



# People Detection Guidelines

# ABOUT MANTRA

Mantra Softech is a global hi-tech manufacturer of biometric products and solutions. We offer a wide range of products in the biometric and RFID industry. Mantra was established by like-minded visionaries in Ahmadabad, Gujarat, India. It was registered as Mantra Softech India Private Limited on 06 April 2006. Customers rapidly growing requirements for the complex and sophisticated security system are the inspiration behind Mantra's Innovative products and solutions.

Globally recognized as one of the leaders in biometric and RFID technology field, Mantra continues to position itself as an innovation-driven brand. Mantra's product portfolio includes Fingerprint Sensors, IRIS Sensors, Integrated Fingerprint Devices, Integrated IRIS Devices, POS / MicroATM / Financial Terminal, IRIS Recognition in Mobile and many more biometric devices. New products and solutions are added every year in our solution and in the product category to meet the future needs of business in terms of their security concerns. Our security solutions include Business & Enterprise Security System, Integrated Security Solution, Access Control System, Smart City Solution, Airport Solution, and many more RFID and Biometric based solutions which can enhance security, productive and transparency in small to large enterprises.

Mantra is the pioneer of Aadhaar Enabled biometric devices which are currently used by the Indian Government for monitoring the official attendance and in implementing the social welfare schemes for beneficiary identification. Apart from this, banking, telecom and insurance sector are also using it for customers Ekyc purpose. Our manufacturing units are equipped with cutting-edge technology and powerful automation to avoid any human error in manufacturing Assembly line. Mantra's state-of-the-art Manufacturing facility is located at Ahmadabad.

Our valuable assets are Mantra's brands, R&D, and Manufacturing facilities along with unparalleled, multi-layer distribution network. With a view of taking our range of products to distant corners, we have carved out a strong network around the nation. Also, Mantra's international presence spans across African and middle eastern countries.

Mantra is one of the few players in the industry to have successful R&D facilities to improve product functionality and develop new products which are future proof. For quality standards, Mantra is committed to the core values of integrity, ethical practices, customers satisfaction, and the eco-friendliness. Brilliant quality and design achieved by the vision of our founder have led Mantra to become a global brand and tagged as the powerhouse of biometric innovations.

## Why Mantra ?

Mantra has extensive experience of 13 years with the World's Largest National ID Project "Aadhaar," India's one of the biggest Access Control Project and an Identity-based Food Distribution Project. Mantra has also worked with the top banking & financial institutions and corporates of India. Mantra is known for its innovations and will provide latest technology based product and solution to our customer for enchaining the security and operational efficiency.

## Whom Can Mantra Help ?

The Governments of all developing Countries are looking for National ID Projects, and Citizen Verification projects through biometrics. Even Banking & Telcos companies are using biometric technology to carry out e-KYC for customer onboarding and verification processes.

## How Can Mantra Help ?

Mantra is one of the leading Biometrics, Access Control & RFID provider in India. Mantra leverages the next-generation technologies like Biometrics, RFID, and Artificial Intelligence to develop advanced Access Control Solutions, support National ID, eKYC, and Individual Verification Projects. With groundbreaking innovations and cutting-edge techniques, Mantra can help to meet the new and evolving security demands of today and tomorrow through secure identity management and authentication services.



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## Understanding People Detection

- People detection is the process of identifying and localizing human beings within visual data, typically images or videos.

## Challenges in People Detection

- Variability in human appearance (e.g., clothing, pose, lighting conditions).
- Occlusions (partial or full obstruction of individuals by objects or other people).
- Scale variations (people appearing at different sizes in images).
- Real-time processing requirements for video streams.

## Best Conditions To Detect People

- Detecting people through a camera involves several factors that can affect the accuracy and reliability of the detection. Here are some of the best conditions for detecting people through a camera:



### Good Lighting:

- Adequate lighting is crucial for accurate people detection. Well-lit environments provide clear visibility of individuals and reduce shadows and glare that could obscure or distort features.



### Minimal Occlusions:

- Ensure that there are minimal obstructions or occlusions between the camera and the individuals being detected. Objects, furniture, or other people blocking the view can hinder accurate detection.



### Contrast:

- Optimal contrast between individuals and the background aids in distinguishing people from their surroundings. Avoid overly cluttered or monotonous backgrounds that may make it challenging for the algorithm to differentiate individuals.



### Stable Camera Position:

- Maintain a stable camera position to avoid motion blur and ensure consistent perspective. Unstable or shaky cameras can introduce distortions that affect the accuracy of detection.



### Appropriate Camera Angle:

- Position the camera at an appropriate angle to capture individuals' full bodies or relevant areas of interest. The camera angle should provide a clear view of the scene without excessive distortion or perspective skew.



## Controlled Environment:

- In controlled environments such as indoor spaces, ensure that factors like temperature, humidity, and airflow are regulated to prevent environmental conditions from affecting camera performance.



## Minimal Noise:

- Reduce noise in the camera feed caused by factors like low light conditions, electronic interference, or camera sensor limitations. High-quality cameras with low noise levels produce clearer images for more accurate detection.



## Adequate Resolution:

- Use cameras with sufficient resolution to capture fine details, especially in scenarios where individuals may appear small or distant. Higher resolution allows for better recognition of facial features and body characteristics.



## Optimized Camera Settings:

- Configure camera settings such as focus, exposure, and white balance to optimize image quality and clarity for people detection purposes.



## Calibration:

- Regularly calibrate the camera and any associated equipment to maintain optimal performance and accuracy over time.

- By ensuring these conditions are met, developers can enhance the effectiveness of our people detection algorithms and improve the overall performance of camera-based systems for detecting individuals.

## Best Practices



## Data Augmentation :

- Augment training data to increase model robustness to variations in lighting, poses, and occlusions.



## Continuous Model Evaluation and Fine-tuning :

- Evaluate model performance regularly using metrics like precision, recall, and F1 score.
- Fine-tuning of all models on domain-specific datasets for improved accuracy in real-world scenarios.



## Optimization for Efficiency :

- We Optimize models for inference speed and memory footprint, crucial for real-time applications.
- Consider model quantization, pruning, and architecture modifications for efficient deployment on resource-constrained devices.

## Privacy and Ethical Considerations

- We ensure compliance with privacy regulations and ethical guidelines when deploying people detection systems, especially in public spaces.
- Implement measures to anonymize and protect personal data captured by the system.



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