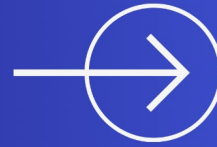




# CLAHE



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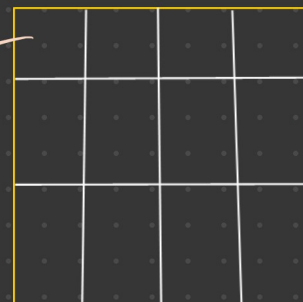
CLAHE improves contrast by applying histogram equalization in small regions or tiles of the image. Unlike global histogram equalization, which enhances contrast for the entire image, CLAHE focuses on localized contrast while avoiding artifacts like noise amplification.

It limits the contrast enhancement in each tile to prevent over-brightening.

## CLAHE

- 1 → Divide Images into Tiles.
- 2 → Apply histogram equalization on each tile.
- 3 → Apply contrast Limit to set the maximum limit intensity amplification in each tile for smoother results.
- 4 → Combine Tiles with bilinear Interpolation to remove seams between tiles.

Step 2,3



- Enhancing medical images (X-rays, CT scans)
- Improving visibility in low-light conditions.
- Enhancing specific details in satellite or aerial imagery.

Example : —

- Original image intensities range from 50-100 means too dark and lack definition in certain areas.
- We will split the image in 8x8 pixel blocks
- Each block will undergo histogram equalization and Histogram equalization maps values to 0-255.
- CLAHE Clip Limit: Ensures no pixel intensity exceeds a specified value (e.g., 180) and this is called contrast-limiting threshold.
- The enhanced tiles are stitched together with smooth transitions.