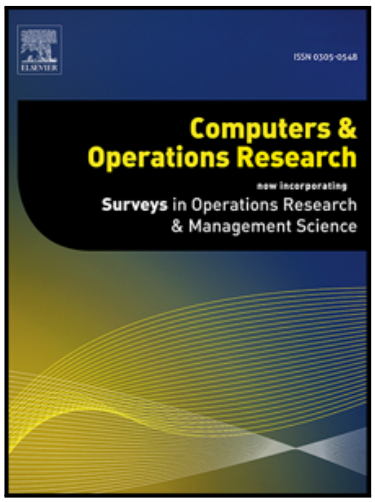

Data driven hybrid evolutionary analytical approach for multi objective location allocation decisions: Automotive green supply chain empirical evidence

Ian Shivraj Doolun , S.G. Ponnambalam ,
Nachiappan Subramanian , Kanagaraj G

PII: S0305-0548(18)30008-X
DOI: 10.1016/j.cor.2018.01.008
Reference: CAOR 4391

To appear in: *Computers and Operations Research*

Received date: 16 March 2017
Revised date: 14 December 2017
Accepted date: 9 January 2018

Please cite this article as: Ian Shivraj Doolun , S.G. Ponnambalam , Nachiappan Subramanian , Kanagaraj G , Data driven hybrid evolutionary analytical approach for multi objective location allocation decisions: Automotive green supply chain empirical evidence, *Computers and Operations Research* (2018), doi: 10.1016/j.cor.2018.01.008

Data driven hybrid evolutionary analytical approach for multi objective location allocation decisions: Automotive green supply chain empirical evidence

Ian Shivraj Doolun[a], S. G. Ponnambalam[b], Nachiappan Subramanian[c] , Kanagaraj G[d]

[a] Dematic Pty Ltd, 24 Narabang Way, Belrose, NSW 2085, Australia. idoolun90.id@gmail.com

[b] School of Engineering, Monash University Malaysia, 47500 Bandar Sunway, Malaysia. sgponnambalam@monash.com

[c] School of Business Management and Economics, University of Sussex, Falmer, Brighton BN19SL, United Kingdom, N.Subramanian@sussex.ac.uk

[d] Department of Mechatronics Engineering, Thiagarajar College of Engineering, Madurai – 625015, India, gkmech@tce.edu

Abstract

The strategic location of manufacturing plants and warehouses and the allocation of resources to the various stages of a supply chain using big data is of paramount importance in the era of internet of things. A multi-objective mathematical model is formulated in this paper to solve a location-allocation problem in a multi-echelon supply chain network to optimize three objectives simultaneously such as minimization of total supply chain cost (TSCC), maximization of fill rate and minimization of CO_2 emissions. Data driven hybrid evolutionary analytical approach is proposed by integrating Non-Dominated Sorting Genetic Algorithm-II (NSGA-II) to handle multiple objectives into Differential Evolution (DE) algorithm. Five variants of the hybrid algorithm are evaluated in addition to comparing the performance with the existing Multi-Objective Hybrid Particle Swarm Optimization (MOHPSO) algorithm. Extensive computational experiments confirm the superiority of the proposed Data driven hybrid evolutionary analytical approach over the existing MOHPSO algorithm. This study identifies a specific variant that is capable of producing the best solution in a higher order simulated instances and complex realistic scenario such as an automotive electronic parts supply chain in Malaysia.

Keywords: Location-Allocation Decision, Supply Chain Network, Multi-objective Differential Evolution, Big Data.