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Infrared Image Enhancement Using Contrast Limited Adaptive Histogram Equalization and Denoising Convolution Neural Network

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Abstract:

Digital Image processing is an evolving area of research over decades. Several techniques, algorithms, technologies, and trends are still being developed in this area. Detecting an object in day vision and when the background is stable is quite simple. When focusing on night vision object detection, thermal images have to be processed and when the background is not stable object detection or identification is a bit challenging. Deep image learning is more trending process to overcome complex issues to make machine vision analogous to human vision. A dynamic image has a lot of blur and noise whereas image preprocessing eases the complexity. Contrast Limited Adaptive Histogram Equalization (CLAHE) when applied on an infrared image is further enhanced with Denoising Convolution neural network (DCNN) on approach for improving contrast.

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I. Introduction

Preprocessing image relays on the concept of enhancing an image, where as any image emphasized to perform a set of process to remove any noise, adjusting image level, removing surplus element to highlight target element. Image preprocessing done to improve the quality of an image and even reduce size of an image for further training and interfacing. Enhancement is further classified into spatial and frequency domain enhancement. Where pixel by pixel processing is done in spatial domain and in frequency domain reduction of noise or edge detection is done by computing Fourier transformation of a signal. Contrast enhancement of spatial or pixel domain is histogram equalization, where image pixels were manipulated to perform contrast enhancement. The noise may affect the image during transmitting, issue in sensors, or during formatting. The objective is to improve the image's visual features or to offer a better transform version to feed with image processing applications like segmentation, analysis, and feature detection. Additionally, it helps in the identification of background data, which is necessary to understand object behavior through human perception and vision.

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 2018 10th International Conference on Intelligent Human-Machine Systems and Cybernetics (IHMSC)
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