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Secure Data Recovery with Enrichment of Reversible Watermarking

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ABSTRACT: Data technology is increasing role within the use of data systems comprising relative databases. These databases area used effectively in cooperative environments for data extraction. Watermarking is used to hiding all the information with high level security. Watermarking encoding and decoding for the role of all the position in data discovery, original data recovery within the presence of active malicious attack. During this paper, planned to hide the data in various fields which it is related to the security purpose.Watermarking(RRW)technique for numerical relative data has been validated by using chaotic algorithm. The broad chaos encryption method is the simplest technique to encrypt video data or message by chaotic equation. Here the logo image is embedded within video using wavelet decomposition.Watermarking techniques are used to recover original data from watermarked data and ensure data quality to some extent. The Information extraction and transmission of data securely in many communication channels like military and crime branch.The way of techniques applied here for more level enhancement techniques for video stenography.

KEYWORDS: Reversible watermarking, chaotic algorithm, data recovery, data quality, numerical data

I.INTRODUCTION

Data is stored in various digital formats such as images, audio, video, texts and relational data. Relational data in particular is shared extensively and in data storage locations in the cloud. The purpose is to work in a collective environment and make data is available useful for knowledge extraction and decision making.

In modern world, all are hiding the data in various fields. In this paper also implement to hiding and recovering the original data by using reversible watermarking techniques.

Watermarking techniques have historically been used to ensure security proofing for a wide variety of data formats. This includes images, audio, video, texts processing software relational databases and more.

Reversible watermarking techniques can ensures data recovery along with security protection. Finger prints, data hashing, serial codes are some other techniques used for security protection. Fingerprints also called transferable watermarks are used to maintain and identify digital proprietorship by watermarking and all the copies of information with different watermarks for different beneficiary. If the hash of the original and intrude data is the same, data authenticity can be verified but proprietorship cannot be proved easily.

Watermarking has the property that it can provide proprietorship protection over the digital information by specifying the data with a watermark unique to the proprietor. The embedded watermark can consequently be used for proving and claiming proprietorship. It may be used for the purposes of identifying financial tendency through data mining. Anyhow these openly available datasets make attractive targets for attacks. According to a survey related to the security.

II. RELATED WORK

In this, irreversible watermarking technique for relational databases was proposed by agrawal and kirenan. Similarly, these reversible watermarking scheme for relational databases was proposed by saman iftikhar, m.kamran and zahid anwar.in this technique, scatter diagram expansion is used for reversible watermarking of relational database. Zhang et al. Suggested a method of handling of error between two evenly distributed variables and selected some initial nonzero digits of faults to form scatter diagrams. Scatter diagram expansion technique is used to reversibly watermark

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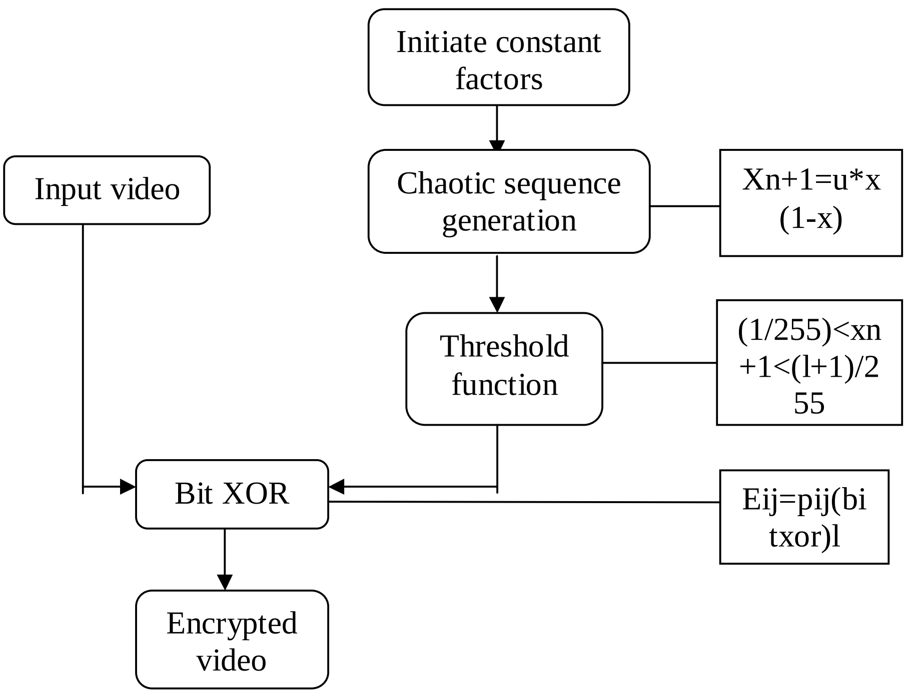
the preferred nonzero initial digits of faults. This technique is keeps track of overhead information to authenticate data quality.

