

Putting the squeeze on computer art

August 9 2024, by David Bradley



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Researchers have demonstrated a novel image compression tool that combines recursive algorithms with convolutional neural networks (CNNs) to out-perform other approaches to the compression of images from computer art and interaction design. The research is [published](#) in the *International Journal of Computational Systems Engineering*.

Digital art and design increasingly rely on large volumes of visual data, so effective image [compression](#) is important for reducing the computer storage requirements without compromising quality. Duan Song of the Department of Fine Arts at Hebei Vocational Art College in Shijiazhuang, China, has proposed an algorithm that works to address the issues by integrating traditional and modern techniques.

Recursive algorithms, which simplify complex problems through repeated application of rules. Song explains that the approach works by breaking an image down into simpler components. By applying the process iteratively, quality can be maintained.

The integration of CNNs into the compression approach builds on the way in which such systems were initially inspired by the way the human brain processes [visual information](#). They are widely used in [deep learning](#) for image recognition and processing.

Song's innovative merging of the recursive methods with CNNs allows him to overcome some of the limitations of earlier image compression techniques, which commonly struggle to achieve useful compression ratios because of the increasing complexity and scale of modern image data.

Song has tested the algorithm on two well-known image datasets, Kodak1 and Kodak2, to evaluate its performance. The results indicate that the algorithm consistently reduced the mean square error (MSE) between the original and compressed images. A lower MSE means better conservation of image quality.

After 800 iterations, the [algorithm](#) achieved the lowest MSE compared to other methods and also performed well in terms of peak signal-to-noise ratio and multi-scale structural similarity. These results suggest that the proposed method can compress images effectively with no

significant loss of quality.

The approach will be useful in the field of computer art but might also be useful in animation modeling, art interface design, and [medical imaging](#).

More information: Duan Song, Recursive quantitative analysis modelling of computer art design interaction, *International Journal of Computational Systems Engineering* (2024). [DOI: 10.1504/IJCSYSE.2024.139715](#)

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