

Audio Signal Compression using DCT and LPC Techniques

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Abstract—Audio compression is designed to reduce the transmission bandwidth requirement of digital audio streams and storage size of audio files. Audio compression has become one of the basic technologies of the multimedia age to achieve transparent coding of audio and speech signals at the lowest possible data rates. This paper presents a comparative analysis of audio signal compression using transformation techniques like discrete cosine transform and linear prediction coding. Performance measures like compression ratio, signal to noise ratio (SNR), peak signal to noise ratio (PSNR) and mean square error (MSE) etc are calculated for analysis.

Key words— Discrete Cosine Transform (DCT), linear prediction coding (LPC), compression ratio (CR), SNR, PSNR, MSE.

I. INTRODUCTION

In digital signal processing data compression involves encoding the information using fewer bits than the original representation. Compression reduces the usage of resources like storage space and transmission capacity. Audio Compression is a process of lessening the dynamic range between the loudest and quietest parts of an audio signal. This is done by boosting the quieter signals and attenuating the louder signals. Audio compression basically consists of two parts. The first part, called encoding, transforms the digital audio data (.WAV file) into a highly compressed form called bit stream. However, the second part, called decoding takes the bit stream and re-expands it to a WAV file[1].

Compression Types

There are mainly two types of compression techniques: Lossless Compression and Lossy Compression techniques. Lossless data compression algorithms allow exact reconstruction of original

data from the compressed data. Lossy compression techniques does not allow perfect reconstruction of data but offers good compression ratio values relative to the lossless compression techniques.

B. General Audio Compression Architecture

The most common characteristic of audio signals is the existence of redundant information between adjacent samples. Compression tries to remove this redundancy and makes the data de-correlated. Typical audio compression system contains three basic modules to accomplish audio compression. First, an appropriate transform is applied. Second, the produced transform coefficients are quantized to reduce the redundant information; here, the quantized data hold errors but should be insignificant[1]. Third, the quantized values are coded using packed codes; this encoding stage changes the format of quantized coefficients values using one of the suitable variable length coding technique.

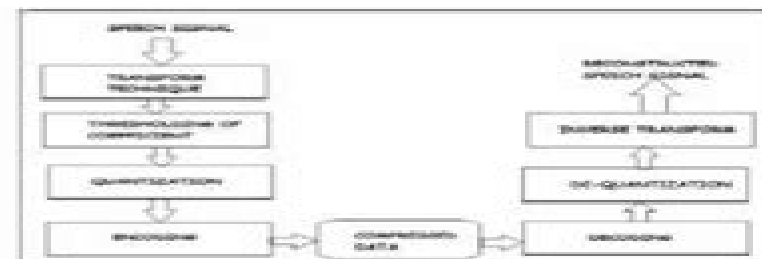


Fig1: General block diagram

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Table of Contents Matlab Code For Dct In Audio Signal

1. Understanding the eBook Matlab Code For Dct In Audio Signal
 - The Rise of Digital Reading Matlab Code For Dct In Audio Signal
 - Advantages of eBooks Over Traditional Books
2. Identifying Matlab Code For Dct In Audio Signal
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Matlab Code For Dct In Audio Signal
 - User-Friendly Interface
4. Exploring eBook Recommendations from Matlab Code For Dct In Audio Signal
 - Personalized Recommendations
 - Matlab Code For Dct In Audio Signal User Reviews and Ratings
 - Matlab Code For Dct In Audio Signal and Bestseller Lists

5. Accessing Matlab Code For Dct In Audio Signal Free and Paid eBooks
 - Matlab Code For Dct In Audio Signal Public Domain eBooks
 - Matlab Code For Dct In Audio Signal eBook Subscription Services
 - Matlab Code For Dct In Audio Signal Budget-Friendly Options
6. Navigating Matlab Code For Dct In Audio Signal eBook Formats
 - ePub, PDF, MOBI, and More
 - Matlab Code For Dct In Audio Signal Compatibility with Devices
 - Matlab Code For Dct In Audio Signal Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Matlab Code For Dct In Audio Signal
 - Highlighting and Note-Taking Matlab Code For Dct In Audio Signal
 - Interactive Elements Matlab Code For Dct In Audio Signal
8. Staying Engaged with Matlab Code For Dct In Audio Signal
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Matlab Code For Dct In Audio Signal
9. Balancing eBooks and Physical Books Matlab Code For Dct In Audio Signal
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Matlab Code For Dct In Audio Signal
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Matlab Code For Dct In Audio Signal
 - Setting Reading Goals Matlab Code For Dct In Audio Signal
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Matlab Code For Dct In Audio Signal
 - Fact-Checking eBook Content of Matlab Code For Dct In Audio Signal
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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