

# Retail Store Analytics

## using Computer Vision on AWS



Our Retail Store Analytics using Computer Vision on AWS offers a comprehensive suite of tools designed to revolutionize your store operations.

# Introduction.



In the fast-paced world of retail, staying ahead of the competition requires innovation and efficiency. **Our Retail Store Analytics using Computer Vision** on AWS offers a comprehensive suite of tools designed to revolutionize your store operations. Harness the power of computer vision to enhance operational efficiency, elevate customer service, and bolster security.

## Our Story

Imagine a bustling retail store where every action is seamlessly monitored and analyzed. From tracking customer movements to optimizing shelf layouts, our solution brings this vision to life. By leveraging AWS' robust infrastructure, we provide retailers with the tools they need to thrive in a competitive market.

## Problem Statement

*Retailers face challenges in designing a user-friendly AI-based CCTV analysis solution that enhances operational efficiency, customer service, marketing strategies, staffing, and security using real-time video stream data. Key obstacles include decoding encoded video files into MP4 format, managing inconsistent video sizes and non-static frames, addressing discontinuity in video frames due to unorganized storage, and ensuring live feed data availability. Overcoming these issues is crucial for seamless analytics platform operation.*

# How Analytics Will Help.

## Leverage AI and Computer Vision

Analyze video footage from surveillance cameras within retail and QSR environments.

## Track Customer Behavior

Understand foot traffic patterns, monitor queue lengths, and detect anomalies such as theft or accidents.

## Optimize Store Layouts

Enhance customer flow and increase sales by optimizing store layouts.

## Enhance Operational Efficiency

Improve customer service, staffing levels, and security measures.

## Real-Time Data Utilization

Use real-time video data to refine customer experience, marketing strategies, and overall store performance



**Retailers face challenges in designing a user-friendly AI-based CCTV analysis solution**

Overcoming these issues is crucial for seamless analytics platform operation.



# Solution Approach.

## Requirement Gathering

- Collaborate with business teams to identify the scope & granularity of key use cases
- Define key metrics associated with each use case
- Collect the input video data from CCTV cameras for preprocessing and analysis

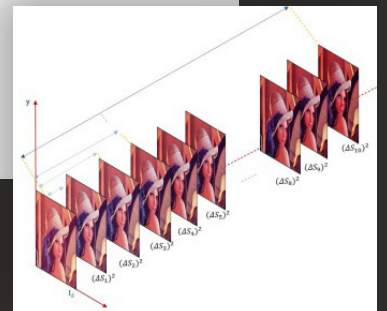
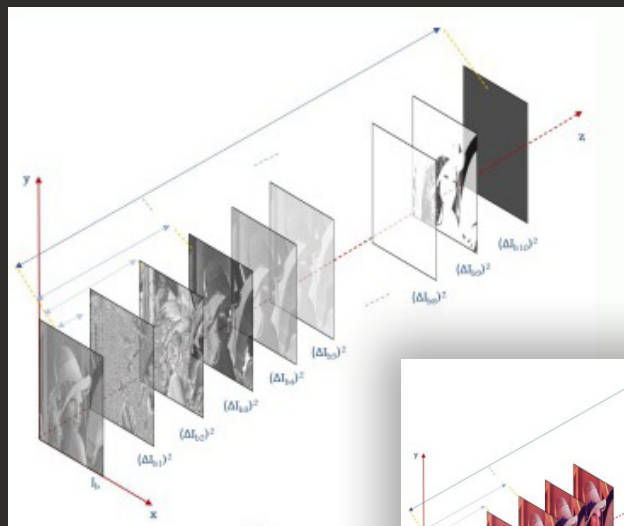


