

Pattern recognition for bivariate process mean shifts using feature-based artificial neural network

Abstract:

In multivariate quality control, the artificial neural networks (ANN)-based pattern recognition schemes generally performed better for monitoring bivariate process mean shifts and provided more efficient information for diagnosing the source variable(s) compared to the traditional multivariate statistical process control charting. However, these schemes revealed disadvantages in term of reference bivariate patterns in identifying the joint effect and excess false alarms in identifying stable process condition. In this study, feature-based ANN scheme was investigated for recognizing bivariate correlated patterns. Feature-based input representation was utilized into an ANN training and testing towards strengthening discrimination capability between bivariate normal and bivariate mean shift patterns. Besides indicating an effective diagnosis capability in dealing with low correlation bivariate patterns, the proposed scheme promotes a smaller network size and better monitoring capability as compared to the raw data-based ANN scheme.