II .[A] WATERMARK CREATION THROUGH CHAOTIC ALGORITHM SCHEMEA:

The broad chaos encryption method is the quiet technique to encrypt video data or message by chaotic equation. This method can facilitate to determine some essential information and establish the crucial stage of security. The advantage of chaotic encryption is High level security. The encryption is completed by iteration. Simplest No short cuts are available. Whereas the requirement of large cipher storage and slow in speed are examined the major disadvantages.The properties of chaos are slightly generating some changes in the entire cryptography. Sensitive on initial stage and topology transitivity are the properties in it. In an initial condition, chaotic is always delicate. Hence it will produce a slight difference in path. It gives the totally different path sectional value. Identical trajectory only can produce the same values. The topology transitivity defines that the state points consist in a bounded space state and approaches.

The chaotic encryption method is proposed by (Baptista). It shows to be a much better encryption algorithm than traditional algorithms were used. First identify the mapping scheme for a path to encrypt the message. Subsequently decide the initial state and parameters for the key. Then assume the initial condition as the current route. Iterate the chaotic equation until the path reaches the target site and then store the bulk of iterations as a code for each message symbol. Encrypt the next message by iterating the recent path. Produce the next cipher according it and so on.



Water Mark Creation

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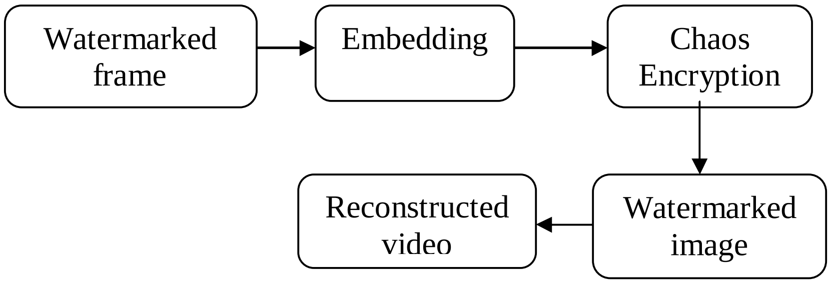

Water Mark Extraction

II [B]. INTRODUCTION TO WAVELET

In applications such as still image compression, discrete wavelets transform (DWT) based schemes have exceeded other coding schemes like the ones based on DCT. Since there is no need to split the input image into non-overlapping 2-D blocks and its base functions have variable length, wavelet-coding schemes at higher compression ratios avoid blocking artifacts, scalability and tolerable degradation are important. Basically use Wavelet Transform (WT) to evaluate non-stationary signals, i.e., signals whose frequency response varies in time, as Fourier Transform (FT) is not applicable for such signals.

To overcome the limitation of FT, Short Time Fourier Transform (STFT) was proposed. There is only a slight change between STFT and FT. In STFT, the signal is divided into small segments, where these segments of the signal can be simulated to be stationary. By STFT, one can get time-frequency response of a signal concurrently, which can't be obtained by FT. The short time Fourier transform for a real continuous signal is defined as:

$$X(f,t) = \int_{-\infty}^{\infty} [x(t) w(t-\tau)^{*}] e^{-2j\pi ft} dt$$

Where the length of the window is (t-τ) in time such that we can shift the window by changing value of t and by varying the value τ get from different frequency response of the signal segments.

