HOW IOT DEVICES ENSURE PRIVACY PROTECTION

Insights from Milesight VS125 AI Stereo Vision People Counter

Abstract

In an era where data ethics drive market trust, IoT devices must balance regulatory compliance and commercial interests. This guideline explores how Milesight ensures privacy protection and provides an in-depth analysis of the GDPR-certified core product of the Milesight People Sensing sensor series—the VS125 AI Stereo Vision People Counter. It examines how this device achieves multi-dimensional people sensing and accurate people counting, leveraging trusted IoT technology to unlock business value, enhance performance, and ensure privacy protection.

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IoT Industry Insights: The Privacy Economy

In the rapidly advancing digital economy, data security and privacy protection have become global focal points. Countries around the world have introduced stringent privacy regulations, with the European Union leading the way. Since the implementation of **the General Data Protection Regulation (GDPR)** in 2018, the EU has set a global benchmark for privacy protection. The GDPR mandates that businesses must implement rigorous technical and managerial measures to ensure that data is processed securely, legally, and compliantly. Failure to comply can result in fines of up to 4% of annual revenue.[1]

In 2018, Google was fined €50 million by France for failing to adequately inform users of its data collection policies.

In 2023, Meta was fined €1.2 billion by the Irish Data Protection Commission for violating GDPR, specifically for failing to ensure the adequate protection of EU users' personal data in its EU-U.S. data transfer practices via Facebook.[2]

[1] European Data Protection Board
[2] European Data Protection Board

As privacy concerns continue to escalate, privacy-enhancing technologies has emerged and become increasingly important. Businesses must not only employ technical measures to enhance data protection but also navigate increasingly complex compliance requirements. Adopting a more proactive approach to privacy management has become crucial for addressing the privacy challenges of the digital age.

KPMG's survey report[3] indicates that 69% of respondents are concerned about the security of Internet of Things (IoT) technologies, particularly regarding privacy. This directly impacts consumer trust in businesses. However, the IoT market is growing at an astonishing rate, with the global market expected to reach $4,062.34 billion by 2032, and the European market's compound annual growth rate (CAGR) approaching 12%. [4] As the market expands, privacy protection issues become increasingly prominent, and companies must prioritize addressing them.

Notably, according to Article 25 of the ***General Data Protection Regulation (GDPR)*** on "privacy by design," companies should incorporate privacy protection from the early stages of product development. This principle is driving the IoT market from passive compliance to proactive value propositions.

However, research by the Information Systems Audit and Control Association (Isaca) shows that only 24% of European organizations adhere to privacy by design principles.[5] This implies that many organizations may be violating the GDPR and other new EU frameworks and regulations.

IoT companies are facing dual challenges in product development and data security.

[3] Consumer Loss Barometer - KPMG
[4] Fortune Business Insights
[5] ISACA

Privacy Challenges for People Counter

In the IoT industry chain, hardware devices, particularly sensors, play a crucial role in data collection. The environmental data gathered by these sensors is used for downstream analysis and service enhancement. However, there is a risk of privacy breaches throughout the entire data flow process, so the use of sensors at the upstream stage requires extra caution.

Among these sensors, **people counters** face more severe privacy protection and data security challenges because the data they collect directly involves personal information.

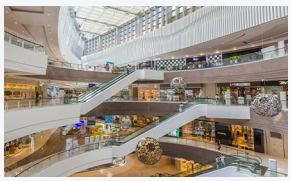
Additionally, the application of IoT technology in various downstream industries also faces privacy protection challenges:

Building Management:

IoT sensors are used to monitor personnel movement and safety, but collecting location and activity data from employees and visitors can lead to privacy issues, especially without explicit consent.

Retail Industry:

Retailers use IoT devices to monitor foot traffic and analyze customer behavior to optimize store layouts and inventory management. However, customer facial data may touch on privacy boundaries. Retailers need to balance precise market analysis with customer privacy protection.



Public Utilities:

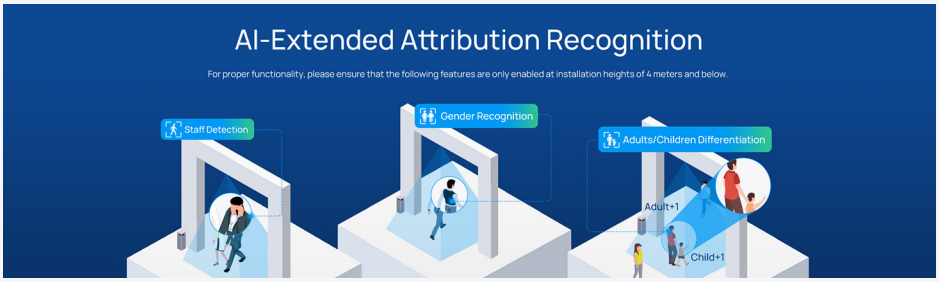
In banks, museums, and other public places, IoT sensors are used for counting people and analyzing foot traffic. This data helps optimize layouts and improve service quality, but when personal identity is involved, ensuring personalized services without infringing on customers' privacy rights, especially without sufficient user consent, is a key issue.

