Detection of Financial Statement Fraud Using Evolutionary Algorithms

Abstract

In this paper, a fuzzy rule-based classifier (FRBC) system was developed and used in two Evolutionary Algorithm Models to detect patterns of financial statement fraud and assess the effectiveness of a subset of SAS No. 99 red flag variables. Each FRBC was evolved by using Generic Algorithm (GA) and MARLEDA – a modern estimation of distribution algorithm (EDA) – and trained with a data collection of both Accounting and Auditing Enforcement Release (AAER)-cited corporations and matched, non-cited corporations. The quality of each FRBC was measured in terms of its classification accuracy and complexity. Using cross-validation, MARLEDA and GA yielded training classification accuracy rates of 69.53 and 62.10 percent, respectively, and validation accuracy rates of 53.05 percent and 59 percent, respectively. Finally, six red flags were considered to hold the most promise in detecting patterns of fraud.

Keywords: estimation of distribution algorithm; fuzzy rule-based classifier; fraud detection; SAS No. 99.; AAER; evolutionary algorithm