

School of Engineering and Applied Science (SEAS)
Ahmedabad University

ECE500: Information Coding Theory

Project Abstract

Group Number: 01

1. Group Members:

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2. Project Title: LZW Compression with Hamming Error Control Code

3. Brief description:

We will simulate Lempel–Ziv–Welch compression algorithm along with its decompression. Moreover, for error correcting we will implement Hamming code.

(a) **Lempel–Ziv–Welch Compression:**

LZW is a lossless algorithm, meaning no data is lost while compressing. The idea of LZW is based on the repeating patterns which optimizes the data space. This algorithm is commonly used in Unix file compression and also in the popular GIF image format.

(b) **Hamming Error Correcting Code:**

Hamming code is useful for error detection up to two-bit errors. However, it is also capable of correcting single-bit errors. In Hamming Code, we use extra parity bits to identify the error on the receiving side. Hamming Codes are commonly used in Modems, Embedded Processor, etc.

4. Programming Language: Python

5. User Interface & Result Format:

We will integrate a graphical interface, **PyQt** to our Python Code.

Following data/metrics would be shown on the GUI **after** a text file is transmitted:

- (a) **Uncompressed File Size**
- (b) **Compressed File Size**
- (c) **Compression Ratio**
- (d) **Decompressed File Size**
- (e) **Compression Speed**
- (f) **Decompression Speed**
- (g) **Compression Time**
- (h) **Decompression Time**

Following data/metrics(for each Code-word) would be shown on the GUI **during** transmission of the text file:

- (a) **Information Bits**
- (b) **Transmitted Bits**

- (c) **Received Bits**
- (d) **Detected Error Bits**
- (e) **Corrected Error Bits**
- (f) **Percentage of File transferred**

All the data would be shown in tabular boxes on the GUI.