In summary, companies need to adopt effective technical and managerial measures to ensure that the entire process of developing and using people counters safeguards user data security and compliance. This is essential to earn market trust.

Privacy Protection Mechanisms in VS125

Milesight IoT's GDPR-certified **VS125 AI Stereo Vision People Counter** is perfect for privacy-focused environments. It offers precise people counting and can cover large areas like buildings and shopping malls. Flexible installation and device-stitching support ensure wide-ranging traffic capture while maintaining 99.8% accurate data collection, enhancing operating efficiency.

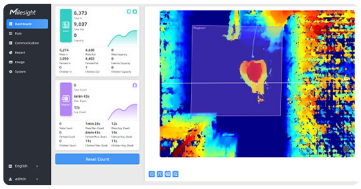
- Mighty Bi-Directional & Regional People Counting
- Industry-Leading Accuracy of up to 99.8%
- Advanced Binocular Technology and Deep Learning AI
- AI-Extended Attribution Recognition
- 0Lux Ultra Low Light Performance
- Compliant with GDPR
- 16 Devices Stitching for Wide Coverage
- Extendable Performance with Rich Interfaces
- User-Friendly Remote Management



As a GDPR-certified AI binocular people counting sensor, the VS125 features stringent personal data protection measures and compliance-oriented design.

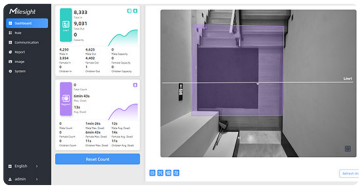
Configurable Image Preview

The VS125 uses binocular vision imaging technology to generate depth maps and integrates RGB images to detect human contours and achieve target detection. Users can configure the image preview settings to maximize privacy protection:



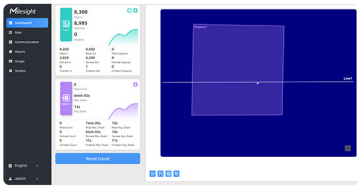
Depth Video Stream Mode

Avoids privacy issues while still providing a dynamic view of the scene and people.



Black-and-White Single Frame Image

No real-time video, only displays the scene image when no one is present.



No Image

Completely eliminates any imaging, allowing users to draw detection lines and areas based on historical and real-time trajectories.Data Security Management

Data Security Management

Access Control

The VS125 allows access to the device management page via HTTPS, combined with digest authentication mechanisms, ensuring that only authenticated users can access the device and its data, preventing unauthorized access and data breaches.

Data Encryption

When transmitting and storing user passwords and other personal information, the VS125 employs strong encryption algorithms (such as SHA256) and secure transmission protocols (such as TLS, HTTPS) to ensure data confidentiality and integrity.Through these rigorous personal data protection measures, the VS125 ensures user privacy and compliance, meeting GDPR requirements and achieving GDPR certification.

GDPR Compliance Mapping

Article 5 Principles Relating to Processing of Personal Data

VS125 only collects personal information necessary for core functions, such as body contours and movement trajectories, ensuring data minimization. Data is used solely for purposes clearly communicated to users, ensuring transparency and lawfulness. Data storage and processing are completed on the device, and users can manually delete data to maintain full control. The device does not share data with third parties unless user consent is obtained or required by law.

Article 6 Lawfulness of Processing

VS125 adheres to the principles of lawfulness, fairness, and transparency in data processing, clearly informing users about data collection methods and purposes, and providing an easy mechanism to withdraw consent, ensuring compliance with GDPR requirements.

Article 25 Data Protection by Design and by Default

VS125 incorporates data protection principles in the design phase, ensuring that the devices and services comply with data protection requirements by default, minimizing the processing of personal data.

Article 32 Security of Processing

VS125 adopts industry-standard security measures, including personal data encryption, access control, and regular security audits, ensuring the security of data processing. VS125 conducts regular security audits, assessing and reviewing the effectiveness of security measures to ensure an appropriate level of security.

Through these rigorous personal data protection measures, the VS125 ensures user privacy and compliance, meeting GDPR requirements and achieving GDPR certification.

