Machine Learning Enabled Quality Improvement in Smart Manufacturing Systems

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Abstract

In a smart manufacturing system, a large number of sensors are installed to monitor machine status, process variables, product quality, and the overall system performance. It is always a challenging problem on how to analyze those massive amounts of data effectively for cost reduction and quality improvements in all manufacturing companies. This presentation will discuss research opportunities, challenges, and advancements in this important research area, especially how machine learning concepts and algorithms can be used to solve challenging quality improvement problems. Examples of ongoing research projects will be used to articulate the frontiers of this research area. All examples come from real data and problem in industrial production systems. This presentation will emphasize the motivations of these research undertakings: challenges to be overcome, new methods that were developed, validation/implementation undertook, as well as the potential impacts.