

AI-Based Risk Management and Progress Tracking System

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Abstract

This research investigates an innovative Artificial Intelligence (AI) based Risk Management and Progress Tracking System for delivering occupational safety and efficiency improvements throughout industries. This Integrated AI system employs Machine Learning to analyze data contained in a structured risk assessment process to identify potential hazards, assign risk score values to measured potential hazards, and provide mitigation strategies that align with established regulations such as the NIST AI Risk Management Framework and the hierarchy of controls.

Through this system, a real-time dashboard enables users to track risk mitigation and accountability, allowing for continual monitoring of risk management throughout the entire project life cycle.

An empirical validation of the AI based Risk Management and Progress Tracking System was tested over 78 situations that occurred in the Construction, Healthcare, Financial Services and IT industries. As a result, the overall prediction accuracy was approximately 92.7% and repeatability was approximately 94% confirming consistency and reliability in the development of risk assessment outputs.

In comparison to conventional methodologies, the AI-based risk management system produced nearly an 88% decrease in the time necessary for conducting risk assessments due to the automated process resulting in improved efficiency and speed of decision-making. Additionally, the standardized process for identifying potential risks and the associated mitigation recommendations provided by the AI-based risk management system will minimize the level of human error and the variability of the risk assessment output.

The research highlights how AI-based tools can transform traditional risk management approaches by providing quicker, data-driven, and scalable alternatives. The system is performing well; however, there are still important factors for wider use of this solution, including model transparency, regulatory requirements, and integration with current processes. Overall, the research provides an excellent contribution to the development of intelligent safety management systems that can be applied in real-world industrial applications.

Keywords

Artificial intelligence, risk management, machine learning, occupational safety, automation.