



Warehouse Digitization

Logistics Transformed by
Depth-Sensing
Technology

intel **REALSENSE™**



In warehouses throughout global supply chains, inventory management ensures that materials are properly transported, managed, picked, sorted, and stored. Digitization is transforming these processes.

Lost, damaged, and unrecognizable inventory and packaging remain a substantial challenge. As Supply Chain Dive reports, out-of-stock inventory due to shrinkage and warehouse errors represents a \$634 billion-dollar problem worldwide every year. According to the National Retail Federation, the percentage of shrink remains unchanged since 2014, despite dramatic industry-wide shifts and efficiency improvements.

With the growth of ecommerce and customer expectations, warehouses must scale ever larger. Innovations in computer vision are driving greater efficiency and cost-saving.

Digitization is transforming **logistics** by enabling warehouses to automate receiving, loading, shipping, and inventory monitoring. Technology today provides unprecedented visibility and capability for organizations to scale their operations and gain meaningful cost savings.

Computer vision technologies that assist with conveyor, static bin, multistatic, and random pick and place support a wide range of common warehouse use cases and applications. There is a growing demand for robots with volumetric measurement capability to support shipping and retail logistics. This means depth cameras are increasingly needed that can measure objects in all three dimensions while minimizing measurement error. Camera features such as a small form factor, accuracy, and cost of ownership, provide endless options for developers within the warehouse space.

With these innovations, computer vision technology is powering new possibilities in logistics - driving greater savings, improving accuracy, and expanding capabilities at scale.

The Intel RealSense Advantage

With over 10 years of experience developing computer vision solutions, the Intel RealSense family of devices has a broad range of LiDAR, stereo, and tracking cameras that perform in multiple environments in varying conditions.

Intel® RealSense™ Dimensional Weight Software (DWS) is a ready-to-use library that supports custom applications. DWS is a legal for trade ready measurement platform that improves billing accuracy, assists with space management in the warehouse, and enables increased workflow efficiencies with fast measurements and high accuracy.

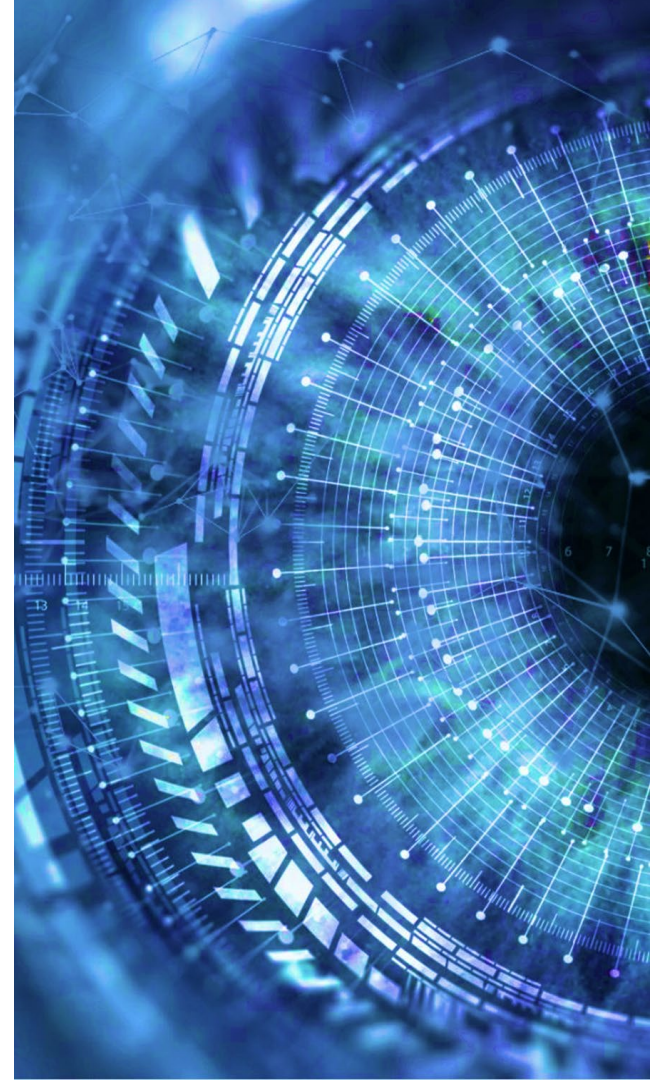
The combination of the Intel RealSense family of cameras' range of capabilities, small form factor, single SDK, and the power of Intel's reputation means that the Intel RealSense family delivers an overall value and price performance that is unique in warehouse logistics. These advantages make Intel RealSense devices perfect for many applications in the warehouse and logistics industry.

