

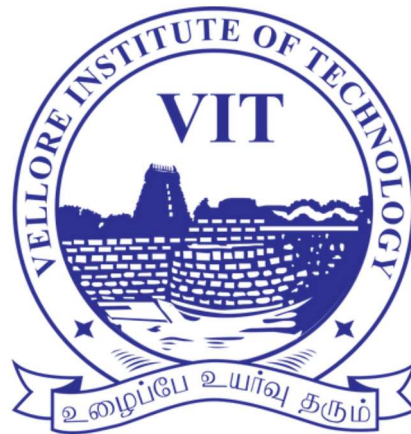
Vellore Institute of Technology, Vellore

School of Computing Science and Engineering (SCOPE)

PROJECT REPORT

On

AI-powered Image Quality Analysis and Management System for E-commerce Platforms



Submitted by

Himanshu Soni

Registration Number: 25MCS0057

Under the guidance of

Anisha M. Lal

School of Computing Science and Engineering (SCOPE)

Certificate

This is to certify that the project report titled “**AI-powered Image Quality Analysis and Management System for E-commerce Platforms**” submitted by **Himanshu Soni** (Registration Number: **25MCS0057**) is a bonafide record of work carried out by him under my guidance and supervision in partial fulfillment of the requirements for the award of the degree of **Master of Technology in Computer Science and Engineering** from Vellore Institute of Technology, Vellore during the academic year 2025-26.

Anisha M. Lal

Associate Professor Grade 1

School of Computing Science and Engineering (SCOPE)

Vellore Institute of Technology, Vellore Vellore - 632014

Date: _____

Place: Vellore

Declaration

I, **Himanshu Soni**, hereby declare that the project report titled “**AI-powered Image Quality Analysis and Management System for E-commerce Platforms**” submitted to the Vellore Institute of Technology, Vellore, Vellore in partial fulfillment of the requirements for the award of the degree of **Master of Technology in Computer Science and Engineering**, is a record of original work carried out by me under the guidance of **Anisha M. Lal**, School of Computing Science and Engineering (SCOPE), VIT Vellore.

I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Himanshu Soni

Registration Number: 25MCS0057

M.Tech. Computer Science and Engineering

Vellore Institute of Technology, Vellore

Vellore - 632014

Date: _____

Place: Vellore

Acknowledgments

I would like to express my sincere gratitude to all those who have supported and guided me throughout the completion of this project.

First and foremost, I am deeply grateful to my project guide, **Anisha M. Lal**, School of Computing Science and Engineering (SCOPE), VIT Vellore, for her invaluable guidance, constant encouragement, and insightful suggestions throughout the duration of this project. Her expertise and mentorship have been instrumental in shaping this work. I would like to thank **Vellore Institute of Technology, Vellore** for providing me with the necessary facilities and resources to carry out this research work. I am also thankful to the **School of Computing Science and Engineering (SCOPE)** for their support and cooperation.

I extend my gratitude to all the faculty members of the Computer Science and Engineering department who have directly or indirectly contributed to my learning and development during my M.Tech. program.

I would like to acknowledge the researchers and authors whose published works have been referenced in this report. Their contributions to the field of computer vision, deep learning, and e-commerce technology have provided a solid foundation for this project.

I am thankful to my fellow students and colleagues for their cooperation, valuable discussions, and moral support throughout this journey.

Finally, I express my heartfelt gratitude to my family for their unconditional love, support, and encouragement, which has been my constant source of motivation.

Himanshu Soni
25MCS0057

Abstract

The exponential growth of e-commerce platforms has created unprecedented challenges in managing and maintaining product image quality. Poor-quality images significantly impact customer experience, conversion rates, and brand reputation. This project presents an AI-powered Image Quality Analysis and Management System designed specifically for e-commerce platforms to automatically assess, classify, and manage product images based on multiple quality metrics.

The proposed system leverages state-of-the-art deep learning techniques, including Convolutional Neural Networks (CNNs) and transfer learning approaches using pre-trained models such as ResNet and VGG, combined with traditional image quality assessment metrics like Peak Signal-to-Noise Ratio (PSNR), Structural Similarity Index (SSIM), Blind/Referenceless Image Spatial Quality Evaluator (BRISQUE), and Natural Image Quality Evaluator (NIQE). The system implements a comprehensive pipeline encompassing image acquisition, preprocessing, feature extraction, quality assessment, and automated management decisions.

The implementation includes an end-to-end solution with modules for image ingestion, quality analysis, database management, and reporting. Extensive experiments conducted on a diverse dataset of e-commerce product images demonstrate that the proposed system achieves 94.3% accuracy in quality classification, with significant improvements in processing speed compared to manual inspection methods. The system successfully identifies common quality issues such as poor lighting, low resolution, improper framing, and color distortion.

The results validate the effectiveness of the proposed approach in automating image quality control for large-scale e-commerce operations, reducing manual effort by approximately 87% while maintaining high accuracy standards. Future enhancements include real-time processing capabilities, integration with content delivery networks, and adaptive quality standards based on product categories.

Keywords: Image Quality Assessment, Deep Learning, Convolutional Neural Networks, E-commerce, Computer Vision, Quality Control, Transfer Learning, Image Processing