

Virtual Design System for Explainable AI-Based Product Packaging Optimization through Machine Vision

Neeraj Bhagarva¹, Sumit Srivastava², Deepshikha Saxena^{3*}

¹ Professor, School of Engineering & System Sciences, MDS University, Ajmer, India

² Professor, Department of Information Technology, Manipal University Jaipur

³ Research Scholar, MDS University Ajmer, India

*Corresponding author's e-mail: d.shikhasaxena@gmail.com

ABSTRACT

This paper introduces a ground breaking Virtual Design System (VDS) designed to enhance the efficiency and transparency of product packaging optimization through the integration of Explainable Artificial Intelligence (XAI) and Machine Vision technologies. The system aims to streamline the packaging design process, ensuring not only visual appeal but also adherence to branding guidelines, environmental sustainability, and regulatory compliance. The VDS employs high-resolution cameras and sophisticated image processing algorithms to capture and analyze product and packaging features. Machine learning models, enhanced with explainability tools, contribute to the decision-making process by suggesting design modifications. Users benefit from a user-friendly interface with real-time feedback, drag-and-drop design tools, and collaboration features, seamlessly integrated with popular design software. The system incorporates a centralized database containing packaging guidelines, environmental impact data, and regulatory compliance information. This ensures that design suggestions align with industry standards and environmental considerations. Security measures, including data encryption and user authentication, are implemented to safeguard sensitive design data. By fostering transparency in decision-making, the VDS allows users to comprehend the rationale behind AI-driven design recommendations. This not only empowers designers but also facilitates collaboration within design teams. The system undergoes rigorous testing and continuous improvement cycles, with feedback loops from users shaping ongoing enhancements. This research presents a holistic approach to the intersection of machine vision, explainable AI, and packaging design. The Virtual Design System offers a transformative solution for businesses seeking to optimize product packaging, promoting creativity, compliance, and sustainability in a rapidly evolving market.

Keywords: Machine vision, Product packaging, detecting system

How to Cite

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