Abstract

The clustering problem under the criterion of minimum sum of squares is a non-convex and non-linear program, which possesses many locally optimal values, resulting that its solution often being stuck at locally optimal solution. The purpose of this research is introducing an efficient and effective clustering method based on genetic, Tabu-search and K-means algorithms clustering problem. In order to overcome local optima problem, many studies have been done in clustering but in this research we introduce new mutation operator for the proposed hybrid genetic algorithm for the clustering problem. In the proposed method instead of using the mutation operator randomly in the whole solution space, Tabu-Search is used in a limited region, so better solution will be achieved. The key idea of proposed Tabu-Search is to produce tabu space for escaping from trap of local optima and finding better solution. We compared proposed algorithm with other algorithms in clustering such as Genetic algorithm (GA), Tabu-Search (TS) and particle swarm optimization (PSO) by implementing them on seven standard datasets and two simulated datasets. We also compared results of new algorithm with other researcher's results in clustering the standard datasets. Our finding shows that the proposed algorithm works better than others do. Finally, regarding the fact that passenger train delays is one of the worries of the Islamic Republic of Iran's railway and this delays decrease people's trust to this transportation mode and so increase costs for railway, we clustered passenger train delays with using proposed algorithm and analyzed it's results. Then rules was drawn out from passenger train delays dataset with using decision tree.