All Sciences Proceedings
http://as-proceeding.com/

AS-ABSTRACTS
https://as-proceeding.com/index.php/as-abstracts
ISSN: 2980-1834

All Sciences Abstracts,
Volume 1, pp. 1, 1, 2023

Advanced Image Compression Techniques for Medical Applications: Survey

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Abstract – The field of artificial intelligence has grown significantly in the past decade, with deep learning being a particularly promising technique due to its ability to learn complex feature representations from data. One area where deep learning has shown promise is in image compression, which is important for applications such as medical imaging, remote sensing, and video streaming. Traditional compression methods such as JPEG, JPEG200 and PNG have been used for decades, but recent advances in deep learning have led to innovative techniques that involve training deep neural networks to learn a compressed representation of the image data. This survey paper focuses on research-based applications of deep learning in image compression and reviews recent works on using deep learning techniques to compress and accelerate deep neural networks, including pruning, quantization, and low-rank factorization methods.
In addition, we discuss the use of deep learning techniques to minimize compression defects, such as block artifacts and ringing, which can degrade image quality. The paper provides an overview of popular methods and recent works in the field, highlighting their characteristics, advantages, and shortcomings.
We also discuss challenges and open research questions, such as the trade-off between compression efficiency and reconstruction quality, and the need for standardized evaluation metrics for comparing different compression methods. Overall, this survey aims to provide a comprehensive understanding of current trends in image compression using deep learning techniques and their potential to revolutionize the field. By exploring the advantages and limitations of these methods, we hope to facilitate further research and development in this exciting area.

Keywords – Medical Image compression, Predictive compression, Deep Learning, CNN, LSTM, RNN.