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Entry No: 18ANZ8059

Assignment: 1

Objective: This assignment deals with processing of images so that these can be converted into painterly rendered images. There are two parts to the assignment. The first part of the assignment requires implementation of parts from the paper on color quantization. These are:

- Popularity algorithm
- Median cut algorithm
- Floyed and Steinberg algorithm

The second part of the assignment requires implementation of edge detection using extended Difference of Gaussian (xDoG) from the paper (reference [2]). You are encouraged to try out different toning functions other than tanh.

A final result in terms of non-photorealistic (or painterly) rendered output you are required to combine the color quantization from fist part with edges obtained from the second part.

Part 1: Popularity algorithm

Part 2: Median-Cut

Part 3: Apply Floyed and Steinberg on Both Popularity and Median-Cut algorithm

Part 4: Fuse xDoG of image and result of part 3 to make a non- photorealistic rendered output

The implementation has been tested on set of 8 images at 5 bit (32 color) and 8 bit (256 color) quantization

Conclusion:

Popularity algorithm simple but the color map desired efficiency lower and even worse when large range of colors is available in image. Median cut is as good as Kmean and Colorgram color maps.

MedianCutFsxDogImg = MedianCut Quantization + FloyedStainburg Dithering + xDoG

PopularFsxDogImg = Popularity Quantization + FloyedStainburg Dithering + xDoG

Image 1: 8 bits



Original Image



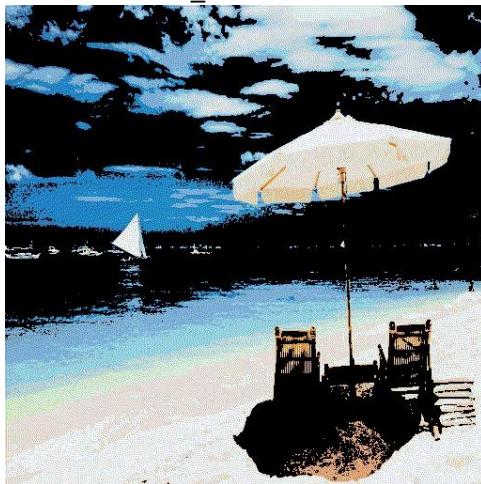
Quantized_medianCut - 8 bits



MedianCutFslImg - 8 bits



MedianCutFsDoGImg - 8 bits



MedianCutFsxDoGImg - 8 bits



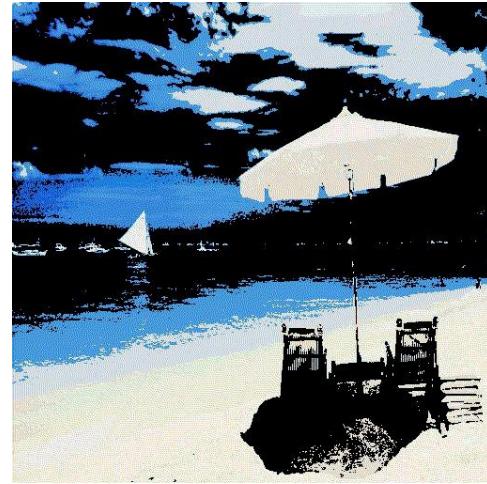
Quantized_Popularity - 8 bits



PopularFslImg - 8 bits



PopularFsDoGImg - 8 bits



PopularFsxDoGImg - 8 bits

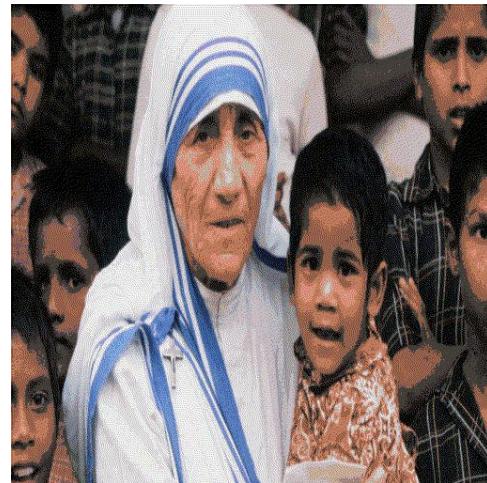
Image 3: 8 bits



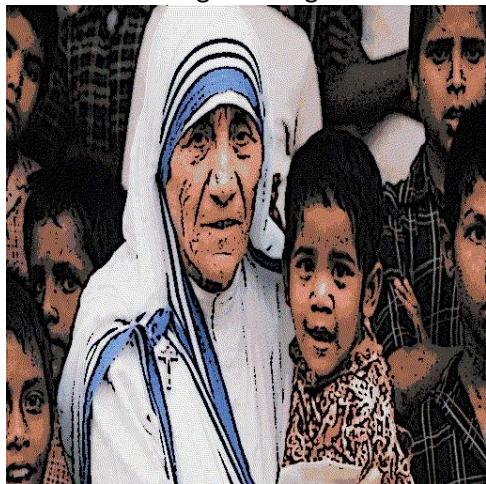
Original Image



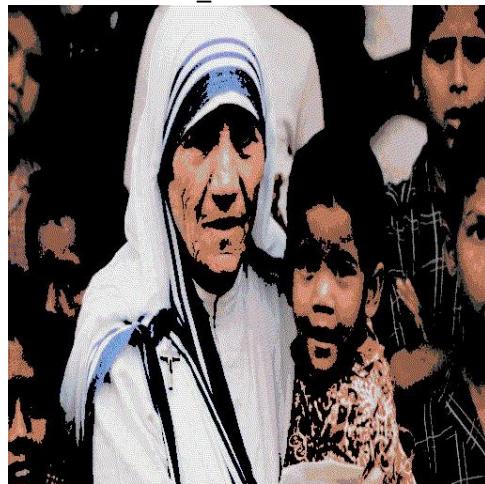
Quantized_medianCut – 8 bit



MedianCutFsImg – 8 bit



MedianCutFsDoGImg – 8 bit



