ARIA
APPLIED RESEARCH IN ACTION

Revitalizing Retail: Edge-Driven Computer Vision for Real-Time Analytics

Infusing AI Excellence into Retail: Harnessing State-of-the-Art Deep Learning for Instantaneous Insights, Robust Security and Advanced Customer Analytics.

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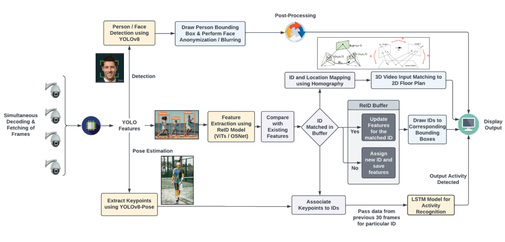

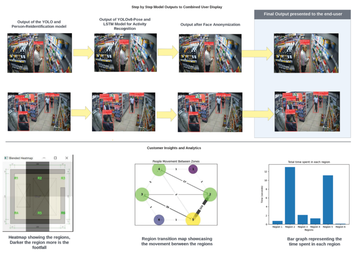

PROJECT SUMMARY

With costs, employee shortages, and customer expectations soaring, retailers must tackle increased shrink, boost safety, and offer personalized shopping experiences. In 2020, the National Retail Federation noted inventory shrinkage at 1.62% of sales and growing safety concerns. Additionally, the demand for advanced marketing analytics has underscored the need for deeper customer insights in-store. To address this, J-Squared Technologies' FALC-AI team introduced an AI-driven solution using advanced computer vision and real-time edge device analytics for retail. The focus is on deep analysis of customer behavior, movement, and in-store interactions.

Our approach integrates state-of-the-art models for person and face detection, re-identification, pose estimation, and activity recognition. By merging CCTV footage with store layouts, the system dynamically displays human interactions, highlights dense areas, and gives crowd size estimates, improving situational awareness.

By employing advanced model optimization and mixed precision training, our system's accuracy is notably improved. The initial feature set allows measurement of customer dwell times, accurate density estimates, and tracking of activity patterns, revealing detailed shopper routes.

For operational and privacy reasons, real-time detection and re-identification models operate on edge devices, enabling fast local processing. Edge-based processing offers benefits such as reduced latency, data privacy, and bandwidth savings compared to traditional cloud-based solutions. With data processed locally, there's less reliance on continuous internet connectivity, ensuring a more resilient and efficient system. Our research underscores AI and edge devices' pivotal role in retail analytics, offering a flexible and efficient alternative to traditional cloud-based systems.

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