

电子技术

基于NSCT和IHS变换域的灰度可见光与红外图像融合方法

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摘要:

针对灰度可见光与红外图像的融合问题, 提出了一种基于非下采样轮廓波变换(non subsampled contourlet transform, NSCT)和IHS变换域的自适应融合方法。该方法利用IHS变换域的有效分离图像亮度信息和光谱信息的优势, 对灰度可见光图像进行彩色传递并得到亮度、色调、饱和度(intensity hue saturation, IHS)三个分量的值; 然后通过NSCT变换分别对可见光图像的I分量和红外图像进行多尺度和多方向分解, 并采用一定的融合规则得到融合图像的低频分量和高频分量, 而后进行NSCT逆变换得到灰度融合图像并将其作为最终融合图像的I分量, 最后进行IHS逆变换得到红绿蓝(red green blue, RGB)彩色融合图像。理论分析和仿真实验验证了该算法的有效性。

关键词: 图像融合方法 亮度 色调 饱和度变换 非下采样轮廓波变换 彩色传递

Fusion technique for gray scale visible light and infrared images based on NSCT and IHS transform

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Abstract:

With regard to the fusion problem of gray scale visible light and infrared images, an adaptive fusion technique based on non subsampled contourlet transform (NSCT) and intensity hue saturation (IHS) transform is presented. With the help of the advantages of IHS transform, which can separate the intensity information from the spectrum information in the image, the color transfer approach is conducted to colorize the gray scale visible light image and the three component values of I, H and S can be gained. Multi scale and multi direction decomposition of the gray scale visible light image's intensity component and infrared image are performed by NSCT. By adopting certain fusion rules, the low frequency and high frequency components of the fusion image can be gained, besides, being the intensity component of the final fusion image, the gray scale fusion image can be also got by use of the inverse NSCT. Finally, the red green blue (RGB) colorized fusion image is reconstructed by the inverse IHS. The theory analysis and simulation examples show that the technique is effective.

Keywords: image fusion technique intensity hue saturation (IHS) transform non-subsampled contourlet transform (NSCT) color transfer

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