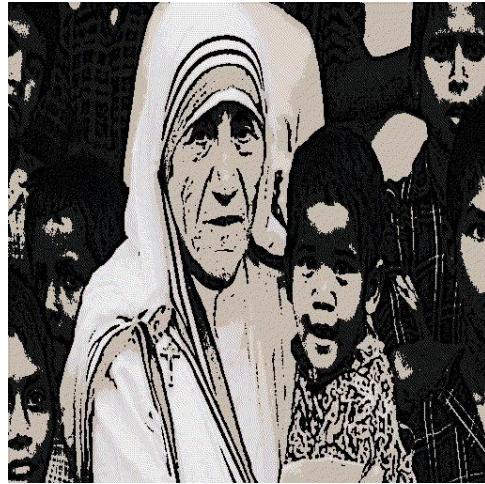
MedianCutFsDoGImg – 8 bit



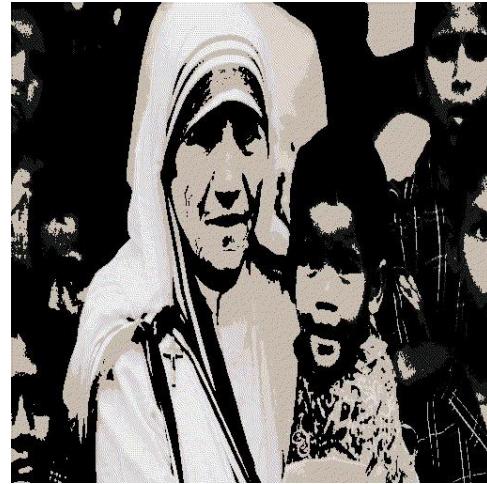
Quantized Popularity – 8 bit



PopularFsImg – 8 bit



PopularFsDoGImg – 8 bit

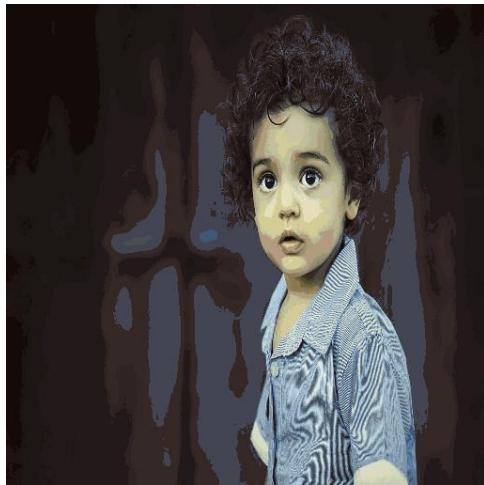


PopularFsDoGImg – 8 bit

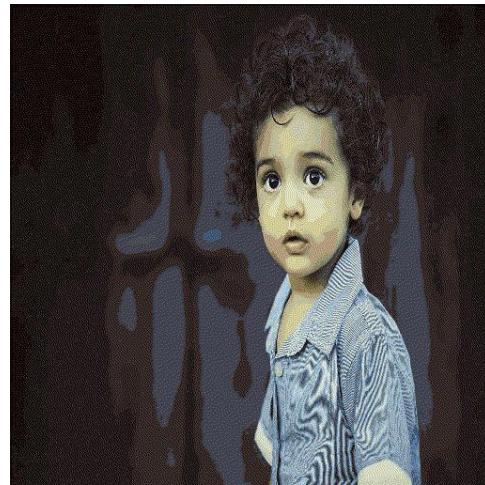
Image 4: 8 bits



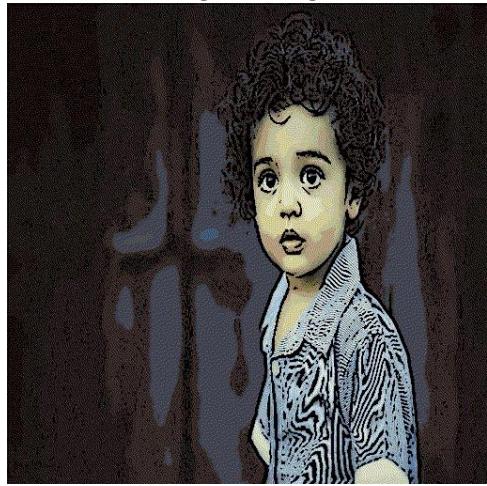
Original Image



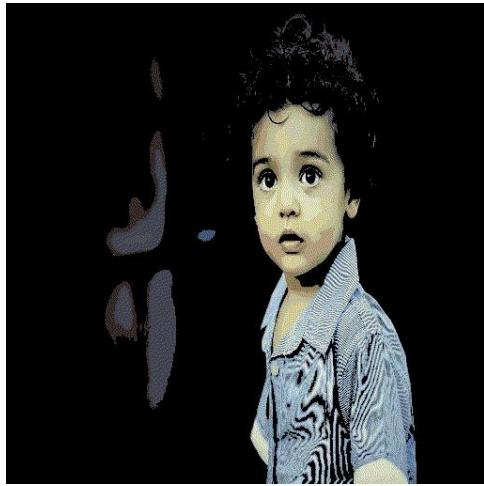
QuantizedMedianCut – 8 bit



MedianCutFsImg – 8 bit



MedianCutFsDoGImg – 8 bit



MedianCutFsDoGImg – 8 bit



Quantized Popularity – 8 bit



PopularFsImg – 8 bit

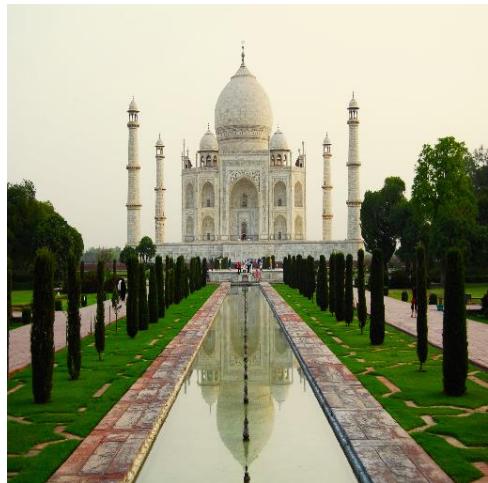


PopularFsDoGImg – 8 bit

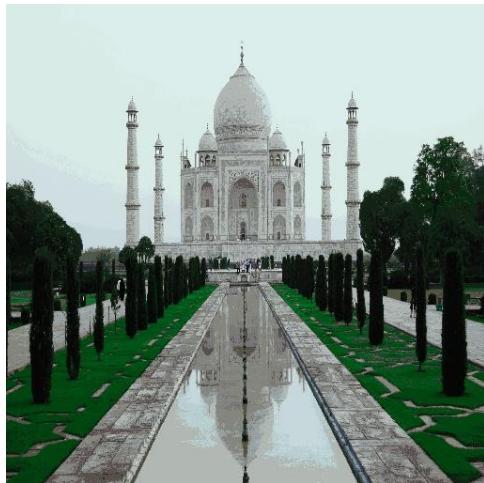


