VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI

A PROJECT REPORT ON

"SPECULAR REFLECTION REMOVAL FROM IMAGES"

Submitted in partial fulfillment for the award of Degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE & ENGINEERING

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CERTIFICATE

This is to certify that the project entitled **"SPECULAR REFLECTION REMOVAL FROM IMAGES"** has been successfully completed by

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14.5.24

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ABSTRACT

Specular reflections pose significant challenges in various imaging applications, including photography, computer vision, and image processing. They often degrade image quality, obscure details, and hinder the performance of automated algorithms. Thus, developing effective techniques for removing specular reflections from images has garnered substantial attention in recent years.

This paper presents a novel approach for specular reflection removal using only images as input. Unlike traditional methods that rely on multiple images or additional sensors, our proposed method leverages the information within a single image to identify and eliminate specular reflections. We employ a combination of image processing techniques, deep learning algorithms, and optimization strategies to achieve robust and efficient reflection removal.

The proposed method consists of several key steps. First, we detect regions likely to contain specular reflections based on local intensity variations and geometric properties. Next, we employ a deep neural network trained specifically for specular reflection removal to predict reflection maps within these regions. Subsequently, we refine the predicted reflection maps using optimization techniques to enhance accuracy and consistency. Finally, we combine the refined reflection maps with the original image to generate a reflection-free output.

We evaluate the performance of our method on various datasets comprising images with diverse scenes and degrees of reflection. Experimental results demonstrate that our approach outperforms existing methods in terms of both qualitative and quantitative metrics. Furthermore, we conduct extensive ablation studies to analyze the contributions of individual components and validate the effectiveness of our proposed technique.

Overall, our method offers a promising solution for mitigating specular reflections in images, with potential applications in fields such as photography enhancement, object recognition, and image-based rendering. We believe that the proposed approach can facilitate advancements in image processing and computer vision tasks that are susceptible to the adverse effects of specular reflections covers model design, simulation, and stability analysis, offering a comprehensive approach to exploring and validating industrial automation models