

## **Integrated Intensity and Spatial Enhancement Technique for Color Images**

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**Abstract :** Video imagery captured for real-time security and surveillance applications is typically captured in complex lighting conditions. These less than ideal conditions can result in imagery that can have underexposed or overexposed regions. It is also typical that the video is too low in resolution for certain applications. The purpose of security and surveillance video is that we should be able to make accurate conclusions based on the images seen in the video. Therefore, if poor lighting and low resolution conditions occur in the captured video, the ability to make accurate conclusions based on the received information will be reduced. We propose a solution to this problem by using image preprocessing to improve these images before use in a particular application. The proposed algorithm will integrate an intensity enhancement algorithm with a super resolution technique. The intensity enhancement portion consists of a nonlinear inverse sign transformation and an adaptive contrast enhancement. The super resolution section is a single image super resolution technique is a Fourier phase feature based method that uses a machine learning approach with kernel regression. The proposed technique intelligently integrates these algorithms to be able to produce a high quality output while also being more efficient than the sequential use of these algorithms. This integration is accomplished by performing the proposed algorithm on the intensity image produced from the original color image. After enhancement and super resolution, a color restoration technique is employed to obtain an improved visibility color image.

**Keywords :** dynamic range compression, multi-level Fourier features, nonlinear enhancement, super resolution

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