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Enhancing Quality in Industry 4.0: A Data-Centric Approach to Lean Six Sigma

Saarthak Chawla
Student, Department of Computer Science,
Dronacharya College of Engineering, Gurgaon, India

Abstract: *Nearly all methods aimed at improving quality rely on the collection and analysis of data to address quality issues. The fusion of six sigma and lean manufacturing results in lean six sigma methodology, which targets achieving six sigma quality levels (less than 3.4 defects per million) by minimizing variations and inefficiencies in processes. Attaining this objective hinge on meticulous data collection to tackle quality challenges.*

While many conventional data analysis techniques are applicable for enhancing product and process quality, the advent of Industry 4.0 technologies generates vast datasets that necessitate robust data analysis methods to derive actionable insights from big data. Employing these analysis methods throughout the lean six sigma cycles, particularly during the measurement and analysis phases, is crucial for making informed decisions.

This study aims to offer a comprehensive guide for implementing lean six sigma to expedite decision-making processes, enhance reliability, and foster satisfaction through data utilization. It not only enhances manufacturing processes by reducing lead times and delivering superior quality products but also facilitates effective decision-making through various mining techniques..

Keywords: Lean Six Sigma, Data Analysis, Efficiency, Quality

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