## CORRECTION



# Correction: Web service location-allocation using discrete NSGA-II with matrix based genetic operations and a repair mechanism

Shanu Verma<sup>1</sup> • Millie Pant<sup>1,2</sup> • Vaclav Snasel<sup>3</sup>

Published online: 29 November 2023

© The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature 2023

Correction: Journal of Ambient Intelligence and Humanized Computing (2023) 14:14163–14187 https://doi.org/10.1007/s12652-023-04625-6

In the original publication of the article, Fig. 6 was published incorrectly and has been corrected with as follows:

#### **Incorrect diagram**

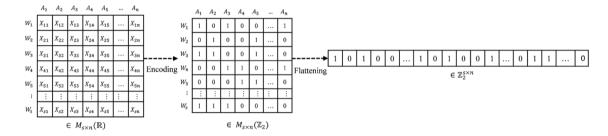


Fig. 6 Chromosome representation for BMOPSOCD, BMOGWOCD and BMOWOCD

The original article can be found online at https://doi.org/10.1007/s12652-023-04625-6.

Millie Pant pant.milli@as.iitr.ac.in

Shanu Verma sverma@as.iitr.ac.in

Vaclav Snasel vaclav.snasel@vsb.cz

- Department of Applied Mathematics and Scientific Computing, Indian Institute of Technology Roorkee, Roorkee 247667, India
- <sup>2</sup> Centre for Artificial Intelligence and Data Science, Indian Institute of Technology Roorkee, Roorkee 247667, India
- Department of Computer Science, VSB-Technical University of Ostrava, 70800 Ostrava, Czech Republic



798 S. Verma et al.

#### Revised diagram

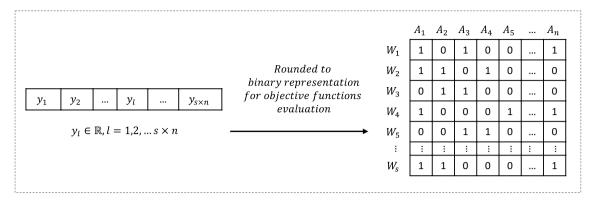


Fig. 6 Continuous representation for BMOPSOCD, BMOGWOCD and BMOWOCD

Additionally, there were minor typographical errors in Sect. 4.2 related to Fig. 6 and have been corrected as below:

#### **Incorrect Sect. 4.2:**

### 4.2 Other algorithms

The proposed NSGA-II variants are compared with BMOPSOCD [state-of-the-art algorithm in the literature for WSLAP (Tan et al. 2021)] and multi-objective versions of GWO (Mirjalili et al. 2014) and whale optimizer (Oloieri and Diac 2021). BMOPSOCD is the best available metaheuristic for WSLAP, which has a novel chromosome encoding procedure to convert the real coding of PSO to binary encoding, as shown in Fig. 6, and a fixed-sized external archive to store the non-dominated solutions. The diversity among the population members is maintained using the crowding distance mechanism.

The pseudocodes used for coding the multi-objective versions of GWO and whale optimizer are similar to BMOP-SOCD. These algorithms are also integrated with an external archive and use the crowding distance mechanism to maintain the population diversity. The chromosome encoding, initialization, and dominance criteria are also the same as BMOPSOCD. Therefore, we have used a similar naming convention as BMOPSOCD and named them 'BMOGWOCD' and 'BMOWOCD'.

# Corrected Sect. 4.2 4.2 Other algorithms

The proposed NSGA-II variants are compared with BMOPSOCD [state-of-the-art algorithm in the literature for WSLAP (Tan et al. 2021)] and multi-objective versions of GWO (Mirjalili et al. 2014) and whale optimizer (Oloieri and Diac 2021). BMOPSOCD is the best available metaheuristic for WSLAP, which has a novel rounding procedure to convert the real representation of PSO to binary representation, as shown in Fig. 6, and a fixed-sized external archive to store the non-dominated solutions. The diversity among the population members is maintained using the crowding distance mechanism.

The pseudocodes used for coding the multi-objective versions of GWO and whale optimizer are similar to BMOP-SOCD. These algorithms are also integrated with an external archive and use the crowding distance mechanism to maintain the population diversity. The rounding procedure, initialization, and dominance criteria are also the same as BMOPSOCD. Therefore, we have used a similar naming convention as BMOPSOCD and named them 'BMOGWOCD' and 'BMOWOCD'.

The original article has been corrected.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

