metric to analyse algorithms and it is compared to a distance metric which is its closest comparison.

Is the subject matter presented in a comprehensive manner?: No.

Response :

Reviewer 1 thought the paper was presented reasonably. However as stated above the previous submission had grammatical errors due to it being an early edit. A machine synchronisation failure resulted in the wrong version being submitted.

Actions:

Paper proof read and corrected grammatically.

Are the references provided applicable and sufficient?: Yes.