

## Defining Privacy Standards for Autonomous Mobile Robots

Autonomous mobile robots (AMRs) have become an increasingly common sight in grocery stores and retail facilities around the world, taking on repetitive tasks such as cleaning the floors with robotic floor scrubbers, shelf-scanning, and autonomous delivery, to help free up workers for other activities. These intelligent machines safely navigate in high-traffic, public settings by leveraging cameras and other sensor-based technologies.

For many people, cameras in public spaces imply surveillance due to how they have been used traditionally (e.g., traffic cameras, retail security cameras, etc.). But for companies who focus on autonomous mobile robots, cameras are used for the purpose of helping self-driving robots like delivery tug robots navigate the world around them in a safe and efficient manner. For these technology providers, an ongoing challenge is to build public trust and help reshape preconceived notions regarding the use of camera images. At **Amazon**, we've designed our products with data protection in mind and are committed to being a trustworthy champion of data privacy within the autonomous mobile robots (AMR) industry.

### A reassuring force

The General Data Protection Regulation (the European Union's recently enacted privacy law), defines personal data as any information "related to an identified or identifiable natural person." Emerging US privacy law definitions of personal information are consistent with this view, including the California Consumer Privacy Act. Such personal data may include photo or video data that captures an individual's distinguishing characteristics if, when combined with additional data sources, it could be used to identify that individual.

Since **Amazon**-powered AMRs operate in commercial public environments, generating over 10,000 hours of additional productivity per day for end customers, it's especially important that we provide information on **Amazon**'s data use and security practices. By following the principles described below, **Amazon** is able to thoughtfully protect the data captured by its AMRs, while still gathering the information we need for our fleet to operate safely and successfully. This commitment is also critical to our manufacturing partners, who trust our AI-driven robotic software to operate to the highest global standards.

1. Limited data retention: At **Amazon**, our goal is for **Amazon**-enabled autonomous mobile robots to navigate safely to complete their function. As AMRs navigate around facilities, all sensor and camera data are securely stored in an encrypted format on the AMR's local hard drive. Images stored on an autonomous mobile robot are purged automatically when capacity is reached, approximately every 30 days.

2. Use of visual data for navigation and solving problems: Low-resolution cameras are installed on **Amazon**-powered AMRs, which are positioned to collect visual data of the environment during navigation. At times, an AMR becomes stuck and triggers the need for human assistance. When this occurs, **Amazon** personnel have limited access to the images from these cameras for the purpose of assessing and resolving the issue which caused the need for human assistance.

3. Privacy features: [REDACTED]'s use of low-resolution images directly relates to the support of [REDACTED]'s core business, such that we receive just enough information to troubleshoot problems without taking up too much precious compute power. Data captured on the autonomous robot is encrypted at rest, and includes facial blurring to further mitigate the possibility that an individual could be identified.

### **Autonomous Mobile Robots (and visual data) with a purpose**

Everything comes down to the purpose behind an AMR's use of cameras. At [REDACTED], our use of low-resolution cameras serves two primary purposes:

1. Safety: Camera data ensures safe navigation for [REDACTED]-enabled AMRs. Our fleet would not be as effective at navigating around obstacles, operating in dynamic environments, and within close quarters of people and objects without the information the AMRs collect about the environment.
2. Autonomy Services Improvement: Camera data facilitates research, development, and improvements in the AMRs' navigation software. This leads to better prediction metrics and more optimal route execution. [REDACTED]-powered AMRs do not need any identifiable or personal data to perform tasks. The visual data collected on our autonomous robots is extremely limited in scope and retention. Therefore, the public can rest easy knowing our fleet will not be used to identify them in any way.

We encourage all vendors in the Autonomous Mobile Robots industry to reflect on their data collection practices and how their use of cameras relates to an AMR's purpose. Consider the data protection principles described herein to decrease the potential identifiability of individuals when designing and enhancing autonomous services.