

Lossless compression of hyperspectral images using spectral and spatial relations

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ABSTRACT

Because of the hyperspectral imaging of lossless compression of compression ratio still has room for improvement, so this paper give high compression ratio of lossless compression algorithm. In the literature use of the LUT forecast pixel values of the current band algorithm has the advantage of a simple and fast, but due to the hyperspectral image pixel value range is very broad, for example, on the need to carry large amounts of memory. In the LAIS-QLUT algorithm it will look up the desired index value to quantify that can effectively reduce the memory required for checking, and improved compression effect. The hyperspectral imaging with high correlation between the spectrum, in the same band under adjacent pixels also has a high degree of relevance, therefore this Paper using least squares methods and multiband quantization look-up, reduce hyperspectral image superfluous information in spatial and spectral, increase accuracy of pixel the predicted value, and use to predict value selection probability model, Finally use the arithmetic coding and Golomb-rice encoding encodes of the prediction difference. When the Cuprite, Jasper Ridge, Lumar Lake, Moffett Field and Low Altitude after compression tests, Get an the average compression ratio of 3.87. The experimental results prove that this thesis can be effective on hyperspectral image compression.

Keywords : Hyperspectral image、LUT、Least suae、Arithmetic coding、Golomb-rice、AVIRIS

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