

Particle swarm stepwise (PaSS) algorithm for variable selection

Ray-Bing Chen^{1*} (陳瑞彬), Chien-Chih Huang² and Weichung Wang²

¹Department of Statistics, National Cheng Kung University

²Department of Mathematics, National Taiwan University

Abstract

A new stochastic search algorithm is proposed for information criterion variable selection problems. The proposed algorithm integrates the stochastic stepwise selection approach with the particle swarm optimization, and is named as particle swarm stepwise algorithm. The key idea of the proposed algorithm is to search the best model for a pre-specified information criterion by quickly exploring the candidate model space from multiple start models and sharing the search information among all individual search paths. In addition to directly solve the information criterion variable selection problems, the proposed algorithm can also be used to generate the variable selection ensembles. Several examples are used to demonstrate the performances of our proposed algorithm.

Keywords: information criterion, L_0 regularization, parallel computing, variable selection ensemble