

SCALABLE SOLUTIONS FOR DETECTING STATISTICAL DRIFT IN MANUFACTURING PIPELINES

Smita Raghavendra Bhat¹, Priyank Mohan², Phanindra Kumar³, Niharika Singh⁴, Prof. (Dr) Punit Goel⁵ & Om Goel⁶

¹University of Southern California, LA, US

²Scholar, Seattle University, Dwarka, New Delhi, India

³Kankanampati, Binghamton University, USA

⁴ABES Engineering College Ghaziabad, India

⁵Maharaja Agrasen Himalayan Garhwal University, Uttarakhand, India

⁶ABES Engineering College Ghaziabad, India

ABSTRACT

In modern manufacturing environments, maintaining product quality and operational efficiency is paramount. Statistical drift in manufacturing pipelines poses significant challenges, potentially leading to increased defects and reduced yield. This study explores scalable solutions for detecting statistical drift, leveraging advanced analytics and machine learning techniques. By implementing robust monitoring frameworks, manufacturers can identify deviations from expected patterns in real-time, enabling prompt corrective actions. The research discusses the integration of statistical process control (SPC) with machine learning algorithms to enhance predictive capabilities. Key methodologies, such as control charts and anomaly detection models, are examined for their effectiveness in identifying shifts in process behavior. The findings highlight the importance of real-time data collection and analysis, suggesting that a proactive approach to drift detection not only mitigates risks but also contributes to overall productivity and cost-effectiveness. Ultimately, this study provides a comprehensive overview of scalable solutions that empower manufacturers to adapt to dynamic operational conditions, ensuring consistent product quality and operational excellence.

KEYWORDS: *Statistical Drift, Manufacturing Pipelines, Quality Control, Machine Learning, Anomaly Detection, Real-Time Monitoring, Predictive Analytics*

Article History

Received: 10 Nov 2022 | Revised: 12 Nov 2022 | Accepted: 18 Nov 2022
