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From Pixels to Bits: A State of the Art of Deep Learning Approaches for Natural Image Compression

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***Abstract* –** With the ever-increasing volume of digital imagery and the growing demand for efficient storage and transmission, image compression has become a crucial aspect of multimedia processing. In recent years, deep learning models have emerged as powerful tools for a wide range of computer vision tasks, including image compression. This research article presents a comprehensive state-of-the-art review of natural image compression techniques leveraging deep learning architectures.

This research article presents a state-of-the-art review of natural image compression using deep learning models. With the exponential growth of digital imagery, efficient compression techniques are essential. Deep learning, particularly Convolutional Neural Networks (CNNs), Generative Adversarial Networks (GANs), and Autoencoders, has shown promise in this area. The paper explores various architectures, discussing their adaptation to image compression tasks. Both lossless and lossy compression approaches are surveyed, considering the trade-off between compression ratios and visual quality. The article identifies challenges, such as computational complexity, scalability, and real-world applications, while suggesting future directions.

Keywords – Image compression, Deep Learning, CNN, LSTM, RNN, GAN.