IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 5, March 2025

Histogram-Based Resolution Enhancement of An Image

Satpute Yuvraj Suryabhan, Dr. Rahul M Mulajkar, Vaishali Mangesh Dhede
Department of Electronic and Telecommunication
Jaihind College of Engineering, Kuran, India

Abstract: *High-resolution (HR) images offer improved clarity and detail compared to low-resolution (LR) images, which is critical in applications like medical imaging, surveillance, and remote sensing. This research presents a histogram-based resolution enhancement technique to address the limitations of conventional methods like Histogram Equalization (HE) and Contrast-Limited Adaptive Histogram Equalization (CLAHE). A neural network model using Back Propagation Neural Network (BPNN) is proposed to learn and enhance histogram features from LR images. The methodology involves dividing images into blocks, calculating histograms for feature extraction, and applying advanced enhancement techniques, including Fuzzy Contrast Enhancement (FCE). The performance of the model is evaluated using metrics such as Peak Signal-to-Noise Ratio (PSNR) and Root Mean Squared Error (RMSE). Experimental results on datasets like brain MRI images demonstrate that the proposed approach effectively improves image contrast and resolution, with enhanced PSNR and reduced RMSE values compared to traditional methods. This work highlights the potential of histogram-based techniques for resolution enhancement in critical fields such as diagnostics and forensics.*

Keywords: Histogram-Based Resolution Enhancement, Image Contrast Enhancement, Neural Network Model, Peak Signal-to-Noise Ratio, Fuzzy Contrast Enhancement