Reversible Watermarking for Relational Data: A Brief Review

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Abstract

Watermarking is method of embedding data into such form that it is not readily available to user rather than authenticated user. These data embedding may affects certain alteration of underlying data. In advance to watermarking, Reversible Watermarking is evolved which assures the data quality along with data recovery. Watermarking for relational database has already under research from past many years, and many watermarking algorithms have been proposed for the embedding purpose. Watermarking scheme is very popular to assures the securities in terms of data manipulation and occupancy rights for the image, audio, video data type too. Still such technique is not robust against malicious attack. The attack may causes alteration, deletion or false addition which degrades quality and performance of the data. There is a lot of scope to improve and advance the current watermarking schemes and also provide feature like selective watermarking. Selective watermarking allows to particular attribute watermarking according to its role of function used in knowledge analysis. New Reversible and Robust watermarking technique for the relational database is proposed for better results.

Keywords- Reversible Watermarking, Robust Watermarking, selective watermarking

1. Introduction

In today’s digital world easy access to the internet and cloud computing causes the extreme generation of data. Improve information technology also cause for the increasing use of information system constitute relational database. The proprietor shared broadly particular Relational data with research association and in virtual data storage locations over the cloud. The desire of the work is to generate collective surrounding and make data readily available so that it can be used for information extraction and governing the decision. Nowadays, distribution of data over online is an important job for organization and research, which also involves buying/selling of databases. For example, sharing of data related to atmosphere, medical, stock market, customer behaviour, scientific, etc. which is simultaneously performed. Therefore, they are vulnerable to security hazard concerning proprietary rights and data alteration. Watermarking is technique which advocated proprietary rights over shared relational data and for providing a means of deal with data alteration. Watermarking supports solutions for various problems occurs in the distribution of different multimedia objects such as, image, video, text, and audio as well as for the relational databases.

The irreversible watermarking technique may causes alteration or modification of underlying data at the certain extent. To overcome such problem reversible watermarking employed which results in lossless and exact authentication of relational databases. This reversible watermarking technique acquire the capability of exact restoration of the original attribute data from the watermarked relational databases. Watermarking may has the threat of malicious attack which may cause alteration, deletion, or false insertion. The robust watermarking scheme possesses the exact recovery also in the existence of active malicious attack. The additional feature is involved that allows selective watermarking of required particular attribute which involves selection of suitable feature for the embedding through the watermark.
2. Literature survey

I) Histogram expansion based watermarking:
Yong Zhang1,2,* , Bian Yang3 [3] initiates this technique in which introduces that the real values have an odd distribution over a variable range of [a-b, b-a] . To make the implementation with reduce complexity histogram expansion in this real value case, we extract just particular portion of each original real value (partial real value) instead of the whole one, and then retrieve the digits resident in the original value order of each error occurred from two adjacent original real values to form the final histogram.

II) Difference expansion watermarking technique:
G. Gupta and J. Pieprzyk [4], proposed a watermarking scheme that is blind as well as reversible. The utilization of difference expansion on integers to achieve reversibility. The Difference expansion watermarking techniques [5], [6] accomplished way of arithmetic operations on numeric features and deliver transformations. The watermark information is usually encoded in the LSB of function of relational databases to optimize distortions. The major advantages offered by this technique are reversibility to high quality original database, rightful proprietor authentication, robust against secondary watermarking attacks, and no need of secure secondary storage for restoring original database.

III) Difference Expansion and Support Vector Regression Prediction:
Jung-Nan Chang and Hsien-Chu Wu [7] initiates the use of FP-tree data mining for the improvised choosing of valuable features in the database table. Then, the correlated valuable features of the secured field in the mining results are farther trained by SVR for predicting the secure field. So, the computation of each record required for the calculation of a difference between the predicted value and the original value of the secure field. Using this objective value and the LSB encoding scheme, the result is upgraded into the table.

IV) Prediction-Error Expansion Watermarking Technique:
Xiaolong Li, Bin Yang, and Tieyong Zeng [8] proposed Prediction-error expansion (PEE) technique which introduce for reversible watermarking that can encode broad payloads into digital images with tiny distortion. The encoding and extraction are two steps in which PEE executed. In PEE[9][10][11][12][13], The prediction algorithm used for the prediction of each bit. Then, scan image pixels from left to right and top to bottom, and repeat the Expansion embedding Histogram shifting operation until the message is embedded. So, to optimize the distortion in PEE, the capacity-parameter is taken as the tiny integer such that the inner region can provide enough expandable pixels to embed the payload.

3. Proposed System

The watermarking scheme possesses the following main phases: 1) Watermark preprocessing 2) Watermark insertion 3) Watermark extraction and 4) Data recovery.
In the preprocessing phase, two important jobs are performed: (1) selection of a suitable function for watermarking; (2) with the use of optimization technique i.e. genetic algorithm calculation of an optimal watermark. These parameter are further used for the watermark insertion and watermark extraction phase. After the preprocessing in watermark insertion information embedded in such way that data quality will not degrade. In the watermark extraction the watermark information is decoded without distortion. The data recovery phase is responsible for the error correction as well as recovery of information in case of malicious attack occur too.

4. Conclusion

By observing the various models of watermarking, we can conclude that they provide scheme for watermarking but still there is scope of improvement. The use of genetic algorithm(GA) provides the optimum watermark information that is required for the encoding of original data. The some models offers Reversible watermarking that is a special type of data embedding. Being reversible, means the original digital content can be fully restored after data decoding. But such model is not degrades their performance when malicious attack occurs. The model based on GA provides the semi-blind and robust reversible watermarking for the relational database.

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7. References

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