Real-Time Inventory Management and Operational Efficiency in Manufacturing

Authors : Tom Wanyama

Abstract : We have developed a weight-based parts inventory monitoring system utilizing the Industrial Internet of Things (IIoT) to enhance operational efficiencies in manufacturing. The system addresses various challenges, including eliminating downtimes caused by stock-outs, preventing human errors in parts delivery and product assembly, and minimizing motion waste by reducing unnecessary worker movements. The system incorporates custom QR codes for simplified inventory tracking and retrieval processes. The generated data serves a dual purpose by enabling real-time optimization of parts flow within manufacturing facilities and facilitating retroactive optimization of stock levels for informed decision-making in inventory management. The pilot implementation at SEPT Learning Factory successfully eradicated data entry errors, optimized parts delivery, and minimized workstation downtimes, resulting in a remarkable increase of over 10% in overall equipment efficiency across all workstations. Leveraging the IIoT features, the system seamlessly integrates information into the process control system, contributing to the enhancement of product quality. This approach underscores the importance of effective tracking of parts inventory in manufacturing to achieve transparency, improved inventory control, and overall profitability. In the broader context, our inventory monitoring system aligns with the evolving focus on optimizing supply chains and maintaining well-managed warehouses to ensure maximum efficiency in the manufacturing industry.

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