

Enhancing Project Performance Forecasting using Machine Learning Techniques

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Abstract : Accurate forecasting of project performance metrics is crucial for successfully managing and delivering urban road reconstruction projects. Traditional methods often rely on static baseline plans and fail to consider the dynamic nature of project progress and external factors. This research proposes a machine learning-based approach to forecast project performance metrics, such as cost variance and earned value, for each Work Breakdown Structure (WBS) category in an urban road reconstruction project. The proposed model utilizes time series forecasting techniques, including Autoregressive Integrated Moving Average (ARIMA) and Long Short-Term Memory (LSTM) networks, to predict future performance based on historical data and project progress. The model also incorporates external factors, such as weather patterns and resource availability, as features to enhance the accuracy of forecasts. By applying the predictive power of machine learning, the performance forecasting model enables proactive identification of potential deviations from the baseline plan, which allows project managers to take timely corrective actions. The research aims to validate the effectiveness of the proposed approach using a case study of an urban road reconstruction project, comparing the model's forecasts with actual project performance data. The findings of this research contribute to the advancement of project management practices in the construction industry, offering a data-driven solution for improving project performance monitoring and control.

Keywords : project performance forecasting, machine learning, time series forecasting, cost variance, earned value management

Conference Title : ICAIT 2024 : International Conference on Artificial Intelligence and Technology

Conference Location : Ottawa, Canada

Conference Dates : July 11-12, 2024