

Vision Pallet (Hands gesture Recognition Based AI Project)

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Abstract: *This research presents a comprehensive study of artificial intelligence applications in two distinct domains: interactive human-computer interfaces and industrial logistics. The first part introduces Vision Pallet, an AI-powered interactive whiteboard that utilizes hand gesture recognition and voice commands to enable seamless user interaction. The system integrates OpenCV and CVZone for gesture tracking, a React.js-based frontend for drawing inputs, and a FastAPI backend that processes data and generates real-time feedback using Google Generative AI. With Firebase-based user authentication and modular architecture, it offers a scalable platform suitable for education and creative fields. The second part focuses on AI-driven vision systems in logistics, particularly in pallet detection, classification, localization, and loading optimization. Deep learning models such as ResNet51 classify pallet damage with high accuracy, while vision systems enable precise localization and integration with automated guided vehicles (AGVs) and forklifts. These AI systems enhance operational efficiency, reduce manual labor, and improve decision-making in warehouse environments, demonstrating the transformative potential of AI in both user interaction and logistics automation.*

Keywords: artificial intelligence

