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On randomness of compressed data using non-parametric randomness tests (Article)

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Abstract

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Four randomness tests were used to test the outputs (compressed files) of four lossless compressions algorithms: JPEG-LS and JPEG-2000 algorithms are image-dedicated algorithms, while 7z and Bzip2 algorithms are general-purpose algorithms. The relationship between the result of randomness tests and the compression ratio was investigated. This paper reports the important relationship between the statistical information behind these tests and the compression ratio. It shows that, this statistical information almost the same at least, for the four lossless algorithms under test. This information shows that 50 % of the compressed data are grouping of runs, 50% of it has positive signs when comparing adjacent values, 66% of the files containing turning points, and using Cox-Stuart test, 25% of the file give positive signs, which reflects the similarity aspects of compressed data. When it comes to the relationship between the compression ratio and these statistical information, the paper shows also, that, the greater values of these statistical numbers, the greater compression ratio we get. © 2018 Institute of Advanced Engineering and Science. All rights reserved.

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