The Heisenberg uncertainty principle define the problem with STFT. This principle states that one cannot know the exact time-frequency image of a signal, i.e., one cannot know what spectral components exist at what instances of times. What one can learn are the time interval which convinced band of frequencies exists and is called resolution problem.If the window function is limited, then it is known as compactly supported. The narrower make the window, the better the time resolution, and better the acceptance of the signal to be stationary, but poorer the frequency resolution:

Narrow window==> good time resolution,lowFrequency resolution

Wide window==> good frequency resolution, low time resolution

The wavelet transform (WT) has been developed as an sub approach to STFT to overcome the resolution problem.Similar to the window function in the STFT, and the alter is measured separately for different segments of the time-domain signal at different frequencies. This approach is good especially when the signal has high frequency components for short periodand low frequency components for long period, e.g., images and video frames.

The wavelet transform involves projecting a signal onto a entire set of translated and dilated versions of a mother wavelet Ψ(t). LWT decomposes the image into different sub bands images, namely, LL, LH, HL, and HH for embedding the logo image in the pixel coefficients of sub bands. Lifting scheme is a technique to transfer DWT coefficients to Integer coefficients without losing information. LL sub bands contains the important part of the spatial domain image.

High-frequency sub band contains the boundary information of input image. These coefficients are preferred as reserved space foe hiding the text data. The private text data is embedded into the wavelet coefficients of highfrequency sub bands because it is non sensitive to human visual system. The basic set of wavelets is generated from the mother or basic wavelet is defined as:

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$$\Psi_{a,b}(t) = \frac{1}{\sqrt{a}}\psi\left(\frac{t-b}{a}\right) \quad a,b \in \Re \text{ and } a>0$$

The variable 'a' (inverse of frequency) reflects the scale (width) of a particular basis function such that its large value gives poor frequencies and small value gives high frequencies. The variable 'b' specifies its translation along x-axis in time. The term $1/\sqrt{a}$ is used for normalization.

B [1] Forward Lifting in IWT

Step1: Column wise handling to get H and L

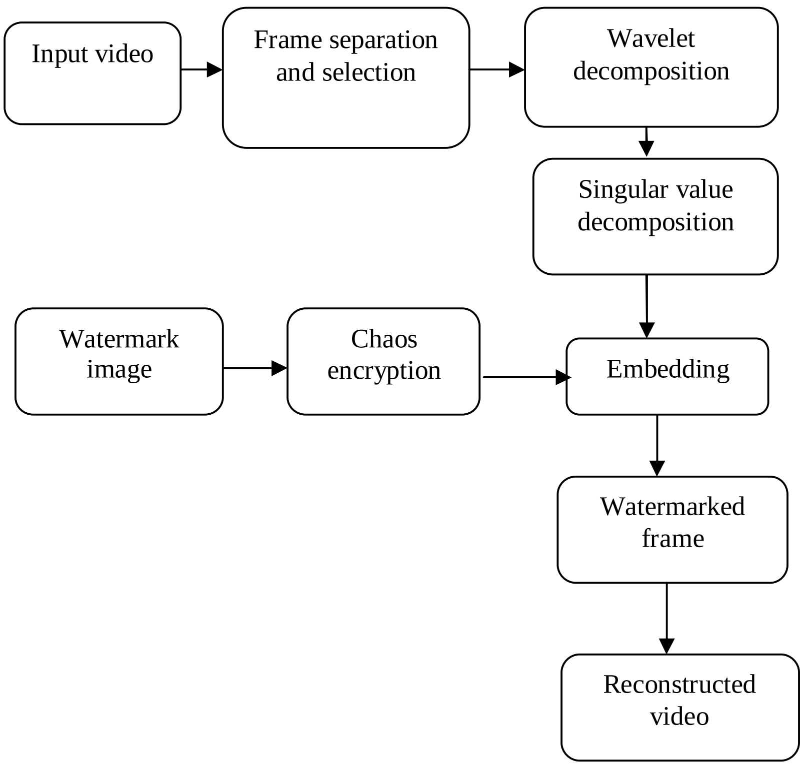
H = (Co-Ce) and L = (Ce+ [*H/2]*)

