Simultaneous Monitoring of Correlated Multivariate Linear and GLM based Regression Profiles in Phase II

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In some applications, quality of a process or product is characterized by correlated multivariate linear and generalized linear models (GLM) based regression profiles. Monitoring these profiles separately leads to misleading results because the correlation structure among the multivariate linear and GLM profiles is neglected. In this paper, we specifically concentrate on Phase II and propose two procedures for monitoring multivariate linear and GLM based regression profiles. The performance of the proposed methods is evaluated under different magnitudes of shifts in the regression parameters in terms of average run length (ARL) criterion through simulation studies. The results of simulation studies show the superior performance of the proposed methods rather than monitoring the multivariate linear and GLM profiles separately. Finally, the application of the proposed methods is illustrated through a real case in producing air conditioner in Iran.

Keywords: Multivariate Linear Profile; Generalized Linear Model (GLM); Phase II; Average run length (ARL).

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A New Memory-Type Monitoring Technique for Count Data

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When it is of interest the monitoring of a high-yield process or a health-related process, the considered quality characteristic cannot always be conveniently represented numerically. In such cases, the common practice is to classify each inspected item (or unit) as either conforming or non-conforming, according to the specifications of that quality characteristic. Therefore, for the monitoring of such processes, attributes control charts like the np or the c charts are used. These charts are known to be insensitive in the detection of small and moderate shifts in the parameter(s) under surveillance. A solution to this problem is to incorporate information from the past observations and use, instead of Shewhart-type charts, control charts with memory, such as the exponentially weighted moving average (EWMA) chart.

However, when the observed data are discrete, by applying the classical EWMA control chart for attributes, the values of the EWMA chart statistic are not in-