

AI Cargo Recognition and Management at Busan Port Smart Logistics Center

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Efficient and accurate cargo detection is crucial for the operational success of handling equipment in warehouse environments. This research presents a novel support system for forklifts at the Busan Port Smart Logistics Center, leveraging advanced computer vision techniques, specifically the YOLOv8 (You Only Look Once version 8) model, to enhance cargo detection capabilities. Our approach involves the development of a comprehensive computer vision pipeline that includes image preprocessing, real-time object detection using YOLOv8. The YOLOv8 model processes visual data and extracts relevant features, enabling the system to handle various cargo types with high accuracy.

The proposed system seamlessly integrates with the warehouse management system (WMS), allowing real-time communication and data exchange. This integration enables accurate counting and management of products for pick-up, significantly contributing to inventory control and order fulfillment. The system also supports real-time updates to the WMS, ensuring synchronized operations and timely responses to dynamic warehouse conditions. Extensive experiments were conducted using a diverse set of warehouse scenarios to evaluate the system's performance.

In conclusion, the integration of the YOLOv8 model into forklifts offers a promising solution for enhancing warehouse automation at the Busan Port Smart Logistics Center. The proposed system not only boosts the accuracy and efficiency of cargo detection but also enhances the overall productivity and effectiveness of warehouse operations. By enabling precise inventory management and streamlined workflows, this comprehensive approach contributes significantly to the realization of a fully automated warehouse system. Furthermore, the system's scalability and adaptability to various warehouse environments make it a versatile tool for optimizing productivity and operational effectiveness across the logistics industry.