PopularFsDoGImg - 8 bit

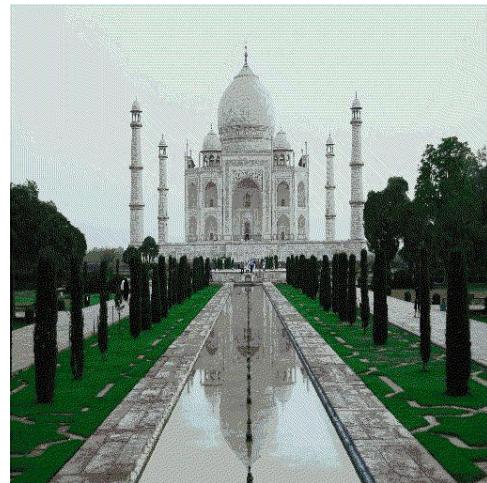
Image 5: 8 bits



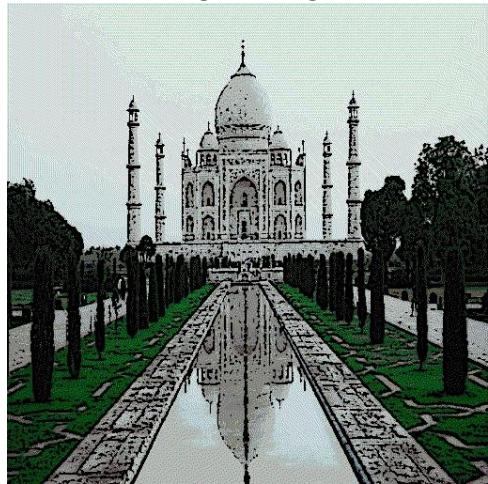
Original Image



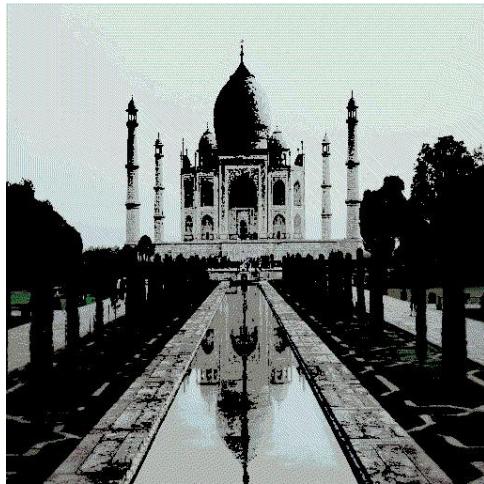
QuantizedMedianCut – 8 bit



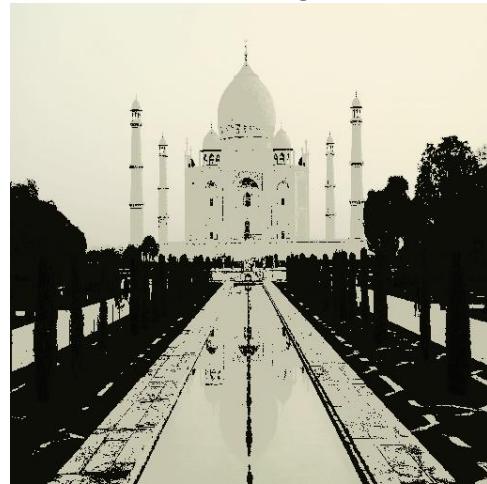
MedianCutFsImg – 8 bit



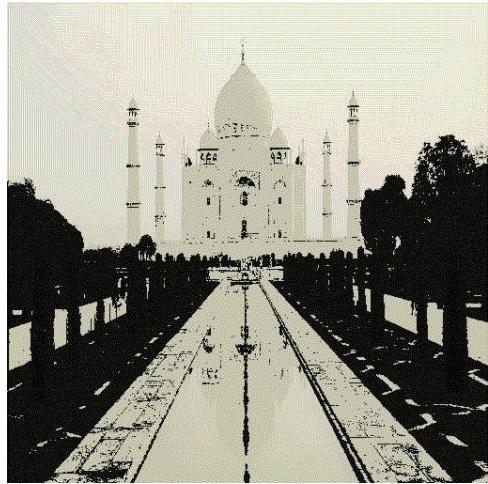
MedianCutFsDoGImg – 8 bit



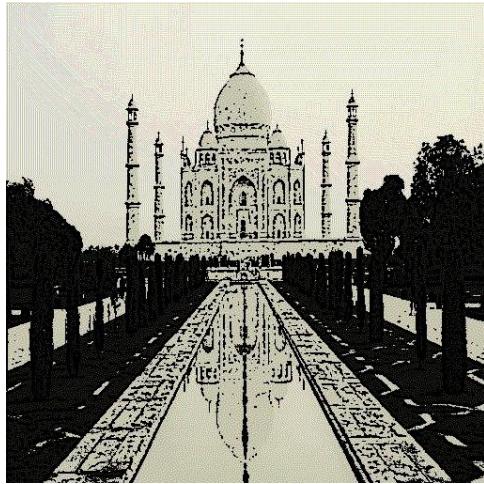
MedianCutFsDoGImg – 8 bit



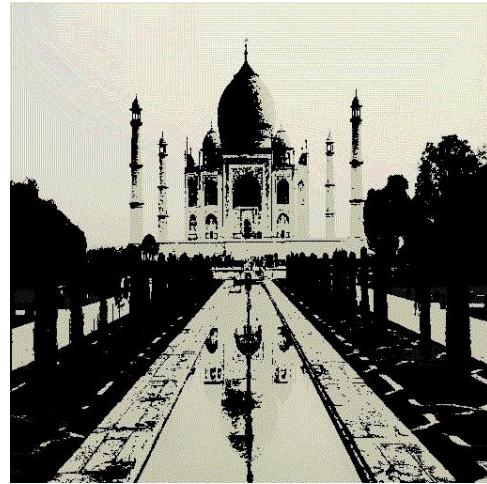
Quantized Popularity – 8 bit



PopularFsImg – 8 bit

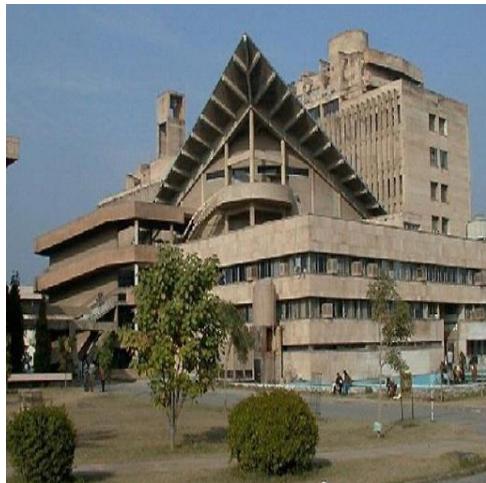


PopularFsDoGImg – 8 bit

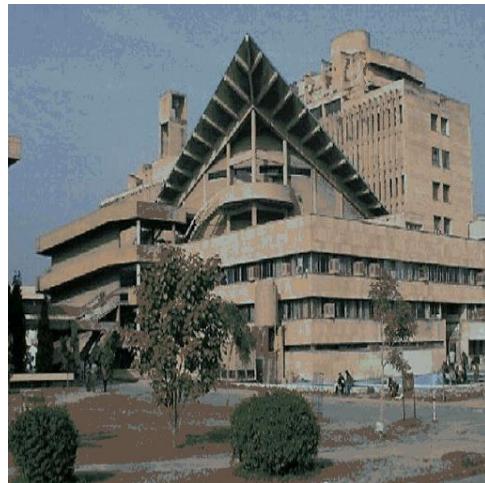


PopularFsDoGImg - 8 bit

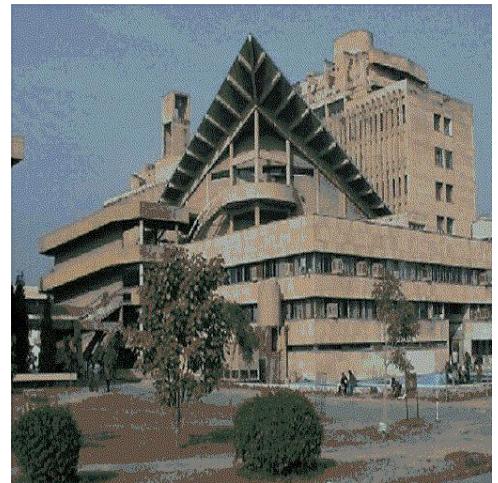
Image 6: 8 bits



