

Abstract

Bayesian Networks is one of the methods to model a probabilistical relationship discussed in Probabilistic Graphical Models. Bayesian Networks is constructed upon nodes and edges, the nodes is the representation of the random variables of the problem, and the edges is the representation of direct influence or dependency relationship between nodes. On a simple problem, the structure of a Bayesian Networks usually determined by an expert judgment or simply human intuition, problem arises when the problem is no longer simple and consists of so many nodes and edges combination possibilities. This research will try to construct an optimal Bayesian Networks structure using Novel Modified Binary Differential Evolution without the help from expert judgment or human intuition. Novel Modified Binary Differential Evolution is a binary discrete optimization problem algorithm with a binary chromosome representation, this algorithm is a further development of the standard Differential Evolution, because the former Differential Evolution is only able to work on a continuous optimization problem. When tested upon Alarm, Asia, Carpo, Insurance, and Water data set, the resulting BDeu score for each data set is -1973.77, -243.68, -2450.54, -2024.17, and -1621.90 respectively.

Keyword : *Bayesian Networks, Structure Learning, Novel Modified Binary Differential Evolution, Differential Evolution*