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Towards privacy preserving content based image retrieval in cloud computing

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ABSTRACT

Content-Based Image Retrieval applications have been rapidly developed along with the increase in the quantity availability and importance of images in our daily life. However, the wide deployment of Content-Based Image Retrieval scheme has been limited by it's server computation and storage requirement. Privacy-Preserving Content-Based Image Retrieval scheme, which allows the data owner to outsource the image database and Content-Based Image Retrieval service to the cloud, without revealing the actual content of the database to the cloud server. Local features are utilized to represent the images, and Earth Mover's Distance is employed to evaluate the similarity of images. The proposed scheme transforms the Earth Mover's Distance problem in such a way that the cloud server can solve it without learning sensitive information. The security analysis and experiments show the security an efficiency of the proposed scheme using a Secure Hash Algorithm.

Keywords— *Cloud Computing, Searchable Encryption, Image Retrieval, Local Search, Earth Movers Distance*

1. INTRODUCTION

Thanks to low-cost storage and easy web hosting, the world has witnessed tremendous growth in the quantity, availability and importance of images in our daily life. Images start to play a crucial role in diverse fields like medicine, journalism, advertising, design, education and entertainment, etc. The need for efficient storage and retrieval of images is reinforced by the increase of large scale image databases among all kinds of areas. Meanwhile, as an emerging technology. However, such kind of Content-Based Image Retrieval service is intensive in both computation and storage intensive. A large image database usually consists of millions of images. Sometimes, one digital image might contain more than 20 million dimensions and its size could be above 40 megabytes, such as mammography images.

2. RELATED WORK

Searchable symmetric encryption on the text domain has been widely studied in the literature. The proposed the first SSE scheme, and the search time of their scheme is linear to the size of the data collection. The proposed formal security definitions for SSE and designed a scheme based on Bloom filter. The search time of Goh's scheme is O (n), where n is the cardinality of the document collection.

3. EXISTING SYSTEM

The participation of a third-party cloud computing platform also increases the vulnerability of private data, e.g., potential data breach and lost. Under current cloud architecture, the content of outsourced image data will inevitably be leaked to cloud service providers. In this case, the leaked content might be sensitive information like the data owner's personal identity, home address, or even financial records. Moreover, even we assume Cloud Service Providers(CSP) are completely honest and could be trusted to have data owners' private information, such privacy leakage still happens. In fact, a cloud server is usually considered as a low-qualified locker rather than a strong bank deposit box.

4. PROPOSED SYSTEM

The proposed system consists of two phases as follows:

4.1 Data Pre-processing

In Data Pre-processing phase, for the image I, a User″ prepares cypher text C through encoding process Encode(I) and sends C to the cloud computing, where computation tasks over the encrypted image C. Such encoding algorithm should be lightweight and support as many image processing algorithms as possible. Hence, User only needs to encode its image data once, and the majority of computation workload is taken by cloud computing.

4.2 Encrypted Image Evaluation

After receiving the encrypted image″ data, cloud computing performs image processing algorithms over the cypher text domain to get the corresponding encrypted results. Meanwhile, the private information of uploaded image data should be protected against cloud computing.

4.3 Advantages

By using the SHA algorithm will provide a secure login. ″ By using CBIR algorithm the images will be divided by the content. ″

5. MODULES

5.1 Registration

Registration is a method of officially saving information into the database. User or Data-Owner can register here by giving their personal information.

5.2 Login

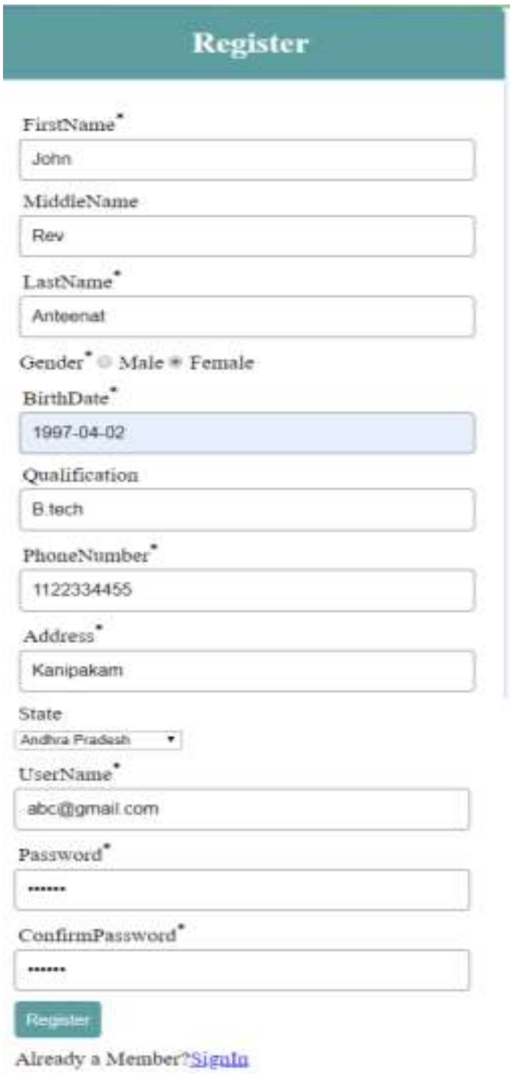
Login is the process by which an individual gains access to a computer system by identifying and authenticating themselves.

5.3 Admin Login

A person who is responsible for the environmental aspect of the database.

5.4 Client Login

A person who accesses a remote service on another computer.



Register

FirstName*
John

MiddleName
Rev

LastName*
Anteenat

Gender* ○ Male ● Female

BirthDate*
1997-04-02

Qualification
B.tech

PhoneNumber*
1122334455

Address*
Kanipakam

State
Andhra Pradesh ▾

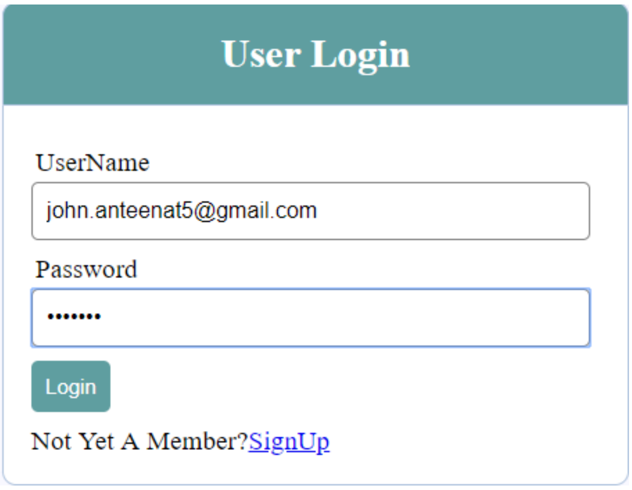
UserName*
abc@gmail.com

Password*
••••••

ConfirmPassword*
••••••

Already a Member?SignIn

Fig. 1: Registration form interface



User Login

UserName

john.anteenat5@gmail.com

Password

•••••••

Fig. 2: User login interface

6. CONCLUSION AND FUTURE WORK

In this paper, we propose a privacy-preserving content-based image retrieval scheme, which allows the data owner to outsource image database and the CBIR service to the cloud without revealing the actual content of the database. Local features are utilized to represent the images, and Earth Movers Distance is employed to evaluate the similarity of images. We transform the EMD problem so that the cloud server can solve the problem without learning sensitive information. The security analysis and experiments show the security and efficiency of the proposed scheme. In the future, we will study how to outsource the feature extraction to the cloud server so as to further relieve the burden of data owner and data user.

7. REFERENCES

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