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| Title | Solving the maximum cut problem using Harris Hawk Optimization algorithm | | |
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| Abstract |  |

The objective of the max-cut problem is to cut any graph in such a way that the total weight of the edges that are cut off is maximum in both subsets of vertices that are divided due to the cut of the edges. Although it is an elementary graph partitioning problem, it is one of the most challenging combinatorial optimization-based problems, and tons of application areas make this problem highly admissible. Due to its admissibility, the problem is solved using the Harris Hawk Optimization algorithm (HHO). Though HHO effectively solved some engineering optimization problems, is sensitive to parameter settings and may converge slowly, potentially getting trapped in local optima. Thus, HHO and some additional operators are used to solve the max-cut problem. Crossover and refinement operators are used to modify the fitness of the hawk in such a way that they can provide precise results. A mutation mechanism along with an adjustment operator has improvised the outcome obtained from the updated hawk. To accept the potential result, the acceptance criterion has been used, and then the repair operator is applied in the proposed approach. The proposed system provided comparatively better outcomes on the G-set dataset than other state-of-the-art algorithms. It obtained 533 cuts more than the discrete cuckoo search algorithm in 9 instances, 1036 cuts more than PSO-EDA in 14 instances, and 1021 cuts more than TSHEA in 9 instances. But for four instances, the cuts are lower than PSO-EDA and TSHEA. Besides, the statistical significance has also been tested using the Wilcoxon signed rank test to provide proof of the superior performance of the proposed method. In terms of solution quality, MC-HHO can produce outcomes that are quite competitive when compared to other related state-of-theart algorithms.