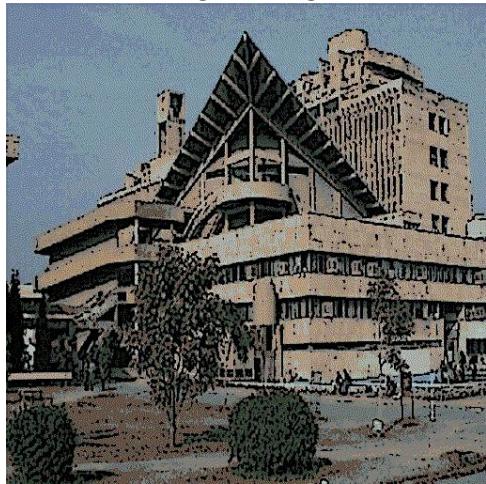
Original Image



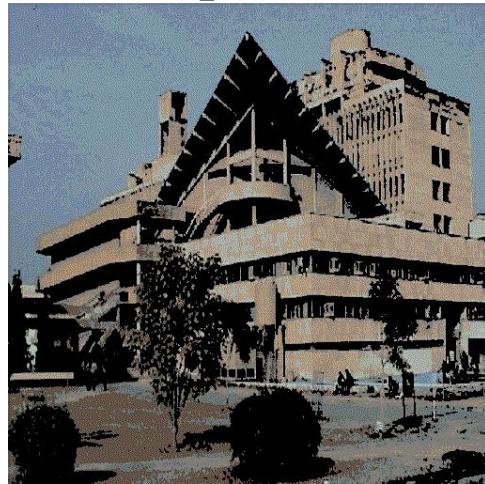
Quantized_medianCut– 5 bit



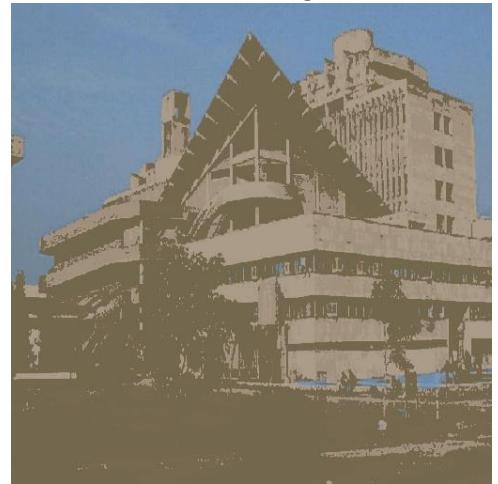
MedianCutFsImg– 5 bit



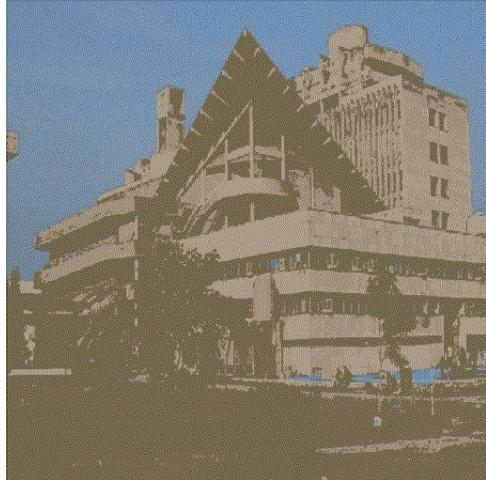
MedianCutFsDoGImg– 5 bit



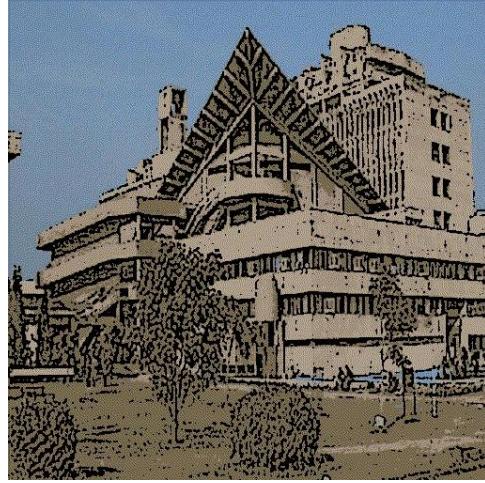
MedianCutFsDoGImg– 5 bit



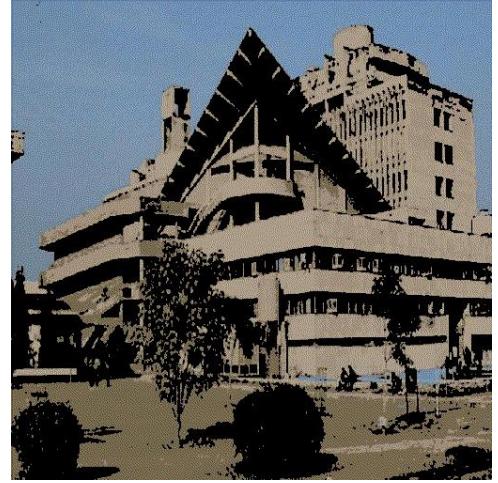
Quantized_Popularity– 5 bit



PopularFsImg– 5 bit



PopularFsDoGImg– 5 bit



PopularFsxDogImg– 5 bit

Image 7: 8 bits



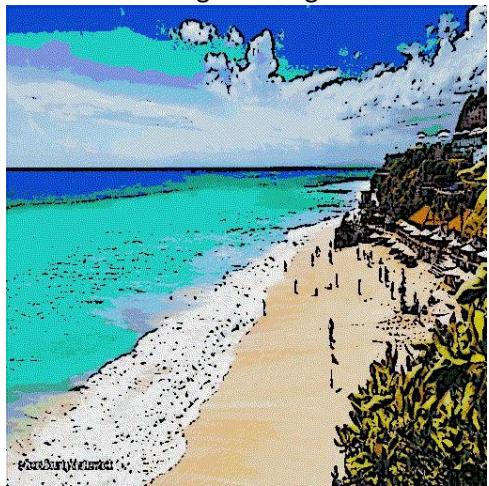
Original Image



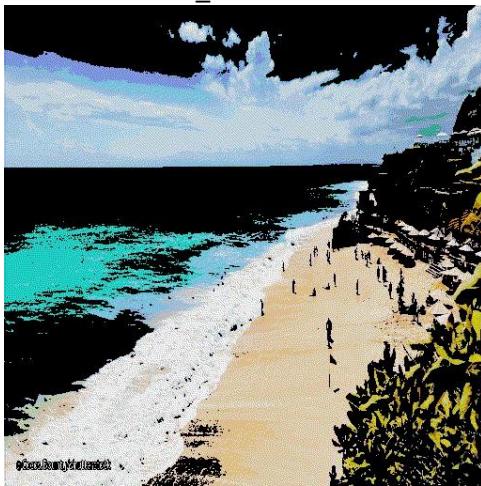
Quantized_medianCut– 5 bit



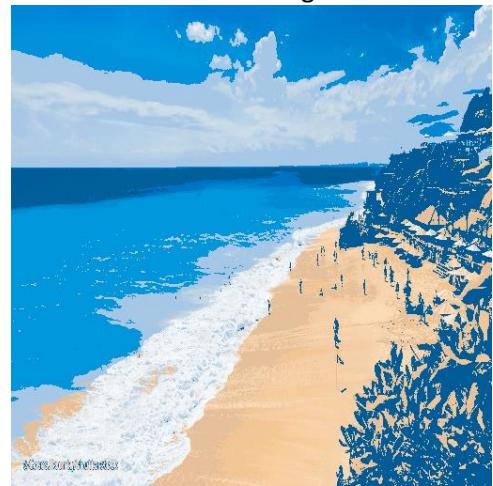
MedianCutFsImg– 5 bit



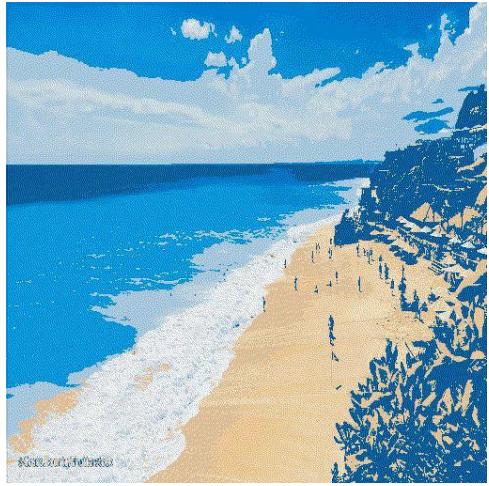
