IMPROVING IMAGE QUALITY: AN INVESTIGATION INTO ENHANCEMENT METHODS

A project report submitted in the partial fulfillment of the requirements for the award of degree of

BACHELOR OF TECHNOLOGY
IN
"ELECTRONICS & COMMUNICATION ENGINEERING"

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CERTIFICATE

This is to certify that the project work entitled **"IMPROVING IMAGE QUALITY:AN INVESTIGATION INTO ENHANCEMENT METHODS"** is being submitted for the partial fulfilment of requirements for the award of Bachelor of Technology of in Electronics & Communication Engineering is a bonafied work done by **L.KALYANI (20811A0435), K.MOHAN KARTHIK (20811A0430), M.DURGA PRASAD (20811A0441), P.CHANDHINI (20811A0450)** under guidance during year 2023 – 2024 and it has been found suitable for acceptance according to the requirements of the University.

INTERNAL GUIDE

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ABSTRACT

In the realm of digital imagery, enhancing image quality under varying lighting conditions remains a formidable challenge. Traditional methods often struggle to balance brightness and contrast across images captured in low-light and normal-light environments. Addressing this issue, we introduce a novel technique called Reflectance-Oriented Probabilistic Equalization (ROPE) that revolutionizes 2D histogram equalization. ROPE ingeniously assumes a dependency between intensity occurrence and co-occurrence, deriving a 1D histogram from the marginalization over a 2D histogram. This method not only enhances global contrast with greater efficacy but also curtails noise amplification, a common pitfall in existing approaches. The cornerstone of ROPE lies in its unique 2D histogram, which integrates local pixel value differences in image reflectance, mitigating the adverse effects of dark lighting. Our approach outshines conventional studies by improving the brightness of low-light images without the risk of over-enhancement in normal-light scenarios. Over 50 images were scrutinized to validate the superiority of ROPE, which demonstrated remarkable qualitative and quantitative advancements over existing image enhancement techniques. ROPE's adaptability ensures it can provide ample brightness for darker images while preserving the natural appearance of those taken in standard lighting, making it a versatile tool for automated image enhancement. This abstract encapsulates the essence of the document, highlighting the innovative approach and its advantages in image enhancement technology.