

Learning Ensemble Classification Method for Supplier Assessment

Ramkumar Harikrishnakumar

Faculty: Dr. Krishna Krishnan, Dr. Saideep Nannapaneni

Department of Industrial and Manufacturing Engineering, College of Engineering

In the current era of the global supply chain, integration of information technology and acceleration of competitiveness are necessary for an effective supply chain management (SCM). The SCM is considered as a competitive strategy that integrates suppliers and customers with the aim of improving the flexibility and responsiveness of the organization. Supplier assessment plays a significant role in accomplishing the strategic goals of the organization. Identification of the appropriate suppliers improves the corporate competitiveness and decision makers believe that the supplier assessment is the most crucial activity of the purchasing department. In today's world of uncertain customer preferences, fluctuating market demands, and new procurement policies, demand a quick and comprehensive supplier assessment process for all the organizations. Hence, supplier assessment is one of the most crucial steps during the procurement stage.

In this paper, supplier assessment play a critical role in the supply chain management, which involves flow of goods and services from the initial stage (raw material procurement) to the final stage (delivery). Supplier assessment is a multi-criteria decision making approach that requires several criteria for the proper assessment of the suppliers. When there are several criteria involved, it makes the supplier assessment process more complicated. For a comprehensive and robust assessment process, we propose machine-learning algorithms to classify various suppliers into four categories: excellent, good, satisfactory, and unsatisfactory. In this paper, machine learning algorithms (especially classification algorithms) are applied for a supplier assessment problem where a model is trained based on the previous historical data and then tested on the new a previously unseen data set. However, the classification algorithm used in this paper helps to analyze the potential suppliers that are considered for the organization. This work concentrates on supplier assessment process by applying machine learning algorithms for model building, which is then used for decision-making regarding supplier selection. This method will provide an efficient way for supplier assessment that is more effective (in terms of accuracy and time). Machine learning techniques that include bagging and boosting methods are used to create various ensemble classifiers from training data, and their performance is measured using test data. Finally, we theorize a method to analyze the supplier performance by utilizing data analytics in SCM.