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Assignment 2#

LITERATURE REVIEW SUMMARY PLATFORM

TITLE: Projections and the U2 multivariate control chart

AUTHOR: George C. Runger

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TOPIC: Providing a new multivariate control chart which is more sensitivity than chi-square chart for assignable causes.

SUMMARY: Multivariate control charts such as Chi-square charts, CUSUM, and EWMA are used for mean shift detection. They are of importance since they can help us the detect the unusual assignable cause while it is usual in univariate control chart. Furthermore, projection pave the way for understanding the situations when an assignable cause causes the another or shift the mean vector into a specific subspace. In order to obviate the dimensionality problem, the method of principal components analysis is provided. Another approach can be just considering a limited number of the variables. There are different approaches to reduce the dimensionality, including subspace approach and sensitized control chart. But none of these approaches are suitable when a subset of variables is affected by an assignable cause. Or in more general case when s shift in means of some variables cause a shift in others. U^2 chart is designed to detect a shift in the mean vector of a subset of the variables. For example, Hawkins method which constituted of observing each variable in an individual control chart. This method has some problems when there is a correlation or an assignable cause shifts more than one variable. The author believes the important advantage of their method is that the dimensionality is reduced without affecting no centrality, so we can use noncentral chi-square tables with different degrees of freedom.

METHOD SELECTION:

WHAT: Using both projections and U2 multivariate.

WHY:

- Simplifies the construction of multivariate control scheme
- More sensitive to the under consideration assignable cause
- Simplify the understanding of multivariate control chart
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PRO/CON:

- ***Pro:*** Simplifies the construction of multivariate control scheme.
- ***Pro:*** More sensitive to the under consideration assignable cause.
- ***Pro:*** Simplify the understanding of multivariate control chart.
- ***Con:*** a number of assignable cause should be considered in advance.
- ***Con:*** you have to know some sense about the relationship between assignable cause s and variables and the correlation of those.
- ***Con:*** it is sensitive to specific assignable cause