



# AI-Powered Prison Tracking and Monitoring System

We developed a custom AI Camera-Based Tracking and Attendance System specifically designed for correctional environments. Using facial recognition, intelligent rule enforcement, and real-time alerting, the system streamlines monitoring while enhancing safety and accountability.



# Prisoner tracking inside prison



## Prison inside or not

## Unknown person alert inside cell



## Prison guard tracking

## Realtime alerts on Prison CMS



## Live monitoring and recording to monitor using IP cameras



# Client Overview

Client	A high-security prison facility focused on modernizing operations
Use Case	Automated tracking and attendance of individuals using AI-powered facial recognition
Location	India
End Users	Prisoners, Guards, Control Room Operators, Administrative Staff

# Problem Statement

Conventional monitoring methods within the facility were facing critical challenges:

- Manual headcounts were time-consuming and repetitive
- Human errors led to potential security risks
- No real-time visibility into zone-based movement
- Dependency on paper-based logs and physical supervision

To address these inefficiencies, the facility required a secure, automated, and real-time system to monitor and track movement and presence accurately within restricted zones.

# System Workflow

Initial Configuration	<ul style="list-style-type: none"><li>• Person Types: Define roles like Prisoner, Guard, Visitor</li><li>• Rules: Set rules for zone access (e.g., cell blocks, yard, kitchen) and time-based shifts</li><li>• Devices: Register and assign AI-enabled cameras to monitor critical areas</li></ul>
AI Server Setup	<ul style="list-style-type: none"><li>• Configure the AI Server with details such as CPU, RAM, OS, MAC address, and IP</li><li>• Enable seamless camera communication via MQTT protocol</li></ul>
Person Enrollment	<p>Required details include:</p> <ul style="list-style-type: none"><li>• Name, Age, Gender</li><li>• Unique Person Number</li><li>• Facial Photograph</li><li>• Assigned Access Rules and Devices</li><li>• Person Type (e.g., Prisoner, Guard, Visitor)</li></ul>
Live Tracking & Attendance	<ul style="list-style-type: none"><li>• AI cameras scan and identify faces at zone checkpoints</li><li>• The system validates presence and triggers alerts for:<ul style="list-style-type: none"><li>• Recognized Individuals</li><li>• Unknown or Unregistered Faces</li><li>• Obstructed or Unclear Faces</li><li>• Absence within required zones or shifts</li></ul></li></ul>
Real-Time Monitoring	<ul style="list-style-type: none"><li>• Web-based dashboard accessible by authorized personnel</li><li>• Logs with timestamps for all movement and alerts</li><li>• Daily, weekly, and zone-specific attendance reports</li></ul>

# Tech Stack Overview

Frontend	React.js (Admin Control Panel)
Backend	Node.js with Express.js
Database	MongoDB
AI Engine	Python-based face recognition
Camera Communication	MQTT (Camera AI Server)
Deployment	On-premise within a secure, isolated network environment

## Core Features Delivered

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- Real-time AI-driven facial recognition
- Seamless integration with on-site AI camera infrastructure
- Zone-based rule configuration and enforcement
- Digitized attendance and movement logs
- Secure, role-based user access for staff and operators
- Automatic alerts for unauthorized access and anomalies
- Comprehensive reporting for compliance and review

## Deployed Across Multiple Locations

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This AI-powered tracking system has been successfully deployed and adapted for various secure environments, including:

- High-security correctional facilities
- Industrial campuses requiring restricted area monitoring
- Secure government and defense-controlled compounds
- Large factories with sensitive zones
- Research labs and infrastructure zones with access control needs
- Juvenile and rehabilitation centers
- Private institutions focused on automated personnel tracking

The platform's modular structure allows easy replication and adaptation across various types of correctional environments.

## Impact & Results

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- Over 90% reduction in time spent on manual attendance and monitoring
- Fully digitized and tamper-proof record keeping
- Significantly enhanced facility security through automated alerting
- Improved real-time monitoring and response readiness
- Reduced reliance on manual supervision for routine checks

