IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 5, March 2025

ML Driven Predictive Maintenance and Life Span Detection for Bridges

Krushna Kishor Patil, Shubham Sunil Dawange, Sudarshan Sanjay Gangurde, Prajwal Gokul Hire
Guru Gobind Singh Polytechnic , Nashik, Maharashtra, India

Abstract: *Ensuring the longevity and safety of bridge infrastructure is vital for public safety, efficient transportation, reducing incidents, and maintaining economic stability. This paper introduces an innovative software model that predicts the durability, remaining lifespan, and required maintenance of bridges by leveraging cutting-edge technologies such as computer vision, Internet of Things (IoT) sensors, and machine learning algorithms.*

The software aims to mitigate the risk of bridge failures by employing an assessment system that integrates historical data with real-time inputs. Through the use of computer vision and non-destructive testing methods, the system identifies structural issues. Machine learning algorithms then analyze environmental conditions and traffic patterns to evaluate the bridge's durability.

The proposed system efficiently operates through four main phases: user interaction, historical data analysis, real-time data collection, and predictive analysis. These phases collectively generate a comprehensive report on the bridge's condition, providing proactive solutions for maintenance challenges through the intelligent application of machine learning algorithms. Ultimately, this software model not only enhances the preventive maintenance of bridges but also promotes informed decision-making and resource allocation by relevant authorities. By continuously monitoring and analysing bridge conditions, the system ensures timely actions and extends the lifespan of critical infrastructure, thereby contributing to overall public safety and economic stability.

Keywords: Predictive Maintenance, Machine Learning, Computer Vision, Internet of Things (IoT), Non-Destructive Testing, Life Span Assessment, Real- Time Monitoring