

Interactive comment on “Multi-objective entropy evolutionary algorithm for marine oil spill detection using cosmo-skymed satellite data” by M. Marghany

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This is an interesting application of remote sensing data. Some of the described algorithms hold promise, but some other aspects of this work require significant improvements. For example, even though the work is entitled as being "multi-objective" in reality several objectives have been lumped together to form a single objective which is minimised. This and several other concerns related to referencing of actual authors are highlighted below. These issues should be addressed before the work is accepted. Specific comments are below:

In section 2.1, the authors state that entropy is due to Harmancioglu (1981). This

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is incorrect. Concept of entropy evolves with Carnot and Boltzmann. The entropy in information sense (which is used by the authors) is due to Shannon. This entire section should be carefully re-written and placed in the proper context of authors who have actually developed the fundamental notion.

Similarly, multi-objective optimisation cannot be associated with Coello et al. (2002). There are quite a few other authors whose work on multi-objective optimisation precedes Coello. For example,

Ching-Lai Hwang; Abu Syed Md Masud (1979). Multiple objective decision making, methods and applications: a state-of-the-art survey. Springer-Verlag. ISBN 978-0-387-09111-2.

Kaisa Miettinen (1999). Nonlinear Multiobjective Optimization. Springer. ISBN 978-0-7923-8278-2.

In context of evolutionary algorithms, the main reference would be:

Kalyanmoy Deb (2001), Multi-Objective Optimization Using Evolutionary Algorithms, Wiley

This is very important, since in this section the authors also seem to be claiming that Marghany (2014b) and Gunawan (2004) have introduced main optimisation concepts in multi-objective sense, which is obviously not the case. I would suggest that author carefully reviews this section and recognise the original authors.

Furthermore, for benefit of other researchers on Ocean Sciences, it could make sense to identify and refer to work of other researchers who have been dealing with entropy and chaotic signals in oceanography. This particularly concerns work of Sannasiraj, such as Enhancing tidal prediction accuracy in a deterministic model using chaos theory, *Advances in water resources* 27 (7), 761-77, 2004.

On page 1273, authors explain that he is combining all objectives into single objective. The author describes that weights are chosen randomly and objectives

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added. This is sub-optimal procedure. In turn, the most widely accepted multi-objective algorithm in evolutionary computing is so-called non-dominated sorting Genetic Algorithm. See for example, A fast elitist non-dominated sorting genetic algorithm for multi-objective optimization: NSGA-II K Deb, S Agrawal, A Pratap (2000) - <http://repository.ias.ac.in/83498/>

This is state-of-the-art algorithm with numerous open source freely available implementations that would as a result provide full Pareto front. I would suggest author to explore performance of NSGA instead of relying on de-facto single objective description of the problem.

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