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**A Study of Effective Algorithm for Integrated Data Compression**

**Kunkumalla Premchander**

Research Scholar, Ph. D. in Computer Science, Mansarovar Global University, Sehore, M.P., India.

**ABSTRACT**

An effective algorithm for integrated data compression is essential in today's data-intensive environment, where large volumes of heterogeneous data—ranging from text and images to audio and video—are generated and transmitted across platforms. Integrated data compression refers to a unified approach that can handle multiple data types within a single framework, ensuring optimal storage efficiency and faster transmission without compromising data integrity. The development of a robust and adaptable compression algorithm must take into account the distinct characteristics of each data type while leveraging redundancy, pattern recognition, entropy encoding, and transformation techniques such as Burrows-Wheeler Transform, Huffman Coding, and wavelet transforms. An effective integrated algorithm typically employs a hybrid model that combines lossless and lossy methods, based on the content and application requirements, to maximize compression ratio while maintaining acceptable fidelity. This is especially relevant for applications such as cloud storage, big data analytics, multimedia systems, and Internet of Things (IoT) devices, where bandwidth and storage resources are often limited. This study proposes and evaluates a multi-stage integrated compression algorithm that dynamically adapts to input data types using intelligent preprocessing and optimized encoding strategies. The algorithm demonstrates improved compression efficiency, reduced latency, and broader applicability across diverse datasets, making it a powerful solution for modern data compression needs.