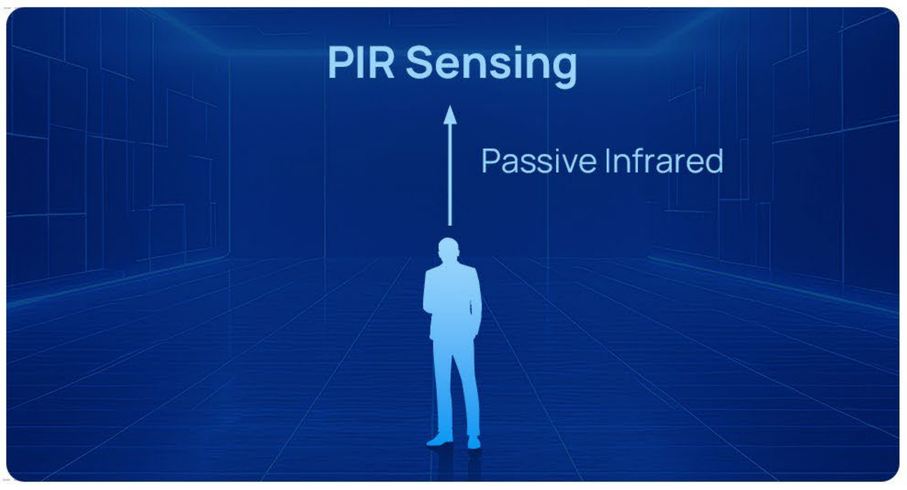
Milesight

Common Technologies Used in People Counting

PIR (PASSIVE INFRARED)

Principle

Detects changes in infrared heat emitted by human to count people as they pass by.



Pros

- Low cost
- Low power consumption
- 100% anonymous detection
- Effective for basic counting

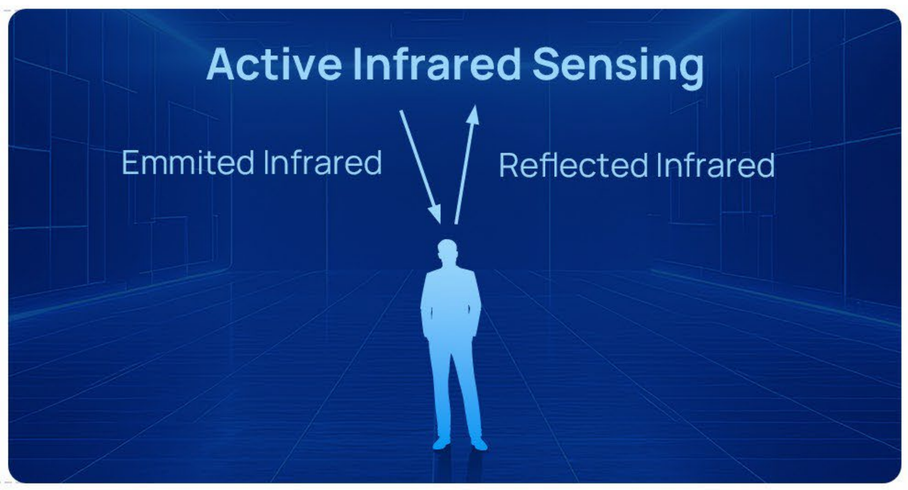
Cons

- Can be interfered with by obstacles or stationary objects
- Can't detect exact numbers in overlapping movements
- Changes in temperature or airflow (like from air conditioning) can cause false readings or reduce accuracy

ACTIVE INFRARED

Principle

Emits infrared beams from a transmitter to a receiver, and when someone passes through, the beam is interrupted or reflected, registering a count.



