

# **Chaotic gaining sharing knowledge-based optimization algorithm: an improved metaheuristic algorithm for feature selection**

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## **Abstract-**

The gaining sharing knowledge based optimization algorithm (GSK) is recently developed metaheuristic algorithm, which is based on how humans acquire and share knowledge during their life-time. This paper investigates a modified version of the GSK algorithm to find the best feature subsets. Firstly, it represents a binary variant of GSK algorithm by employing a probability estimation operator (Bi-GSK) on the two main pillars of GSK algorithm. And then, the chaotic maps are used to enhance the performance of the proposed algorithm. Ten different types of chaotic maps are considered to adapt the parameters of the GSK algorithm that make a proper balance between exploration and exploitation and save the algorithm from premature convergence. To check the performance of proposed approaches of GSK algorithm, twenty-one benchmark datasets are taken from the UCI repository for feature selection. The performance is measured by calculating different type of measures, and several metaheuristic algorithms are adopted to compare the obtained results. The results indicate that Chebyshev chaotic map shows the best result among all chaotic maps which improve the performance accuracy and convergence rate of the original algorithm. Moreover, it outperforms the other metaheuristic algorithms in terms of efficiency, fitness value and the minimum number of selected features.

**Index Terms-** Feature selection · Chaotic maps · Gaining sharing knowledge-based optimization algorithm · Chaos theory · Binary variables

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