

PROXIMA: Proactive Occupancy Risk Management Interface

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Abstract: *PROXIMA: Proactive Occupancy Risk Management Interface is an AI-powered solution designed to enhance safety and efficiency in monitoring crowds in confined spaces. Traditional crowd monitoring methods rely on manual CCTV surveillance, which is prone to human error, slow response times, and limited predictive capabilities. This project leverages machine learning algorithms, particularly YOLOv4 for object detection and Deep SORT for tracking, to provide real-time crowd analysis and anomaly detection.*

The system captures video feeds from CCTV cameras, processes them using AI models, and predicts potential overcrowding or unusual movement patterns. When anomalies are detected, real-time alerts are sent to security personnel, ensuring proactive risk management. The project aims to improve scalability, accuracy, and response times in environments like transportation hubs, industrial zones, and public venues.

Keywords: Crowd Monitoring, Occupancy Detection, Anomaly Detection, YOLOv8, Deep SORT, Real-Time Tracking, Computer Vision, CCTV Surveillance, Confined Space Safety, AI-based Risk Management, PyTorch, OpenCV, PyQt5, Video Analytics, Smart Surveillance Systems.

