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# Intelligent compression for synchrotron radiation source image

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Synchrotron radiation sources (SRS) produce a huge amount of image data. This scientific data, which needs to be stored and transferred losslessly, will bring great pressure on storage and bandwidth. The SRS images have the characteristics of high frame rate and high resolution, and traditional image lossless compression methods can only save up to 30% in size. Focus on this problem, we propose a lossless compression method for SRS images based on deep learning. First, we use the difference algorithm to reduce the linear correlation within the image sequence. Then we propose a reversible truncated mapping method to reduce the range of the pixel value distribution. Thirdly, we train a deep learning model to learn the nonlinear relationship within the image sequence. Finally, we use the probability distribution predicted by the deep leaning model combined with arithmetic coding to fulfil lossless compression. Test result based on SRS images shows that our method can further decrease 20% of the data size compared to PNG, JPEG2000 and FLIF.

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