Pros

- Higher accuracy than PIR
- Low power consumption
- 100% anonymous detection

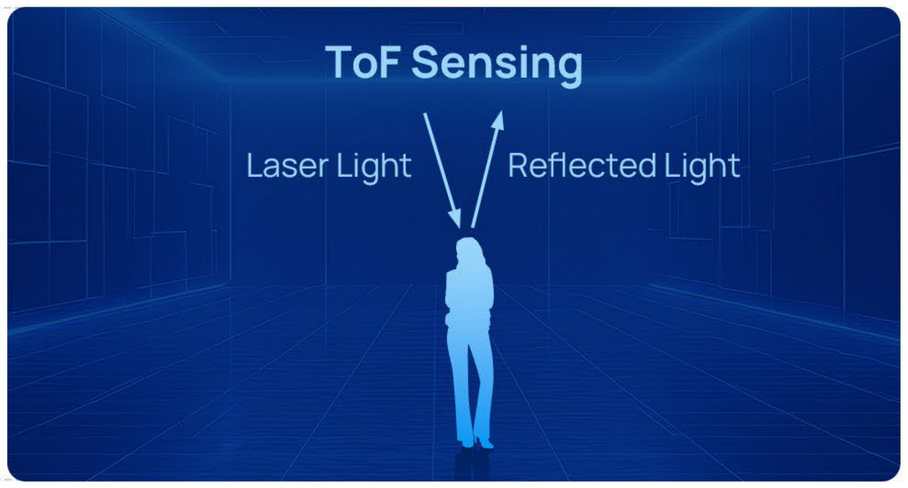
Cons

- Can't detect exact numbers in overlapping movements
- Objects like shopping carts or luggage can trigger false counts
- Can be affected by external factors like ambient light, temperature, and atmospheric conditions

TOF (TIME OF FLIGHT)

Principle

Measures the time it takes for light to travel from the sensor to human body and back to calculate distance and detect presence.



Pros

- High accuracy in low lighting conditions even in darkness
- Anonymous protection: ToF sensing doesn't identify individuals
- Can accurately distinguish individuals in groups

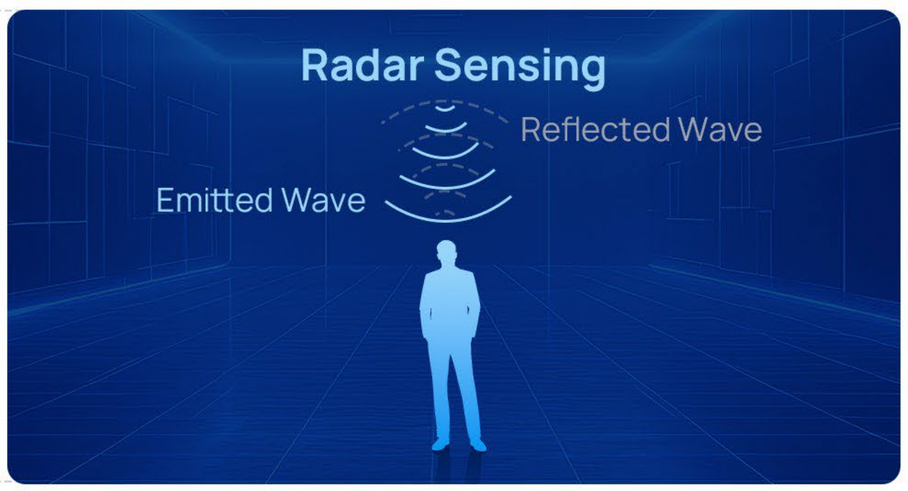
Cons

- Can be affected by reflective surfaces
- Can be influenced by outdoor hard light
- Limited in installation height
- Excessive power consumption makes battery operation impractical

RADAR

Principle

Uses electromagnetic waves (millimeter or microwave) to detect moving bodies and presence by analyzing reflected signals.



Pros

- Works under various lighting and weather (fog, dust, etc.) conditions
- Penetrate non-metallic materials, detecting people even when partially or fully hidden
- Resistant to electromagnetic and environmental noise
- Does not capture images, ensuring privacy
- Can detect stationary people

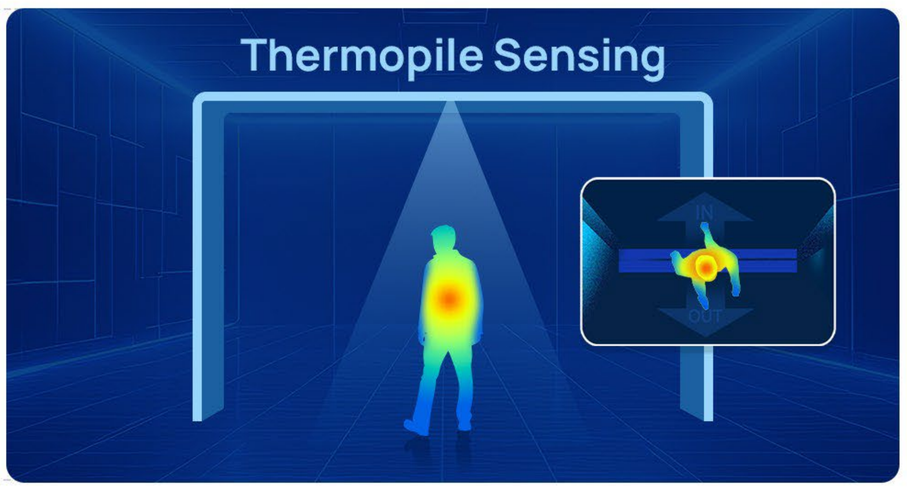
Cons

- May have difficulty distinguishing individuals in dense crowds
- High technical complexity and difficult algorithms required
- Can be affected by interference from nearby radar-based devices and radio frequencies
- Susceptible to interference from moving objects, which can affect accuracy

THERMOPILE

Principle

Detects heat distribution to recognize and count people.



