

# Adaptive color contrast enhancement for digital images

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Adaptive Contrast Enhancement in Digital Image Processing\*\*

### **What is Contrast Enhancement?**

Contrast enhancement refers to the process of improving the visibility of details in an image by adjusting the difference between light and dark areas.

### **What is Contrast Enhancement in Digital Image Processing?**

In digital image processing, contrast enhancement techniques are algorithms that modify pixel values to increase the contrast between objects and their backgrounds. These techniques can be applied to grayscale or color images.

### **Color Image Enhancement**

Color image enhancement techniques extend contrast enhancement to color images, adjusting the balance of colors and enhancing specific features.

### **Adaptive Image Enhancement**

Adaptive enhancement techniques adjust contrast based on local image characteristics. They analyze the image, identifying regions with low contrast and selectively enhancing them without over-enhancing other regions.

### **Adaptive Contrast Control**

Adaptive contrast control adjusts the contrast in real-time, based on the dynamic range of the input image. This helps prevent clipping and retain detail in high-

contrast scenes.

### **Adaptive Mean Filter**

Adaptive mean filters are a type of spatial filter that calculates the mean pixel value of a window around each pixel, but adjusts the window size based on the local image complexity. This helps preserve edges while smoothing out noise.

### **Contrast in Digital Image Processing**

Contrast refers to the difference in pixel values between adjacent areas in an image. Higher contrast images have greater visibility of details.

### **Why Image Enhancement is Needed**

Image enhancement is used to improve the visual quality of images, making them more suitable for analysis, display, or other applications.

### **Best Image Enhancement Technique**

The best image enhancement technique depends on the specific image characteristics and the desired results.

### **Advantages of Color Image Processing**

Color image processing allows for more precise and nuanced adjustments to images, enhancing their overall appeal and facilitating advanced analysis tasks.

### **Mechanism of Contrast Enhancement**

Contrast enhancement algorithms work by stretching or compressing the pixel values, increasing the difference between light and dark areas.

### **Contrast-Enhanced Imaging**

Contrast-enhanced imaging is a medical imaging technique that involves administering a contrast agent to improve the visibility of specific structures in the body.

### **Contrast Enhancement Techniques**

Common contrast enhancement techniques include histogram equalization, gamma correction, and local contrast enhancement.

### **Adaptive Contrast Enhancement**

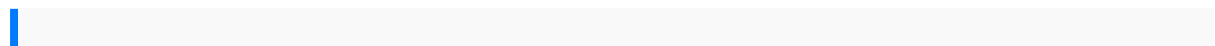
Adaptive contrast enhancement adjusts contrast based on local image characteristics, preserving detail in different regions.

### **HDR vs. SDR**

High Dynamic Range (HDR) images have a wider range of brightness values compared to Standard Dynamic Range (SDR) images, resulting in more realistic and detailed visuals.

### **Advantages of HDR**

HDR provides greater realism, improved detail in shadows and highlights, and a more immersive viewing experience.



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