## Data Pre-Processing

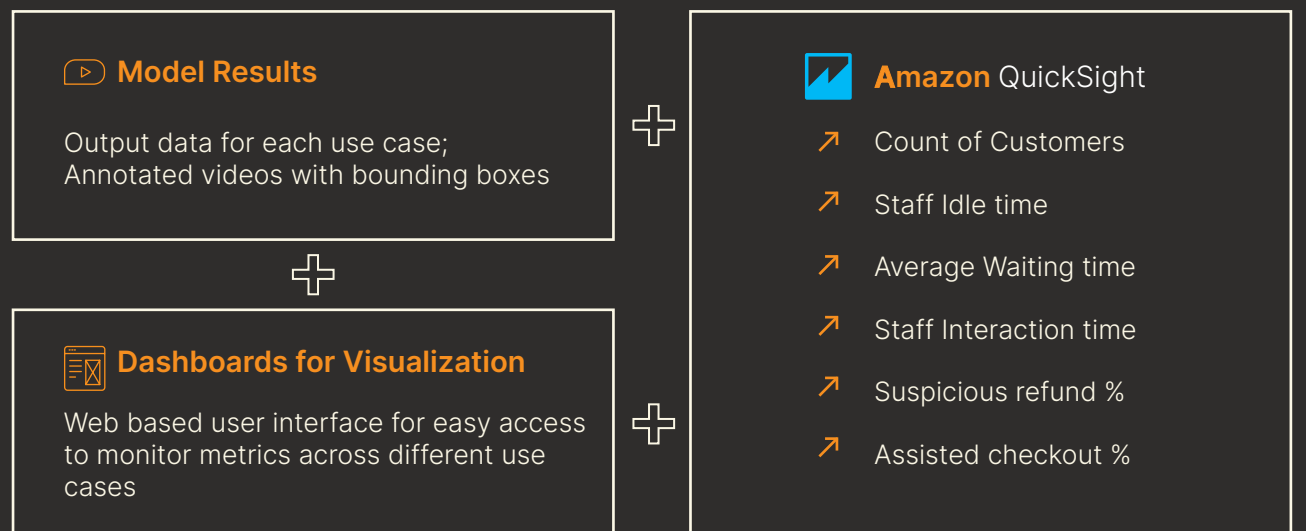
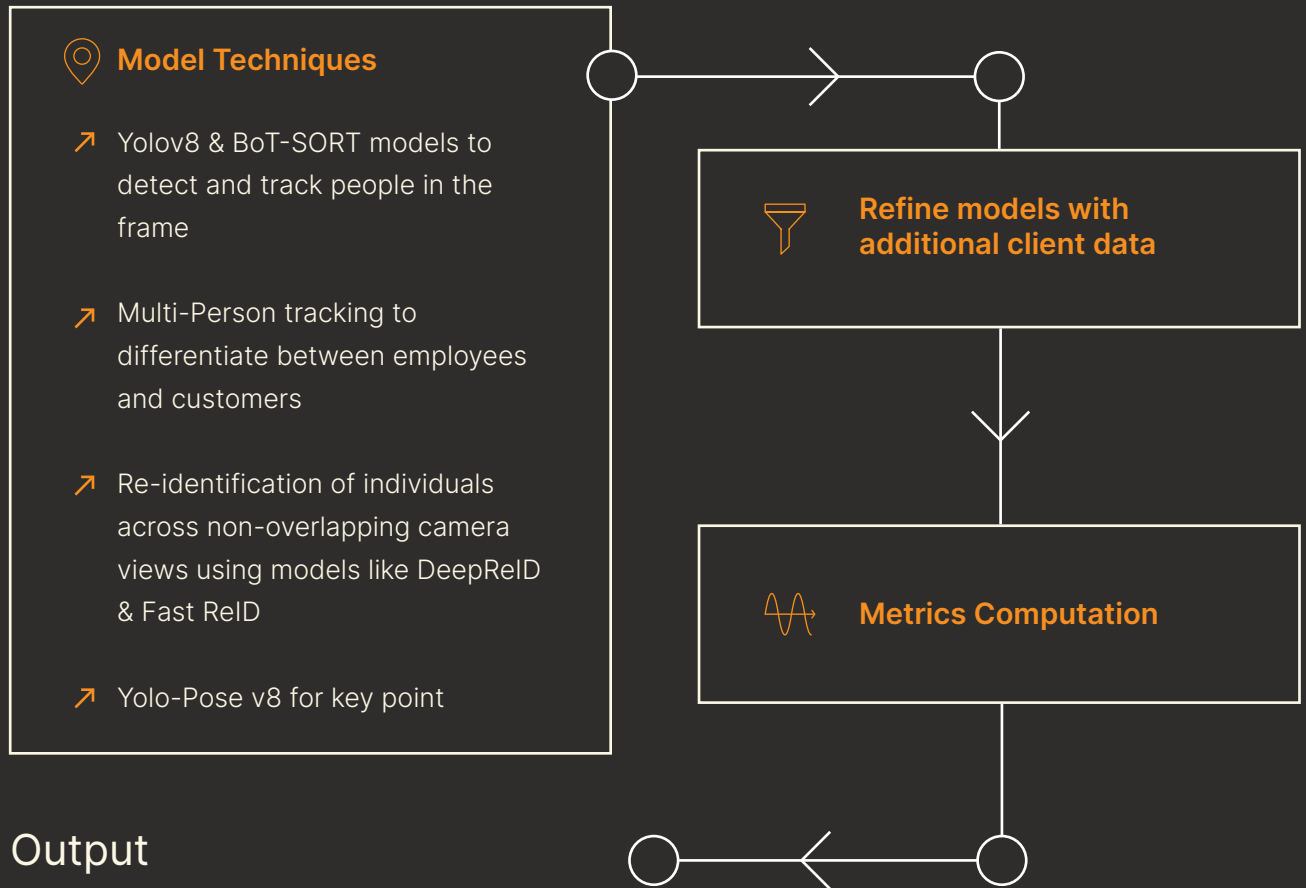
### File Decoding

