

Enhanced Feature Selection Algorithm Using Ant Colony Optimization and Fuzzy Memberships

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:ABSTRACT

Feature selection is an indispensable pre-processing step when mining huge datasets that can significantly improve the overall system performance. This paper presents a novel feature selection method that utilizes both the Ant Colony Optimization (ACO) and fuzzy memberships. The algorithm estimates the local importance of subsets of features, i.e., their pheromone intensities by utilizing fuzzy c-means (FCM) clustering technique. In order to prove the effectiveness of the proposed method, a comparison with another powerful ACO based feature selection algorithm that utilizes the Mutual Information (MI) concept is presented. The method is tested on two biosignals driven applications: Brain Computer Interface (BCI), and prosthetic devices control with myoelectric signals (MES). A linear discriminant analysis (LDA) classifier is used to measure the performance of the selected subsets in both applications. Practical experiments prove that the new algorithm can be as accurate as the original method with MI, but with a significant reduction in computational cost, especially when dealing with huge datasets