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Meteosat Second Generation Image Compression Based on the Radon Transform and Linear Predictive Coding: Comparison and Performance

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Abstract : Image compression is used to reduce the number of bits required to represent an image. The Meteosat Second Generation satellite (MSG) allows the acquisition of 12 image files every 15 minutes. Which results a large databases sizes. The transform selected in the images compression should contribute to reduce the data representing the images. The Radon transform retrieves the Radon points that represent the sum of the pixels in a given angle for each direction. Linear predictive coding (LPC) with filtering provides a good decorrelation of Radon points using a Predictor constitute by the Symmetric Nearest Neighbor filter (SNN) coefficients, which result losses during decompression. Finally, Run Length Coding (RLC) gives us a high and fixed compression ratio regardless of the input image. In this paper, a novel image compression method based on the Radon transform and linear predictive coding (LPC) for MSG images is proposed. MSG image compression based on the Radon transform and the LPC provides a good compromise between compression and quality of reconstruction. A comparison of our method with other whose two based on DCT and one on DWT bi-orthogonal filtering is evaluated to show the power of the Radon transform in its resistibility against the quantization noise and to evaluate the performance of our method. Evaluation criteria like PSNR and the compression ratio allows showing the efficiency of our method of compression.

Keywords : image compression, radon transform, linear predictive coding (LPC), run lengthcoding (RLC), meteosat second generation (MSG)
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