MedianCutFsDoGImg– 5 bit



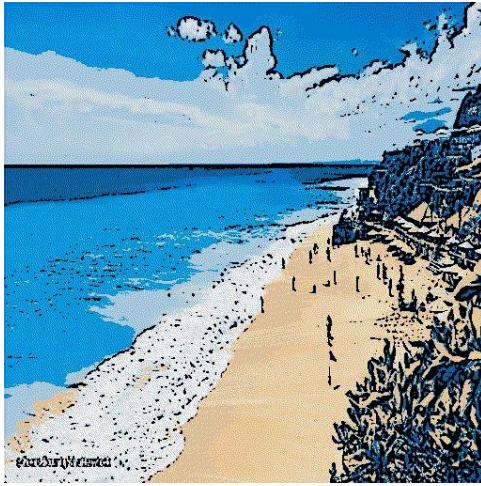
MedianCutFsDoGImg– 5 bit



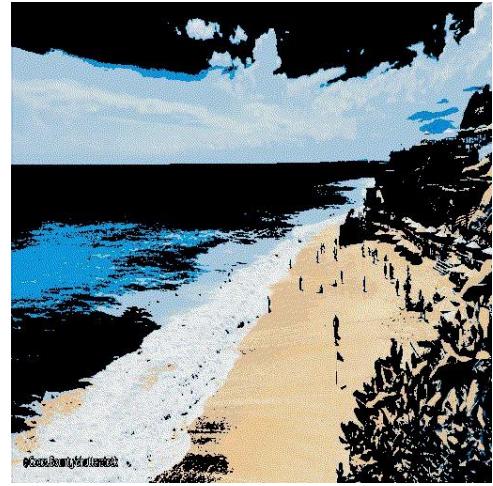
Quantized_Popularity– 5 bit



PopularFsImg– 5 bit



PopularFsDoGImg– 5 bit



PopularFsxDogImg– 5 bit

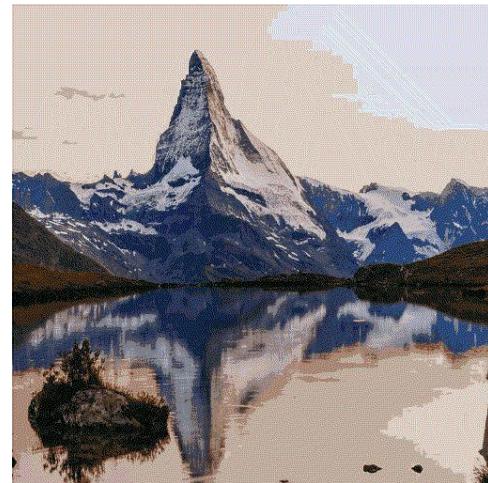
Image 9: 8 bits



Original Image



Quantized_medianCut– 8 bit



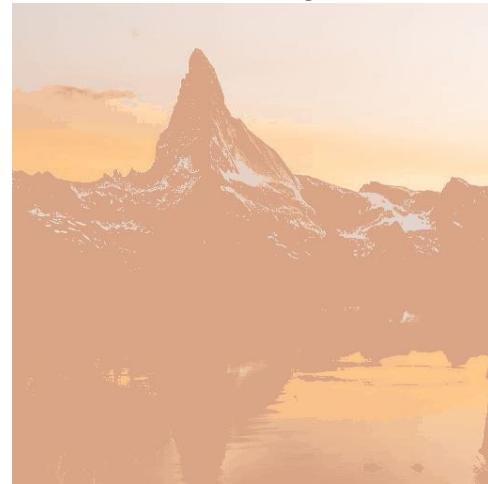
MedianCutFsImg– 8 bit



MedianCutFsDoGImg– 8 bit



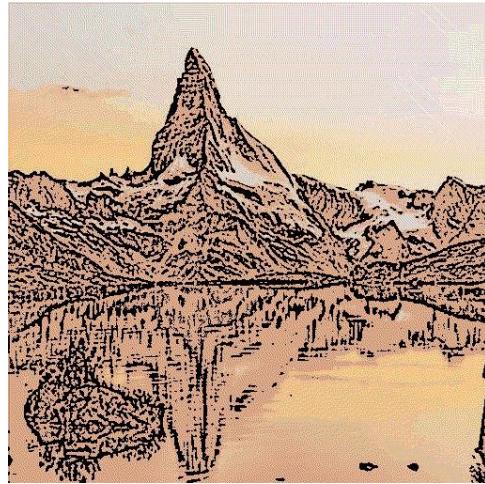
MedianCutFsDoGImg– 8 bit



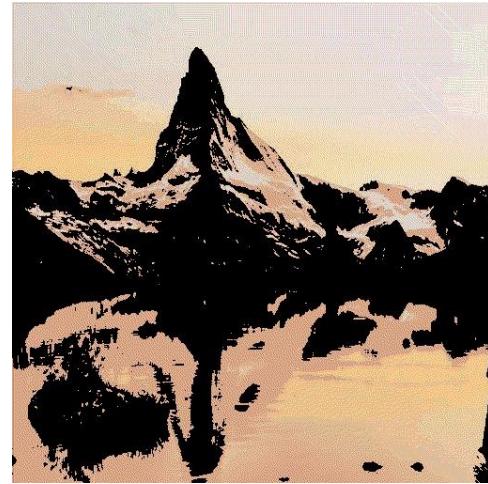
Quantized_Popularity– 8 bit



PopularFsImg– 8 bit

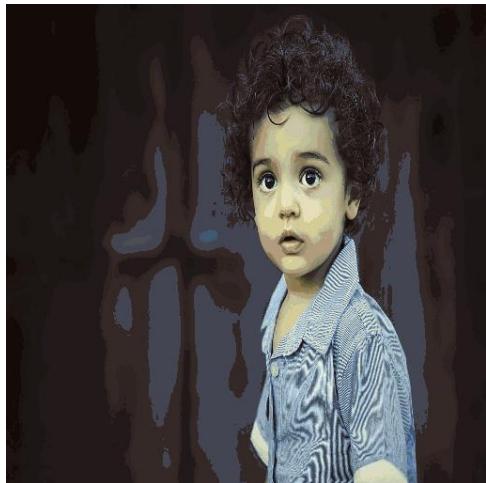


PopularFsDoGImg– 8 bit



PopularFsxDogImg– 8 bit