VS125's Value in Diverse Applications

Building Management

In smart buildings, especially in workplaces, the VS125 AI Stereo Vision People Counter helps optimize space utilization and avoid unnecessary energy waste by monitoring the density of people in typical areas such as meeting rooms, offices, lounges, and workstations in real time.

It ensures highly accurate people counting with an accuracy of up to 99.8% while absolutely protecting privacy. It can further regulate the heating, ventilation, and air conditioning (HVAC) system when the people flow changes.

Additionally, the VS125 supports up to 16 devices stitching to extend the coverage area for the doorways in commercial buildings to get real-time and historical people flow statistics.

Retail Optimization

In the retail industry, such as chain stores, supermarkets, and shopping centers, the VS125 AI Stereo Vision People Counter offers precise foot traffic analysis.

The device adheres to principles of legality, fairness, and transparency, clearly informing users about the purposes of data collection. It only collects personal information necessary to achieve its core functions, such as body outlines and movement trajectories, ensuring absolute privacy protection.

Its advanced detecting performance includes dwell time, heat maps, and group counting to gain deeper insights into customers' behaviors, shopping preferences, and influential dynamics. Additionally, it can achieve rich attribute recognition, including gender, children, and staff, for in-store conversion rate analysis to better understand business effectiveness.

These insights help optimize store layouts and enhance overall commercial efficiency.

Case Study: Enhancing Retail Efficiency and Customer Insights with VS125

Client:
A large retail chain

Challenge:
The large retail chain faced challenges in optimizing store layout, staff allocation, and marketing strategies due to a lack of accurate customer behavior data.

Solution:
The chain implemented the VS125 AI stereo vision people counter in its 300 stores. The VS125 provides:

- Foot Traffic Analysis:
  Accurately counts the number of customers entering and leaving the store.
- Dwell Time Monitoring:
  Measures the time customers spend in different areas of the store.
- Heat Maps:
  Visualizes high-traffic areas within the store.
- Group Counting:
  Identifies groups and their behavior patterns.
- Attribute Recognition:
  Detects gender, children, and employees to refine customer segmentation.

Results:
- Operational Efficiency:
  Improved by 17% through optimized staff allocation based on real-time foot traffic data.
- Store Layout Optimization:
  Enhanced by identifying high-traffic areas and adjusting product placements accordingly.
- Marketing Strategies:
  More targeted through understanding customer demographics and behavior patterns.
- Privacy and Security:
  Ensured through advanced data encryption technology and compliance with GDPR regulations.

After adopting the VS125 sensors, the overall business performance of the chain significantly improved, providing actionable insights that drove better decision-making.

Public Facility Security

In public spaces such as banks, museums, and churches, the VS125 AI Stereo Vision People Counter effectively manages people flow, enhancing safety and service quality. The sensor utilizes encryption, access control, and regular security audits to ensure data security during transmission and storage, as well as to guarantee visitor privacy. With its advanced AI features, the VS125 not only improves service efficiency but also optimizes the allocation of human resources and enhances visitor experience.

Why Milesight Stands Out

The core of **People Sensing** lies in a steadfast commitment to accuracy and security. With years of expertise in the IoT field, Milesight has become a leader with its extensive product line and multi-dimensional industry solutions.

Milesight People Sensing Series epitomizes AI-driven algorithms, offering a range of products that utilize technologies such as binocular vision, time-of-flight (ToF), radar, thermopile, infrared sensing, and AI. Whether in varied lighting conditions, complex layouts, or high-traffic zones, Milesight's technology delivers seamless performance.

Our devices integrate smoothly with other systems, providing businesses with scalable, future-ready solutions for intelligent decision-making and resource allocation.

Worldwide Application

25,000+

Employed Sensors

Help all walks of life to improve management and bring benefits.

1,500+

Retail Stores

Help retailers to increase their sales revenue by more than 16%.

300+

Buildings

Help to optimize management, resource allocation, and reduce cost by14%.

Numerous successful cases worldwide attest to the reliability and excellence of Milesight People Sensing Series. From corporate offices and public facilities to healthcare and retail spaces, over 25,000 sensors help industries improve management and bring benefits; over 1,500 sensors help retailers increase sales revenue by more than 16%; and over 300 sensors help optimize management, resource allocation, and significantly reduce operational costs by 14%.

With a strong commitment to privacy protection, the Milesight People Sensing Series helps businesses capture high-precision occupancy and human behavior data, enabling organizations of all sizes to optimize space, enhance security, and improve operational efficiency.

We, Make Sensing Matter.

Milesight

MAKE SENSING MATTER

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