Convert encoded video files to mp4 format and prepare them for modeling

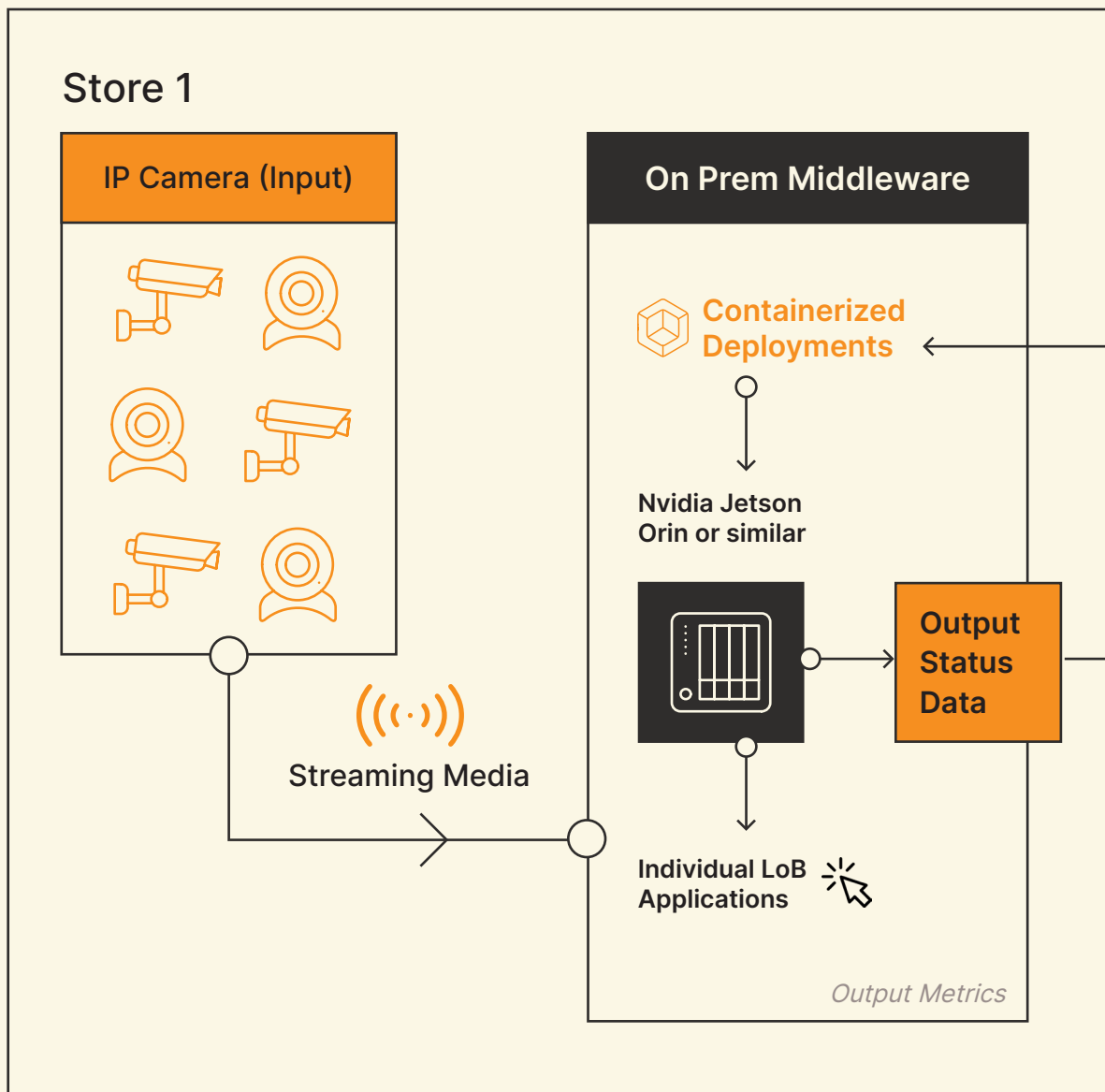
- Frame Extraction
- Zone definition
- Noise Reduction
- Image Enhancement
- Normalization



