

# Next-Gen Smart E-Learning and Assessment Portal Using ML

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**Abstract:** *This paper presents the design and implementation of a next generation learning management system (LMS) that leverages advanced emerging technologies to provide a secure, automated and interactive digital education environment. The proposed system streamlines course enrolment and allows for real-time tracking of learner progress and offers biometric attendance verification. When learners complete assessment tasks, they receive digitally signed certificates stored on a blockchain, which provides an authentication that is not tamper-proof. The administration dashboard provides fast and efficient course management and performance reporting tools, while a GPT-4-powered chatbot helps the learner interact with the system in real-time. Advanced machine learning algorithms allow adaptive learning paths to be determined; predictive analytics identify students with advanced learning problems early enough to improve their performance and offer proactive remediation. Natural language processing enhances user interaction and real-time automated assessments reduce administrative costs and inefficiencies. A scalable data-driven solution with a mission to enable digital education to fulfill the real-world needs of modern learners and institutions, is showcased in this paper.*

**Keywords:** Learning Management System (LMS), Artificial Intelligence (AI), Machine Learning (ML), Generative Pre-trained Transformer 4 (GPT-4), Blockchain, Facial Recognition, AI Chatbot, Adaptive Learning, Predictive Analytics, Blockchain Certification, Digital Certification, Real-Time Monitoring, Automated Testing, Course Enrolment Automation

