ABSTRACT

Supply Chain Management (SCM) plays an important role in coordinating the flow of materials from source to destination. SCM depends on many external factors like SCM of other companies that are involved in supplying raw materials and many internal factors like working conditions of machines, working facilities and availability of in-process materials during manufacturing of products. Any disruption in supply chain leads to increase in time for delivery of finished products to the customers.

This research work focuses on monitoring and estimating the Supply Chain Disruption (SCD) in the fastener/ automobile/ paper production industries by using Fuzzy Inference System (FIS). Inorder to increase the performance of the FIS, the parameters of the FIS are modified by using Artificial Neural Network (ANN) algorithms like Back Propagation Algorithm (BPA), Radial Basis Function (RBF), Echo State Neural Network (ESNN) and Cerebellar Model Articulation Controller (CMAC).

The supply chain data have been collected from fastener/ automobile/ paper production industries. Inorder to train and test the implemented algorithms, additional data have been simulated by employing Matlab®2015 software. The data have been separated into training set and testing set. The values of the data are 1 and 0 and are the codified from the information collected from fastener/ automobile/ paper production industries. The collection of the data is based on various information like (I) the non-working status of the machines, (II) non-availability of the processing materials, and (III) non-working of different personnel responsible for completing a given production target.
The implemented algorithms estimate the status of the SCD even if there is partial loss of data or if a fewer inputs are given with slight changes. The algorithms learn a huge amount of patterns obtained from the factories for estimating the SCD. They provide new directions for the actual usage of neuro-fuzzy methods in SCD supply estimation. In addition, the research comprises of the facility location problems including hypothetical problems. Also, the proposed algorithms are tested and compared with supply network problems.