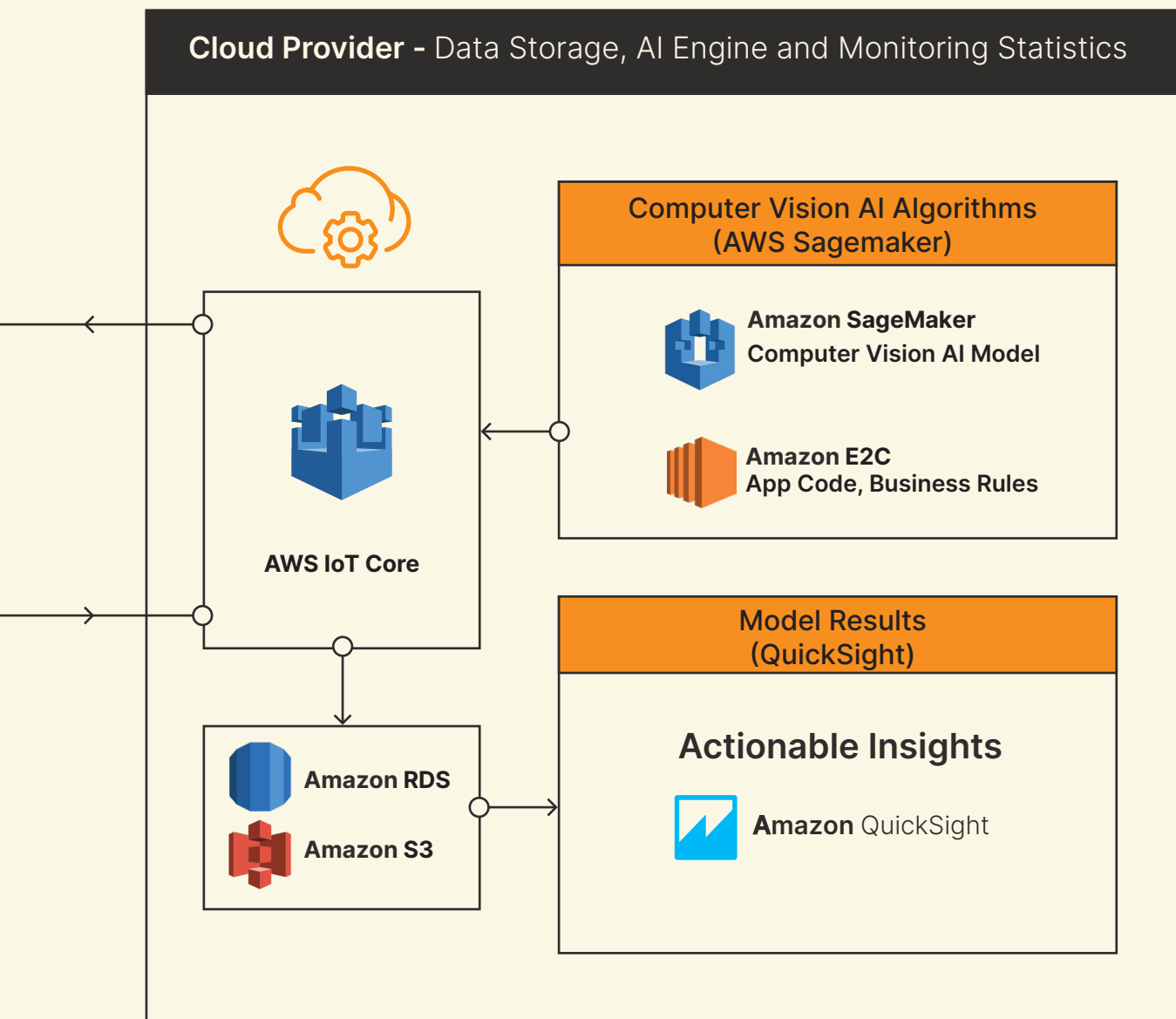
## Custom Model Development



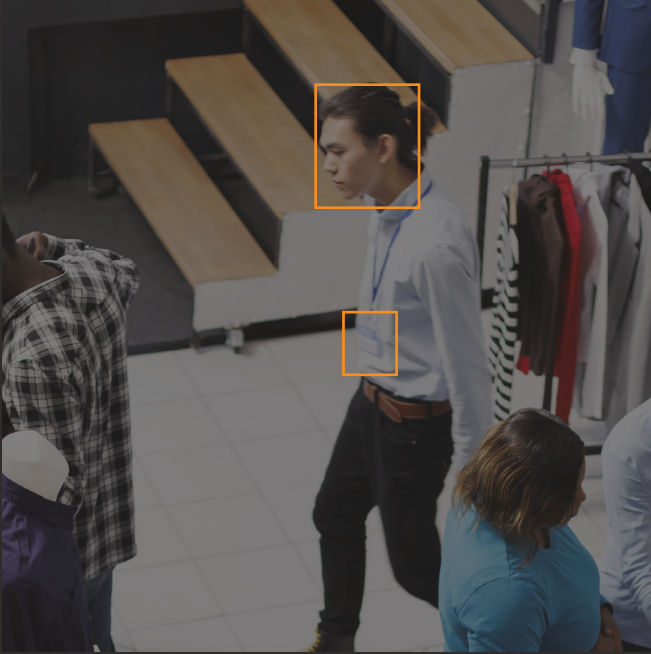
# Solution Architecture.



## High Level Architecture on AWS – Edge Deployment



# Use Cases.



## Assisted Checkout Identification

**Input Video Feed: Self-checkout areas**

### Process

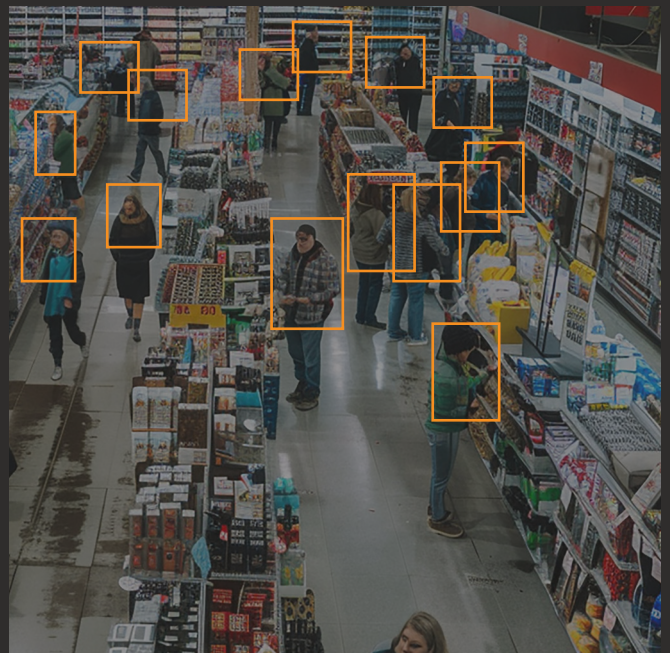
Our solution uses YOLOv8 for object detection to identify checkout counters and individuals, BoT-SORT for tracking with unique IDs, and Fast ReID for re-identifying individuals across camera views. Employees are identified by their presence over two consecutive 30-minute intervals. A checkout interaction is defined if a customer's time is at least 25% of the transaction time, and checkouts are classified as engaged if employee interaction exceeds 10 seconds or 10% of the transaction time.

