

## Revolutionizing Project Management: A Comprehensive Review of Artificial Intelligence and Machine Learning Applications for Smarter Project Execution

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**Abstract :** The integration of artificial intelligence (AI) and machine learning (ML) into project management is transforming how engineering projects are executed, monitored, and controlled. This paper provides a comprehensive survey of AI and ML applications in project management, systematically categorizing their use in key areas such as project data analytics, monitoring, tracking, scheduling, and reporting. As project management becomes increasingly data-driven, AI and ML offer powerful tools for improving decision-making, optimizing resource allocation, and predicting risks, leading to enhanced project outcomes. The review highlights recent research that demonstrates the ability of AI and ML to automate routine tasks, provide predictive insights, and support dynamic decision-making, which in turn increases project efficiency and reduces the likelihood of costly delays. This paper also examines the emerging trends and future opportunities in AI-driven project management, such as the growing emphasis on transparency, ethical governance, and data privacy concerns. The research suggests that AI and ML will continue to shape the future of project management by driving further automation and offering intelligent solutions for real-time project control. Additionally, the review underscores the need for ongoing innovation and the development of governance frameworks to ensure responsible AI deployment in project management. The significance of this review lies in its comprehensive analysis of AI and ML's current contributions to project management, providing valuable insights for both researchers and practitioners. By offering a structured overview of AI applications across various project phases, this paper serves as a guide for the adoption of intelligent systems, helping organizations achieve greater efficiency, adaptability, and resilience in an increasingly complex project management landscape.

**Keywords :** artificial intelligence, decision support systems, machine learning, project management, resource optimization, risk prediction

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