Where Co and Ce is the odd column and even column wise pixel values

B [2] Reverse Lifting scheme in IWT

Inverse Integer wavelet transform is formed by Reverse lifting scheme. Procedure is similar to the forward lifting scheme.

ARCHITECTURE DIAGRAM



Main architecture of RRW

III. PSEUDO CODE

III [A] Watermark Encoding Phase

The watermark information calculation is formulated as a CO problem to meet the data quality restraint of the data proprietor. It is saved for use during watermark encoding and decoding. The watermark is inserted into every tuple

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forthe selected feature of the dataset. The data proprietor can select number of features for watermark embedding based upon a secret threshold.

Algorithm 1:
Watermark Encoding
Input: D,w,β
Output: D_w, Δ_l
for w = 1 to l do
//loop will iterate for entire watermark bits w from 1 to length l of the watermark
for r = 1 to R do
//loop will repeat for entire tuples of the data
if $b_{r,w}$ == 0 then
// the case when the watermark bit is 0
insert η_r into Δ
end if
if $b_{r,w}$== 1 then
// the case when the watermark bit is 1
insert η_r into Δ
end if
end for
end for
return $D_{w,}\Delta$

III [B] WATERMARK DECODING PHASE

In the watermark decoding process, the first step is to locate the features which have been considered. The amount of change in the value of a feature that does not change its data quality. The watermark decoder decodes the watermark by working with one bit at a time. In the decoding phase, η_{dr} is calculated using and represents the percent change detected in the watermarked data. The value of η_{dr}, η_r and hDr is calculated using the values of tuple r and therefore might be different for every r. The parameter hDr is computed by calculating the difference between the original data change amount hr and the watermark detected change amount.

Algorithm 2:
Watermark Decoding
Input: D_w or $D'_{w,}\Delta$,l
Output: W_D
for r =1to R do
//loop will iterate for entire tuples of the data
for b=l to 1 do
//loop will iterate for all watermark bits b from 1 to length l of the watermark
$\eta_{dr} <= D'_{W(r)}$
$\eta_{\Delta r} <= \eta_{dr} - \eta_r$
if $\eta_{\Delta r} \leq 0$ then
detected watermark bit (dtW) is 1
else if $\eta_{\Delta r} > 0$ and $\eta_{\Delta r} \leq 1$ then
find watermark bit (dtW) is 0
end if
end for
end for
$W_D <=$ mode (dtW(1,2,……,l))
return W_D

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III [C] DATA RECOVERY PHASE

After detecting the watermark image, some post processing steps are carried out for error correction and data recovery is used for regeneration of original data.

Algorithm 3:
Data Recovery
Input: D_w or $D'_{w,}b$
Output: D_r
for r = 1 to R do
//loop will iterate for entire tuples of the data
for b= l to 1 do
//loop will iterate for all watermark bits b from 1 to length l of the watermark
if dtW(r,b) == 1 then
// 0 or 1 watermark bit is detected from every tuple r
else
end if
end for
end for
return D_r

IV. CONCLUSION AND FUTURE WORK

The watermarking techniques are make the differences in the data to such an extent that data quality gets compromised. Reversible watermarking techniques are used to supply to such scenarios because they are able to recover original data from watermarked data and secure data quality to some extent. This method can facilitate to discover some essential information and establish the necessary stage of security. The way of techniques applied here for more level enhancement techniques for video stenography.

Future concerns are to watermark shared databases in distributed environments where various members share their data in various proportions and also plan to extend RRW for non-numeric data stores.

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