

AI-Driven Risk Prediction in Software Development Environment

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Software development projects are constantly carried out in circumstances that are highly unexpected and dynamic. Unpredictability caused by frequent demand changes, shifting responsibilities, and delivery schedule concerns can all have a negative impact on the process. The implementation of traditional risk management approaches can be quite challenging, and in many situations, manual processes rely on periodic assessments. This research aims to establish machine learning as a unique approach for prediction and decision-making in software project management, with the goal of overcoming the limits of existing methods. The research was built on a thorough collection and investigation of past project data. Before evaluating several machine learning algorithms on structured project datasets, the data was thoroughly preprocessed and feature extracted. XGBoost was the most effective model, capturing the complicated non-linear relationships between many project variables and identifying risk indicators. The model achieved 83.54% accuracy, 84.19% precision, 83.54% recall, and a low F1-score of 79.49%, indicating that it is an acceptable option for predictive risk analysis in real-world applications. The data from the current project, which was used in short-term live validation findings, show that the model can detect high-risk processes faster than manual evaluation approaches. This allows project managers to take rapid action, such as altering resource allocation, revising task orders, and addressing developing difficulties. The study states that using machine learning techniques improves the accuracy, speed, and reliability of software project risk assessment while also transforming current project management practices through large-scale data-driven advancements and the integration of intelligent, automated monitoring systems.

Keywords: *Machine Learning, Predictive Analytics, Project Risk Management, Risk Prediction.*