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Compare different techniques to retrieve image from database using MATLAB

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Abstract

Newly World Wide Web technologies, there is need to secure data. For securing data cryptography and other relevant techniques were introduced. Multimedia data stream, traditional textual based encryption schemes are not successful so there is need to develop new encryption schemes. During transmission and storage over a network, multimedia content such as digital images and other information are vulnerable to unauthorized access. The images used may be gray or color scale images. There are many measures for testing image quality, like as the mean structural similarity, and mean absolute error, Mean Square Error (MSE), and Peak Signal-to-Noise Ratio (PSNR). These are computed by averaging the squared intensity differences of distorted and original image pixels, along with the related quantity of the PSNR. Results of experiments show that same size images are efficiently encrypted with reliable maximum PSNR as compared with different size images. MATLAB2013a is used for simulation purpose. As refereed by the simulation results, the proposed system not only shows the efficiency in hiding the attributes but also provides better cover image selection.

Keywords: Image Retrieve; MATLAB; Cryptography; Encryption

1. Introduction

1.1. Techniques and Their Comparison

The focus of research work is the development of a general, scalable architecture to support fast querying of large image databases with user-specified histogram similarity measures. We proposed an algorithm for efficient image retrieval from large databases in computer with multiple histogram measure and we investigate method for merging our general, similarity measure-independent method with other useful techniques that may be similarity measure specific as in Table 1. This method uses combining similarity measures and a framework of encrypted image in which users can specify their queries without detailed knowledge of the underlying metrics.

This method gives equal and better results than existing methods and has built a prototype system to test the proposed methods and evaluated it on both a large general image database and a smaller controlled database. In retrieving images there is major issue of extracting the features of images and store them in last database of computer. Today its major issue in content based image retrieval system to how efficiently indexing and extracting images from last database. Colour image retrieval is fast developing methodology in multimedia extraction. If image is encrypted and stored in database of system it is important to retrieve those secret images which is transmitted to the receiver and avoided by the hacker. In content based image retrieval the features of images are stored on low level visual information so these information were directly correlated to the information. In content based image retrieval there are many techniques which developed an organized the bridge between high level and low level semantics. In encrypted image storing technique there is first extracting all features from the encrypted images and then stores them in the multimedia database of system. Then that type of image is decrypted at the receiver by using the secret key.

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With the exponential growth of internet in system, the same growth in information security is required. This security system requires robustness of algorithms with fast execution on minimum hardware requirement. The proposed work is based on research findings, where we have developed an application that would be able to hide data (image/text) into images and encrypted form that provide a robust and secure way of data transmission over open network. The Proposed algorithm is faster enough to be used by internet. The Comparative analysis of various parameters are done based on payload size where values of MSE and PSNR at various stages provide acceptance level of algorithm for imperceptibility and embedding capacity of the cover file. Reduction of PSNR which shows increase in payload size is still in acceptable range to send information without distortion in all proposed algorithm analysis.

Table 1 Results of different Technique

	Techniques	Results
1.	Image retrieval using histogram based contents of an image	Images in a database are in any position vertically/horizontal flipped and rotated in 90°, 180° and 270° in database can retrieved.
2.	Image retrieval using histogram matching technique	We can compare two color histograms and set threshold value. Images in a database are retrieved up to 95%.
3.	Image mining for image retrieval using histogram technique	The Result is 32% improved as when we use only the sum of distances method. In that case precision and recall crossover value is 0.50 and gave only 50% precision, hence in our proposed method precision rate is significantly improved.
4.	Calculate EPSNR	Cover image and secret image size is same and it efficiently encrypted.
5.	Calculate MPSNR	The improvement in PSNR is ranging from 0.0 to 50.0 % represent a significant improvement in the results and average improvement is 29.22 %. Decryption at receiver side without any degradation in image takes place as the MPSNR is infinity.
6.	Overlapped image encryption technique	Improvement in Min for PSNR1 and PSNR2 is 49.8 %. One Quality is improved by PSNR1 is Max and PSNR2 is Min. By this method there is significant improvement in minimum PSNR2 having average of 50% varies from 21.6 to 84.3.
7.	Encrypted image retrieval system	Efficient retrieve encrypted image from color image database and get secret image.

2. Future Developments and Scope

Improvement in retrieval efficiency of images and improvement of speed by applying other algorithms can be addressed in future works. In Future work consideration, we intend to study steganalytic techniques for ISC and to extend ISC to mobile video communication. In Future work will be in the direction of improvement of efficiency and security of search results and use more signal processing in encryption technique to archive comprehensive secure data in real time.

This proposed research work improves the understanding of various techniques for feature extraction and similarity measurement which aids medical image retrieval and advances the state-of the art through its contributions. The incorporation of various techniques presented in this proposed work raises a number of challenges for further research such as validate the practicality of proposed model in real environments.

This work aims at providing a solution to content based image system. We have tried to propose and improved a system that better satisfied the user's demands and needs. Although encouraging performance and modification has been obtained by proposed contributions some of the issues are worth investigating and need further extension. These issues are stated as;

- Use of more efficient approaches for feature extraction and representation of image.
- More sophisticated algorithms for work to improve the performance of relevance feedback with a very less number of training samples.
- To develop more efficient system to encrypt colour images so image security will become improved.
- Faster encryption time such that encrypted image is transferred faster to receiver end.

- Improve perfection in the original image we obtain after decryption of image.
- To design content based video retrieval system in point to point environment.
- Using a realistic medical environment in system.
- Consideration of digital medical images with different priorities of images.
- Incorporating more sophisticated medical image retrieval techniques.
- By developing a retrieval system using Local Tetra Pattern technique considering the diagonal pixels for derivative calculations.
- To extend this method to arrange the text that is obtained by the encryption of image present in database, to form a word or meaningful sentence and new methods can be done by other than LSB method.

In this proposed work it explores only a small part of the science of steganography. As a new discipline of this stream, there is a great deal more research and development to do. If a technique or set of techniques could be devised to detect steganography of image, it would be interesting to conduct a survey of images available on the internet to determine if steganography is used, by whom and for what purposes.

The study in content-based image retrieval in the past has been emphasis on image processing, low-level feature extraction, etc. Extensive or detailed experiments on CBIR systems demonstrate that low-level image features cannot always describe high-level semantic concepts in the users mind. It is believed that CBIR systems should provide maximum support in bridging the semantic gap between low-level visual features and the richness of human semantics and system. In this study of different content retrieval method is discussed like SVM based retrieval, SVM with relevance feedback method, DWT based method etc. in which some of the methods are efficient to shorten the semantic gap between the image while some are less so in future work need to develop such technique which much efficiently and effectively reduces the semantic gap and increases the information gain.

3. Conclusion

Our content based image retrieval system serves query ranging from manmade object such as building, bridges and tower to natural object such as vegetation, water, sky and clouds. The most common usage of our system will be in visual search engine, art collection, photograph archives, retail catalogs and medical records.

Today most common content-based image retrieval system is generally based on object-based model. A system based on user-system interaction (feedback mechanism) and view based model that uses color, texture and structure would be much more efficient and bring more satisfaction to user.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no conflict of interesting.

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