Editorial

# The Open Problem of AI Based Highly Efficient Big Data Representation and Reconstruction

**Honggui Li***

*Yangzhou University, Yangzhou City, Jiangsu Province, China*

**\*Corresponding Author:** Honggui Li, Yangzhou University, Yangzhou City, Jiangsu Province, China.

With the rapid development of human society and science-technology, more and more data spring up, such as text, speech, image, video, medicine, biology, living, transportation, economy, business, industry data and etc. Highly efficient method of big data representation and reconstruction becomes the pursuit of current times. Advanced method of big data representation and reconstruction will provide the prerequisites and basis for high density data storage and high speed data transmission.

Traditional approaches of data compression develop maturely, related international standards have been formulated and progressively perfected. For instance, the latest video compression standard, H.266/VCC, improves the compression efficiency by 40% compared with the lastgeneration standard, H.265/HEVC.

Combination with artificial intelligence is the development direction of more highly efficient method of big data representation and reconstruction. As one of main branches of artificial intelligence, deep learning achieves the greatest success in computer vision and natural language processing, and will also obtain remarkable success in data compression. Actually, deep learning has already combined the classical data compression approaches, replaced one of their components, such as prediction coding, transformation coding, quantization coding or entropy coding, and attained outstanding performance. However, the current main difficulty is that pure deep learning still cannot implement lossless data compression. In order to implement lossless data representation and reconstruction, the open undetermined ill-posed inverse problem form lossy reconstruction datato lossless reconstruction data emerges. The solutions to the open problem may exist in applied mathematics and optimization searching.

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