## Traffic Pattern Mapping

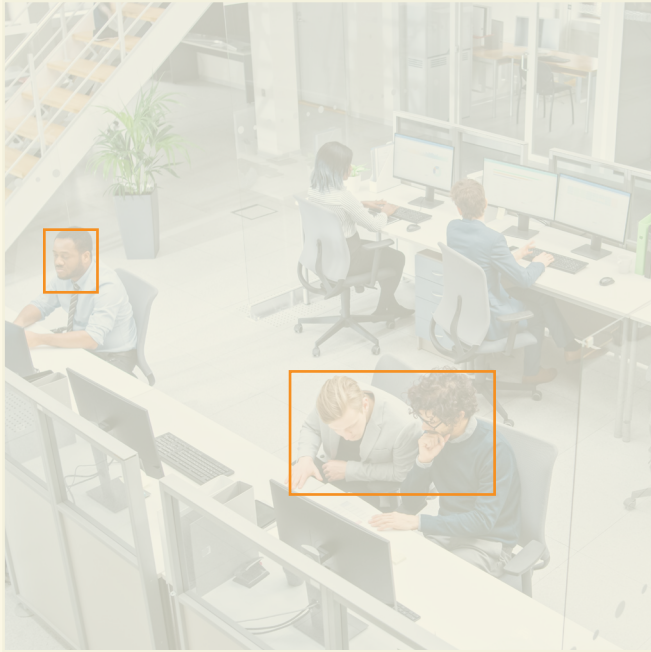
**Input video feed: All 13 cameras from across store**

### Process

Our solution creates heatmaps for each camera view to track and analyze customer movement and uses motion detection to identify the most frequented/high traffic areas/aisles in-store based on time spent moving/ standing still by individuals (both employees and customers).







## Manager Office Activity

**Input video feed: Managers' office**

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### Process

Our solution has an object detection model to identify the individuals present in office and calculate the time spent within the office by each employee, helping in monitor the Idle time per employee and optimize employee schedules.