Median-cut, Colorgram and Kmean Results: 8 - Bit



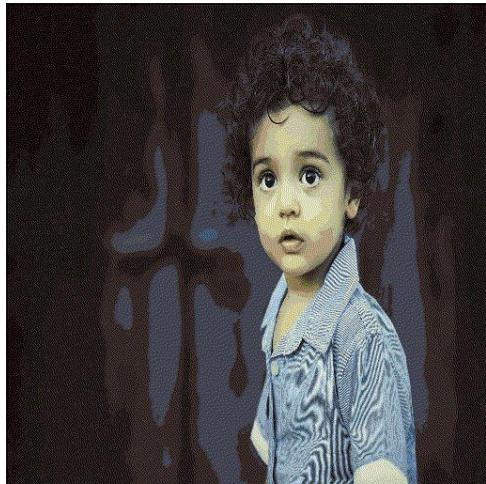
MedianCut- 8 bit



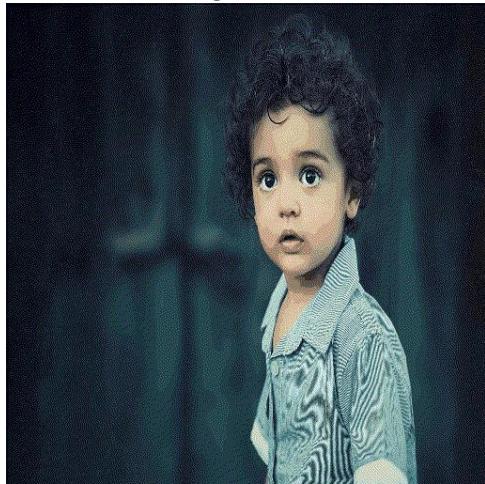
Colorgram- 8 bit



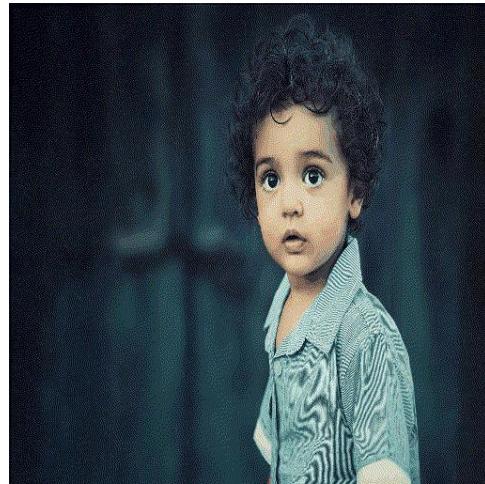
Kmean – 8 bit



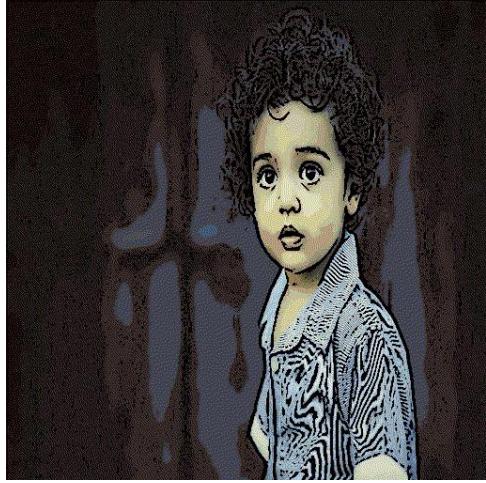
MedianCutF8Img- 8 bit



ColorgramF8Img- 8 bit



KmeanF8Img – 8 bit



MedianCutFsxDogImg- 8 bit



ColorgramFsxDogImg- 8 bit



KmeanFsxDogImg – 8 bit

Image 10: 256 Color



Original



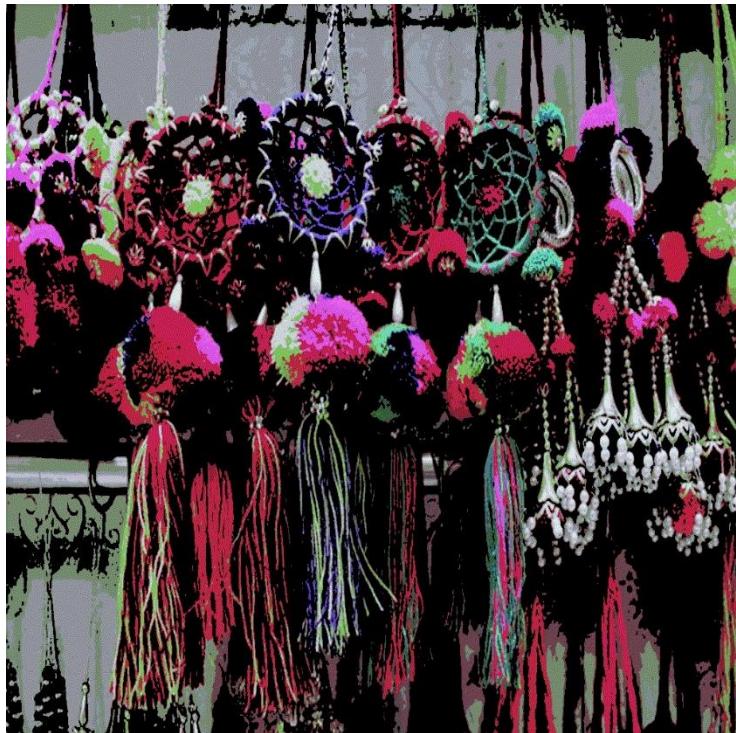
MedianCut – 256 color



Floyd and Steinberg dithering



Applying DoG after dithering



Applying xDoG after dithering



Original Image



MedinaCut + Dither + DoG, 8 - bit



MedinaCut + Dither + xDoG, 8 - bit