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Feature Selection via Modified Gravitational Optimization Algorithm NOOSHIN NABIZADEH, NIGEL JOHN, University of Miami — Feature selection is the process of selecting a subset of relevant and most informative features, which efficiently represents the input data. We proposed a feature selection algorithm based on n-dimensional gravitational optimization algorithm (NGOA), which is based on the principle of gravitational fields. The objective function of optimization algorithm is a non-linear function of variables, which are called masses and defined based on extracted features. The forces between the masses as well as their new locations are calculated using the value of the objective function and the values of masses. We extracted variety of features applying different wavelet transforms and statistical methods on FLAIR and T1-weighted MR brain images. There are two classes of normal and abnormal tissues. Extracted features are divided into groups of five features. The best feature is selected in each group using N-dimensional gravitational optimization algorithm and support vector machine classifier. Then the selected features from each group make several groups of five features again and so on till desired number of features is selected. The advantage of NGOA algorithm is that the possibility of being drawn into a local optimal solution is very low. The experimental results show that our method outperforms some standard feature selection algorithms on both real-data and simulated brain tumor data.

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