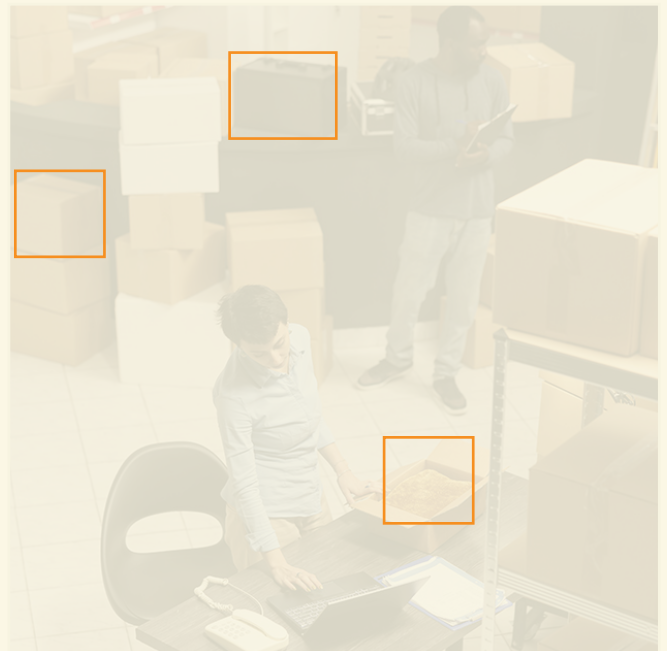
## Stockroom Freight Dwell Time

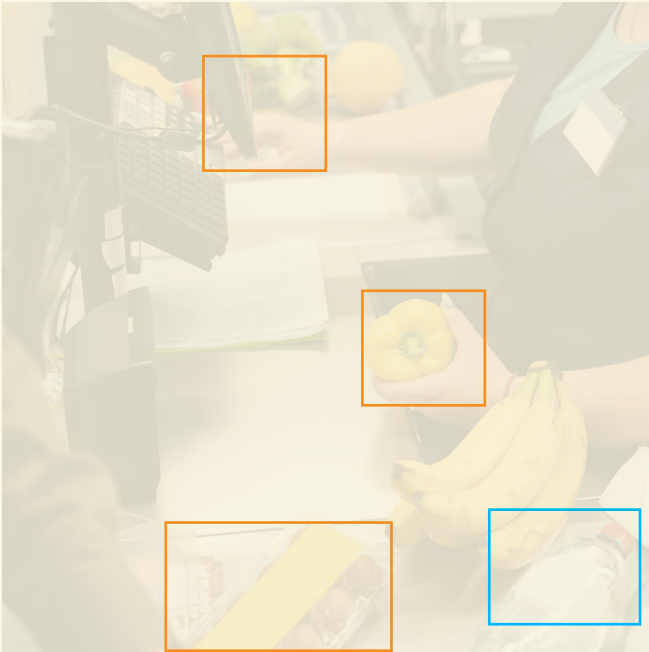
**Input video feed: Custom annotated data from Stockroom cameras**

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### Process

Our solution uses object detection to identify and assign IDs to shrink-wrapped pallets in the stockroom, tracking them across frames. Pallets are detected and given IDs only if they appear in a video for at least 1 minute to avoid false positives. The solution also calculates how long pallets remain untouched, flagging those left for over 36 hours.





## Transaction Oversight at POS

Input video feed: Legacy Point of Sale/  
Register Camera

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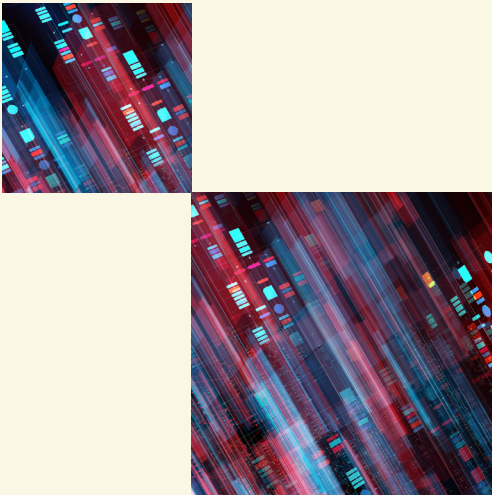
### Process

Our solution correlates video feed data with POS transaction data, using YOLOv8 to identify counter areas and distinguish employees from customers. It detects refund transactions from POS data and examines activity at the counter. A pose detection model identifies employee hands in the counter area, flagging transactions as suspicious if no customer is present during a refund.

# The Summary.

Embrace the future of retail with our advanced analytics solution. Transform your store operations, enhance customer satisfaction, and stay ahead of the competition with Retail Store Analytics using Computer Vision on AWS. Our AI-based solution leverages advanced computer vision models to provide data-driven insights, enhancing retail operations. With heatmaps for visualizing store traffic, metrics for monitoring employee and customer interactions, and user-friendly dashboards, our solution improves operational efficiency and reduces theft. It ensures better inventory management and identifies high-traffic areas, leading to more informed decision-making. Successfully implemented across three retail outlets with approximately 90% accuracy, our solution is a proven tool for modern retail management.

# About us.



We offer full-stack AI and analytics services & solutions to help businesses achieve real outcomes and value at scale. We are on a mission to push the boundaries of what AI and analytics can do to help enterprises navigate uncertainty and move forward decisively. Our purpose is to provide certainty to shape a better tomorrow.



## Tiger Analytics



(Thank you)



We provide certainty to shape a better tomorrow.

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