

**e-CARGOWARE**

the {digital} freight future

# Computer Vision

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Whitepaper

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## Introduction:

In recent years, the use of computer vision in the aviation industry has become increasingly common, particularly in the realm of air cargo. With the global expansion of e-commerce, air cargo has become an essential aspect of supply chain logistics. As a result, there is a growing demand for efficient and cost-effective solutions to ensure the seamless movement of cargo from one location to another. Computer vision technology has the potential to revolutionize air cargo management, making the process faster, more efficient, and more secure. In this whitepaper, we will explore the future of air cargo management through the lens of computer vision technology.

## Overview of Air Cargo Management:

Air cargo management is a complex process that involves several steps, from the initial shipment booking to the final delivery of the cargo.

The process involves the following steps:

**Booking:** The shipper makes a booking with an airline or a freight forwarder.

**Acceptance:** The cargo is accepted by the airline or the freight forwarder and is moved to a cargo terminal.

**Screening:** The cargo is screened to ensure compliance with safety regulations.

**Sorting:** The cargo is sorted according to destination and loaded onto an aircraft.

**Transportation:** The cargo is transported to its destination airport.

**Unloading:** The cargo is unloaded from the aircraft and moved to a cargo terminal.

**Clearance:** The cargo is cleared through customs.

**Delivery:** The cargo is delivered to the recipient.

The air cargo management process is time-consuming and labor-intensive, and any delays or errors can result in significant financial losses. To improve efficiency and reduce errors, computer vision technology is increasingly being employed.

## Computer Vision in Air Cargo Management:

Computer vision is a branch of artificial intelligence that involves the use of algorithms to interpret and analyze visual data from images or videos. The technology can be used to automate several processes in air cargo management, including cargo screening, sorting, and tracking.

### Cargo Screening:

One of the most critical steps in air cargo management is cargo screening. Cargo screening is necessary to ensure compliance with safety regulations and to prevent the transport of dangerous goods. Traditionally, cargo screening has been performed manually, which is time-consuming and error-prone. With computer vision technology, cargo screening can be automated, making the process faster and more accurate.



Computer vision technology can be used to scan cargo images and identify potential threats automatically. The technology can detect suspicious objects, such as explosives or weapons, and alert security personnel to take appropriate action.

### Cargo Sorting:

argo sorting is another critical step in air cargo management. Sorting involves identifying the destination of each item and organizing the cargo accordingly. With computer vision technology, cargo sorting can be automated, making the process faster and more accurate.

Computer vision technology can be used to scan cargo labels and identify the destination of each item automatically. The technology can also be used to read barcodes and QR codes, making it easier to track individual items and ensure that they are loaded onto the correct aircraft.

### Cargo Tracking:

Cargo tracking is essential for ensuring that cargo is delivered to the correct recipient and that it arrives at the destination on time. Traditionally, cargo tracking has been performed manually, which is time-consuming and prone to errors. With computer vision technology, cargo tracking can be automated, making the process faster and more accurate.

Computer vision technology can be used to track cargo from the moment it is accepted to the moment it is delivered. The technology can be used to monitor the location of each item, as well as its condition, temperature, and other vital data. This information can be transmitted in real-time to stakeholders, allowing them to make informed decisions about the movement of their cargo.

## Conclusion

In conclusion, computer vision technology has the potential to revolutionize air cargo management, the process faster, more efficient, and more secure. With automated cargo screening

## Key features or component

**Object detection and recognition:** The cargo vision system should be able to detect and recognize different types of cargo, such as boxes, pallets, and containers, and track them throughout the cargo handling process.

**Barcode and label reading:** The system should be able to read and decode barcodes and labels on the cargo to ensure accurate tracking and routing of the cargo.

**Dimensional measurement:** The system should be able to accurately measure the dimensions of cargo, including length, width, and height, to ensure proper allocation of space and weight on the aircraft.

**Security screening:** The system should be able to identify potentially hazardous or prohibited items in the cargo, such as explosives, weapons, or liquids, and alert security personnel for further inspection.

**Damage detection:** The system should be able to detect any damage to the cargo during handling or transportation and alert personnel to take appropriate action.

**Automated sorting:** The system should be able to automatically sort cargo based on its destination, weight, and size, reducing the need for manual sorting and minimizing the risk of errors.

**Predictive analytics:** The system should be able to use data collected from the cargo handling process to provide insights and predictions about potential delays, capacity constraints, and other operational issues.

**Real-time monitoring and reporting:** The system should be able to provide real-time monitoring and reporting of the cargo handling process, including location tracking, status updates, and alerts for any potential issues.

By incorporating these key features or components into a cargo vision system, air cargo businesses can improve the efficiency and accuracy of their operations, reduce costs, and provide a better customer experience.

## How to Implement

Implementing computer vision in the air cargo business involves several steps. The following steps can be taken to implement computer vision technology in air cargo management:

**Identify the pain points in the existing air cargo management process:** To implement computer vision technology effectively, it is essential to identify the pain points in the existing air cargo management process. This can be done by analyzing the current process, identifying areas where errors or delays occur, and assessing the impact of these issues on the business.

**Evaluate available computer vision technology solutions:** Once the pain points have been identified, it is essential to evaluate available computer vision technology solutions. This can be done by researching available solutions, evaluating their features, and assessing their suitability for the air cargo business.

**Develop a plan for implementation:** Once a suitable computer vision technology solution has been identified, a plan for implementation should be developed. This plan should include details on the deployment of the solution, including hardware and software requirements, data storage, and security measures.

**Deploy the computer vision technology solution:** Once the implementation plan has been developed, the computer vision technology solution can be deployed. This involves installing the hardware and software required for the solution and ensuring that the solution is integrated with existing air cargo management systems.

**Train personnel:** It is essential to train personnel in the use of the computer vision technology solution. This involves providing training on how to use the solution, how to interpret the data generated by the solution, and how to troubleshoot any issues that may arise.

**Monitor and optimize the solution:** Once the computer vision technology solution has been deployed, it is essential to monitor its performance and optimize it where necessary. This involves collecting data on the solution's performance, analyzing this data, and making adjustments to the solution to improve its performance.

In summary, implementing computer vision technology in the air cargo business involves identifying pain points, evaluating available solutions, developing an implementation plan, deploying the solution, training personnel, and monitoring and optimizing the solution. By following these steps, businesses can improve the efficiency and accuracy of their air cargo management processes, reducing errors and delays and improving customer satisfaction.

## About Author



### **Pradip khatua**

CPO (Chief Product Officer) at e-Cargoware

Pradip khatua is associated with air cargo industry with over 17 years of experience. He has worked as various positions at several airlines, GHÀ and IT companies globally including leading cargo operations, business analysis & Product management roles. Pradip has a broad range of experience in cargo management systems, from design and development to implementation and maintenance. He is known for his strategic thinking and has a proven track record of driving revenue growth, innovative ideas and improving operational efficiency as well as customer satisfaction. He holds a Bachelor's degree in Science and MBA from Indian universities.