A Novel Adaptive Compression Technique for Dealing with Corrupt Bands and High Levels of Band Correlations in Hyperspectral Images Based on Binary Hybrid GA-PSO for Big Data Compression

Abstract

Hyperspectral sensors generate useful information about climate and the earth’s surface in numerous contiguous narrow spectral bands, being widely used in resource management, agriculture, environmental monitoring, among others. The compression of hyperspectral data helps in long-term storage and transmission systems. This paper introduces a new adaptive compression method for hyperspectral data. The method is based on separating the bands with different specifications by the histogram analysis and Binary Hybrid Genetic Algorithm-Particle Swarm Optimization (BHGAPSO). The new proposed method improves the compression ratio of the best-known JPEG standards, saves storage space, and speeds up the transmission system. The proposed method is applied on two different test cases, and the results are evaluated and compared with a few powerful compression techniques, such as lossless JPEG and JPEG2000. The results confirm that the proposed method is accurate, simple and fast, which can be useful for big data (i.e., a high volume of data) processing.

References

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