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Study on the Spectrum Modification Algorithms to Enhance the Resolution of Old Photos Images.

In this paper, spatial domain technique was employed to original images to have different effects on output images by changing the pixel intensity. Using mathematical functions and transformations such as $b=T(a)$, where, a and b are the pixel values before and after processing and T is the transformation that maps pixel value a into b . A logarithmic transformation: $b = T(a) = A*\log(1+a)$, and power law (gamma) transformations: $b= T(a)= A*a*\exp(\text{gamma})$ were used for the image process, where the 'A' and gamma are the positive constants. For the gamma transformation, we checked how the power law curves change as gamma varies. The cases such as gamma is greater than 1, gamma is equal to 1, and gamma is less than 1 are tested to map a range of input values into different output values. By performing the different transformation techniques and using various factors or constants, some enhancements and modifications were made. This paper showed the use of spectrum modification algorithms which can be applied to enhance the resolution of the images of old photos or historical relics using spatial domain technique. (Received August 19, 2020)