

Fusion CLAHE-based image enhancement with fuzzy set theory on field images

ABSTRACT

In this paper, a new fusion of Contrast-Limited Adaptive Histogram Equalisation or CLAHE-based method is proposed to enhance field images. The field images, which are low resolution images, were taken using a camera or other devices such as smartphones with lower quality as compared to the lab images with proper setup. The field images had low contrast and were blurred and unsharp due to inconsistent setting or environment exposures. Image enhancement helps to enrich the perception of images for better quality, reduce impulsive noise, and sharpen the edges with the help of different image enhancement techniques. The main attraction towards the enhancement of this research area is due to the additional knowledge and hidden information provided by the results of this procedure, which will further be used for many different useful purposes. This research proposes a fusion of CLAHE-based with Fuzzy set theory. An optimisation technique was applied to increase the enhancement ratio. The result of the proposed fusion method was compared with the standard method as a benchmark. The obtained value is compared by using image quality measurement techniques. The proposed fusion method produces better quality and enhanced images and required minimum processing time than the other methods.

Keyword: Image enhancement; CLAHE; Fuzzy; USM

