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The Future of AI enabled Medical Device Engineering: Integrating Predictive Analytics, Regulatory Automation, and Intelligent Manufacturing

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The integration of Artificial Intelligence (AI) in medical device engineering is revolutionizing the healthcare industry by enhancing predictive analytics, regulatory automation, and intelligent manufacturing. AI-driven predictive analytics enables early fault detection, real-time performance monitoring, and proactive maintenance, ensuring the reliability and efficiency of medical devices. Additionally, regulatory automation powered by AI streamlines compliance processes by continuously monitoring evolving standards and automating documentation, reducing time-to-market for new medical technologies. In manufacturing, intelligent AI-driven automation optimizes production workflows, enhances quality control, and minimizes defects, leading to more precise and cost-effective medical device production. This paper explores the transformative potential of AI-enabled medical device engineering, highlighting its impact on device safety, efficiency, and scalability, while also addressing challenges such as data privacy, regulatory hurdles, and ethical considerations. The future of AI in medical device engineering promises smarter, safer, and more adaptive technologies that improve patient outcomes and revolutionize the healthcare landscape.