Warehouse Robotics

In the warehouse, depth-sensing technologies make it possible for logistics managers to calculate volumes and move products from place to place efficiently and safely with autonomous mobile robots.

Measurement and Picking

Precise and fast picking technology allows objects to be sorted according to differences in shape, size, and other attributes. Measure items and packages in three dimensions simultaneously with high accuracy.



Essential Vision Capabilities for Logistics

The Intel RealSense family of cameras was created to enable the fast, accurate, and affordable collection of visual data necessary to meet some of the most common challenges in supply chain and logistics.

High frame rate and depth accuracy enables part identification and grasping.

Picking and
Sorting

Pick and sort objects according to their differences in shape, size, and other attributes.

Enables non-intrusive monitoring of people moving through a space for safety and analytics.

People
Tracking

People counting, path and attention tracking, social distancing monitoring.

Enables comprehensive measurement of an entire object accurately and with high edge fidelity.

Volume
Measurement

Accurately measure materials using a legal for trade ready volumetric measurement system.

High frame rate and depth accuracy provides the realtime data needed to avoid obstructions.

Collision
Avoidance

Automated inventory robots navigate store aisles and avoid running into objects, carts, or customers.

Review mixed-SKU pallets and assist with proper pallet build.

Safety curtain and notifications, co-bot operation.

Defect tracking, product and piece placement in production.

Allows robots to move around stations safely and avoid unexpected obstacles and people.

Conduct inventory audits, identify objects moving by conveyor.

Safety keep-out zones for heavy machine operation, efficiency analytics

Track and verify the movement of materials from receiving through unloading and processing.

Enables product picking and movement without damage, as well as automated forklift movement.



Retail



Industrial &
Manufacturing



Logistics

Customer Success Stories



AccuPick 3D Enables Fast, In-Motion 3D Scanning

AccuPick 3D from Solomon Technology Corp. is an intelligent bin picking solution which makes full use of Intel RealSense features, including fast 3D point cloud generation, color recognition, and scanning objects in motion.



RightHand Robotics Revolutionizes Automated Warehouse Order Fulfillment

RightPick is an automated piece-picking solution that revolutionizes e-commerce order fulfillment. RightPick2 robots use Intel RealSense cameras to quickly identify and handle items at high speeds with high reliability.



Aethon leads industry-changing mobile delivery solutions

Aethon's TUG series of delivery robots provides reliable, durable, and affordable small form factor units that meet the changing needs of the hospitality, manufacturing, and healthcare industries.



The Intel RealSense family of cameras has a broad range of LiDAR, stereoscopic, and tracking cameras that perform in multiple environments and varying conditions.

The combination of the Intel RealSense family of cameras' range of capabilities, small form factor, single SDK, and Intel's reputation for technology leadership means that Intel RealSense delivers an overall value and price performance that is singularly unique. This price performance opens up a wide range of customers, applications, and use cases across a variety of industries.

Stereo Indoor/Outdoor/Multiple



D415

Ideal Range
.5m-3m

Environment
Indoor/Outdoor

Depth FOV (H x V)
65° x 40°

Inertial Measurement Unit
No



D435/D435i (IMU)

Ideal Range
.3m-3m

Environment
Indoor/Outdoor

Depth FOV (H x V)
87° x 58°

Inertial Measurement Unit
No/Yes



D455

Ideal Range
.6m-6m

Environment
Indoor/Outdoor

Depth FOV (H x V)
87° x 58°

Inertial Measurement Unit
Yes

LiDAR Accuracy over Range



L515

Ideal Range
.25m-9m

Environment
Indoor

Depth FOV (H x V)
70° x 55°

Inertial Measurement Unit
Yes

Tracking



T265

Onboard VSLAM
Intel® Movidius™
Myriad™ 2 VPU

FOV (H x V)
163° ± 5°



intelrealsense.com

Notices and Disclaimers

Intel technologies may require enabled hardware, software or service activation.

No product or component can be absolutely secure.

Your costs and results may vary.

© Intel Corporation. Intel, the Intel logo, and other Intel marks are trademarks of Intel Corporation or its subsidiaries.

Other names and brands may be claimed as the property of others.

Please Recycle 343645-000