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Secure Video Data Hiding Using DCT and LZW

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ABSTRACT
The main aim of the project is to provide software that usually works by sending a text message behind a video which makes unable for a human eye or ear to detect. On review, of digitized video before and after message was inserted, will show video files that appeared to have no substantial differences. Now a days Secure Video Data hiding is an important issue. So we develop a new video data hiding method they link two sets , one set is cover media data and another is embedded data. In this project, we are using DCT (Discrete Cosine Transform), LZW (Lempel-Ziv-Welch). Use DCT for providing security and use LZW for compression and decompression.

Keywords: - Steganography, Discrete Cosine Transform (DCT), Lempel-Ziv-Welch (LZW).

I. INTRODUCTION

Existing system for video data hiding is based on LSB (Least Significant Bit) replacement. LSB is the simplest form of steganography. LSB is based on the inserting data in the form of least significant bit of pixels, it is not noticeable to human eye which leads to a slight changes on the cover images. The existing system is easily cracked and it is more vulnerable to attacks. LSB method has intense effect on the statistical information of images like histogram. Attackers could be aware of a hidden communication by just checking the histogram of an image.

To overcome the drawbacks of the existing system we develop the new secure video data hiding which is more efficient and provides highest level of security.

A. System Architecture:

Sender's side working

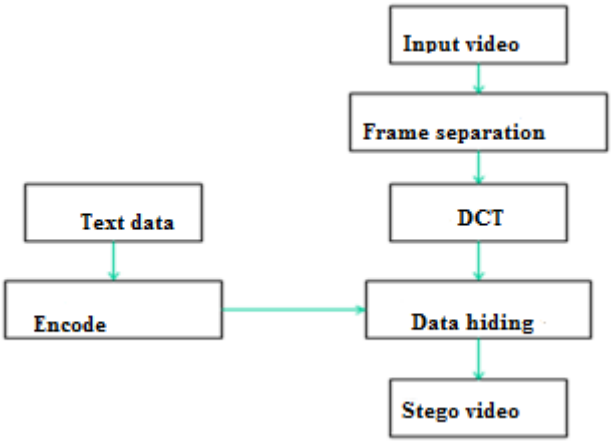

Fig 1: sender side working

The above Fig 1 shows sender side working. First we are taking video as an input and apply frame separation on that video. Apply DCT on frames. DCT will find such points

Which cannot be compressed. Then take a text data and encode it using a security key. Hide the text data behind a particular frame. Then merge all the frame as it is. It will becomes a stego-video. Sender sends the stego-video to the receiver.

Receiver's side working

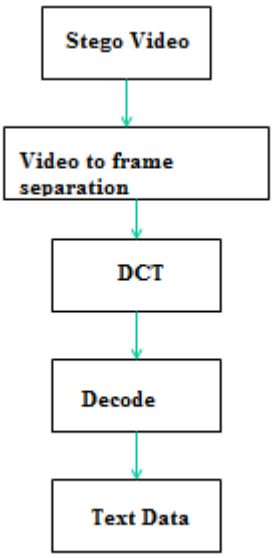

Fig 2: receiver side working

The above Fig 2 shows receiver side working. Receiver takes stego-video as an input. Then he will apply frame separation on the stego-video, decodes the text data using security key and then he will get original message. LZW is used for lossless data compression.

II. DCT

A Discrete Cosine Transform used to express a finite sequence of data points in terms of sum of cosine functions at different frequencies. DCT is important in numerous applications of science and engineering, from lossy compression of audio, video and images. The use of cosine rather than sine functions is critical for compression, since it turns out that fewer cosine functions are needed to approximate a typical signal, whereas for differential equations the cosines express particular choice of boundary conditions.

DCT can be apply on 8x8 or 8x16 blocks. After apply 8x8 blocks on the frame then this will convert into quantization matrix which find such points which is not further compress. So we can hide text data behind the point which is not further classified.

III. LZW

Lempel-Ziv-Welch (LZW) Algorithm

The LZW algorithm is a very common compression technique.

It is dictionary based data compression algorithm. It is developed by Lempel and Ziv in 1977 and 1978.Terry Welch improved the scheme in 1984 (called LZW compression). It used in GIF compression -- 2D window tokens

A. The LZW Compression Algorithm is as follows:

```
w = NIL;
while ( read a character k )
  {
        if wk exists in the dictionary
                w = wk;
        else
                add wk to the dictionary;
        output the code for w;
        w = k;
  }
```

Original LZW used dictionary with 4K entries, first 256 (0-255) are ASCII codes.

B. The LZW Decompression Algorithm is as follows:

```
read a character k;
output k;
w = k;
while ( read a character k )
/* k could be a character or a code. */
  {
    entry = dictionary entry for k;
    output entry;
    add w + entry[0] to dictionary;
    w = entry;
  }
```

Huffman maps fixed length symbols to variable length codes. Optimal only when symbol probabilities are powers of 2.

Arithmetic maps entire message to real number range based on statistics. Theoretically optimal for long messages, but optimality depends on data model. Also can be CPU/memory intensive.

Lempel-Ziv-Welch maps a variable number of symbols to a fixed length code.

Adaptive algorithms do not need a priori estimation of probabilities, they are more useful in real applications.

IV. CONCLUSIONS

DCT uses steganographic method for embedding text data into cover video without changing the quality of original video. It is highly secure to send data using any channel over the network. LZW performs lossless data compression. It is usable in many science, engineering and medical applications.

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