ABSTRACT

Rockfall incidents in open pit mines pose serious risks to worker safety, equipment, and production efficiency. Traditional monitoring methods often rely on manual observation and delayed data analysis, leading to limited prediction accuracy. This project proposes an AI-based Rockfall Prediction and Alert System that utilizes sensor data, computer vision, and machine learning techniques to predict potential rockfall events in real time. The system collects data from sources such as ground vibration sensors, slope stability radars, and surveillance cameras. Using AI models trained on historical and real-time datasets, it identifies early warning signs like micro-movements or stress variations in rock formations. When abnormal patterns are detected, the system triggers immediate alerts through an automated notification network to ensure timely evacuation and preventive action. This intelligent monitoring solution enhances safety, minimizes downtime, and supports sustainable mining operations by enabling proactive hazard management.