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Fusion of Hyperspectral and Multispectral Image Data for Enhancement of Spectral and Spatial Resolution

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Abstract. Hyperspectral image enhancement has been a concern for the remote sensing society for detailed end member detection. Hyperspectral remote sensor collects images in hundreds of narrow, continuous spectral channels, whereas multispectral remote sensor collects images in relatively broader wavelength bands. However, the spatial resolution of the hyperspectral sensor image is comparatively lower than that of the multispectral. As a result, spectral signatures from different end members originate within a pixel, known as mixed pixels. This paper presents an approach for obtaining an image which has the spatial resolution of the multispectral image and spectral resolution of the hyperspectral image, by fusion of hyperspectral and multispectral image. The proposed methodology also addresses the band remapping problem, which arises due to different regions of spectral coverage by multispectral and hyperspectral images. Therefore we apply algorithms to restore the spatial information of the hyperspectral image by fusing hyperspectral bands with only those bands which come under each multispectral band range. The proposed methodology is applied over Henry Island, of the Sunderban eco-geographic province. The data is collected by the Hyperion hyperspectral sensor and LISS IV multispectral sensor.

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