

Nonparametric Statistical Process Control Charts for High Dimensional Data

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Control charts are popular statistical process control tools and have been widely used to monitor data streams from manufacturing processes to detect abnormal variations of the process. The advances in computing and data acquisition technologies have made the collection of large number of data streams a routine practice in many manufacturing processes. How to efficiently monitor such high dimensional data remains a challenge in statistical process control research. So far most of the proposed control charts were developed under a specific distributional assumption, typically the normality assumption. As the applications of control charts continue to become more diverse, the need to specify the distributional assumptions will greatly limit the potential of those control charts. In this talk, I will introduce a novel nonparametric control chart for simultaneously monitoring large number of data streams. The proposed control chart is easy to implement and is shown to be efficient to detect process changes in a variety of simulation settings.

Key words: Average run length, change-point detection, false discovery rate, sequential detection.