Transforming Healthcare Supply Chains: AI-Powered Predictions Meets APEX Integrations and Visualization

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Abstract

Efficient supply-chain management (SCM) is critical to ensuring the timely delivery of medical equipment, vaccines, and pharmaceuticals in healthcare organizations. This paper presents a predictive SCM framework that integrates machine-learning models with Oracle Application Express (APEX) dashboards to provide real-time visibility and forecasting for medical supplies. Historical procurement data, seasonal demand patterns, and live inventory feeds are processed using gradient-boosting and recurrent neural networks to anticipate stock-outs, overstocking, and lead-time disruptions. APEX serves as the low-code orchestration layer, offering configurable dashboards, drill-down analytics, and role-based alerts for supply managers and clinicians. The architecture supports RESTful connectivity to enterprise resource planning (ERP) and warehouse management systems while enforcing strict data security and access controls. A case study across multiple health care centers, community centers and hospital units demonstrates improved forecasting accuracy, reduced emergency orders, and optimized working capital. The proposed approach highlights how combining AI prediction models with a rapid-development platform can transform medical SCM into a proactive, resilient capability, particularly during crises such as pandemics or global shipping delays.

Keywords

AI Forecasting, Oracle APEX, Supply chain management (SCM), healthcare logistics, predictive analytics, medical inventory, gradient boosting, recurrent neural networks, RESTful APIs, low-code dashboards.