Pros

- Effective in low light or complete darkness
- Can detect stationary people
- Anonymous protection: thermopile imaging doesn't identify individuals

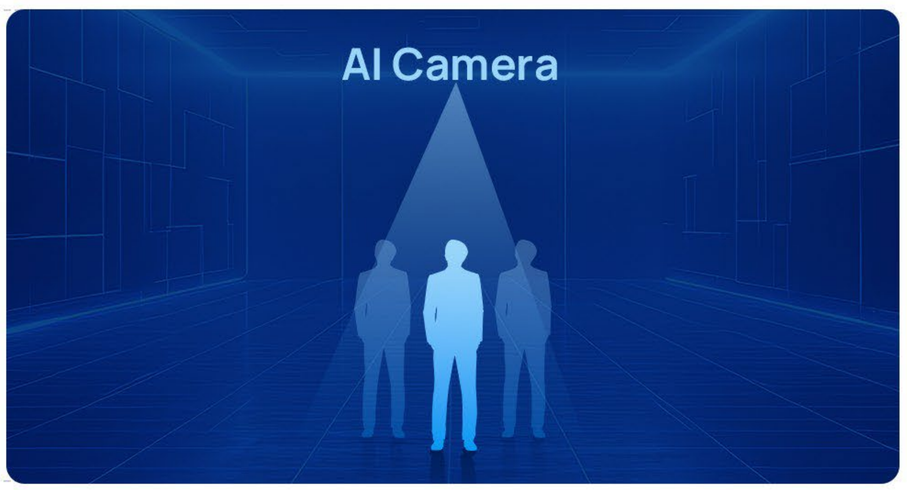
Cons

- Sensitive to temperature changes
- Limited accuracy in large or crowded spaces

2D VISION (AI CAMERAS)

Principle

Uses one camera to captures video footage and uses AI algorithms to analyze the number of people



Pros

- Uses machine learning algorithms to accurately identify and count individuals
- Differentiates between humans and other objects
- Adaptive learning: learn from data and improve their accuracy over time

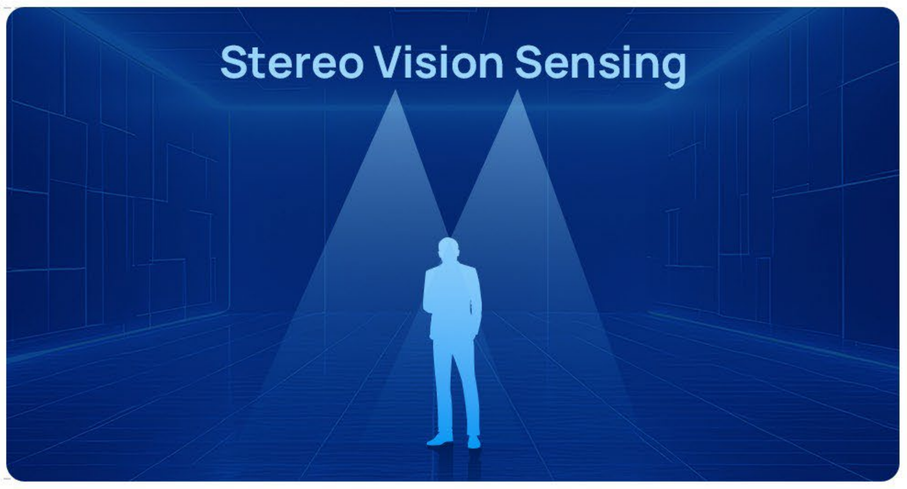
Cons

- Struggles in extreme lighting conditions (e.g., glare, low light)
- Privacy concerns: captures images and videos, raising GDPR compliance issues.
- Excessive power consumption makes battery operation impractical

BINOCULAR VISION (AI CAMERAS)

Principle

Uses two or more cameras to capture video footage and depth information and uses AI algorithms to analyze the number of people



Pros

- High Accuracy
- Improved precision in distinguishing humans from objects compared to 2D systems
- Improved precision in crowded areas compared to 2D systems
- Provide more attributes, like gender recognition and facial expression recognition

Cons

- Higher cost
- Performance can decrease in poor lighting or extreme brightness
- Excessive power consumption makes battery operation impractical
- Privacy concerns: captures images and videos, raising GDPR compliance issues

If you're looking to discover the right technology for your project, feel free to reach out to us!