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Secured Multimedia Management for Image Processing Applications

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ABSTRACT: *A multimedia communication system enables multimedia data's generation, storage, management,distribution, receiving, consuming, editing, sharing, and so on. In such systems, there are several security issues, which must be considered such as eavesdropping, intrusion, forgery, piracy and privacy,etc.For the instant the security of multimediainformation is achieved via the security of the database itself, inside the same manner, for all conventional and multimedia data. So, the cause for the creation of a security controldevice and a set of security guidelines for this sort of data is needed. The purpose is the fast development ofmultimedia data utilization in organisation activities. More and more distributed activities arebased on processing multimedia information in actual time, that's why the implementation ofany such securitysystem is vital.*

KEYWORDS-database security; distributed activities; multimedia information; relationaldatabases; multimedia processing

I. INTRODUCTION

Information security has traditionally been ensured with data encryption and authentication strategies. Through theyears, distinct well-known data encryption requirements had beendeveloped. Although those encryption standards offer aexcessive degree of data security, they may be now not efficient inside theencryption of multimedia contents because of the massive extent ofvirtual picture/video information. In order to address this issue,exclusive image/video encryption methodologies wereevolved. These methodologies encrypt best the keyparameters of image/video data as opposed to encrypting thewhole bit move. In addition, researchers start to make use ofinformation hiding techniques to decorate the security level ofdata encryption methodologies. Information hiding concealsno longer best the content of the secret message, however additionally its veryexistence. The future pathway of multimedia informationsecurity will be at the clever interweaving of encryption,data hiding, and lossless compression to beautify theprotection of multimedia structures. The intent of this paper is togift a country-of-the-era overview of these proceduresand provide destiny research directions.

For more than two decades, a new issue appeared in the database technologies:how to store, manage, manipulate, archive multimedia information. At the beginning theinformation was not stored in the database, but only a logical reference of the physiclocation from the hardware, and of course all the others characteristics of the multimediadata was saved in relational tables, like: height, RGB, resolution, format. In this way a premetadata system for managing this kind of information was created.Furthermore, due to increased number of operations over these data and thenecessity of reducing the access, processing and manipulation and other time costs, broughtabout the storing of the information in the database. A lot of opposing opinions appearedsaying that databases were not designed for storing these multimedia types of data, becausesustaining these data would unjustifiably load the database, due to non character basedinformation.

As mentioned above, Oracle InterMedia is not a specific standalone OracleProduct, it is included in Oracle Database System, to put it in Oracle's own terms, “OracleInterMedia Enables Databases to understand the real nature of images”.Oracle InterMedia is built on the database kernel and

operates as a privilegedcomponent of the database. The advantages of using Oracle InterMedia to store images are,as follows:

- Both the descriptions of an image and the image itself can be stored using industrystandard formats;
- InterMedia's objects model and methods make application programming simple in thedevelopment phase;
- InterMedia's applications maintenance become much easier as well;

II. RELATED WORKS

In multimedia communication, security issues [3],which are generated from the transmitted information'ssensitivities, should be considered. For example, theinformation may be related to military forbiddance,commercial secret or personal privacy. Only someauthorized users can access this kind of information,and any action aiming to make the informationreleased is regarded as the attack. With respect to thecomplexity of the information system, there arevarious threats. Some of them are described below.

Eavesdropping: Eavesdropping is the act of surreptitiously listening toa private conversation. This is commonly thought tobe unethical. Eavesdropping can be done overtelephone lines (wiretapping), email, instantmessaging, and other methods of communicationconsidered private. Wiretapping, also named telephonetapping, is the monitoring of telephone and Internetconversations by a third party, often by covert means.The wire tap received its name because, historically,the monitoring connection was applied to the wires ofthe telephone line being monitored and drew off ortapped a small amount of the electrical signal carryingthe conversation.

Forgery: Forgery is the process of making, adapting, orimitating objects, with the intent to deceive. A forgeryis essentially concerned with a produced or alteredobject (multimedia content, user information, etc.).

Piracy: Copyright infringement (or piracy) is the unauthorizeduse of material that is covered by copyright law, in amanner that violates one of the copyright owner'sexclusive rights, such as the right to reproduce orperform the copyrighted work, or to make derivativeworks. Especially for electronic and audio-visual, media, unauthorized reproduction and distribution isoccasionally referred to as piracy. Generally piracybehavior can be classified into two types, i.e.,unauthorized access and unauthorized distribution.The former one denotes the unauthorized users accessthe multimedia content, while the latter one means thatthe users redistribute the accessed multimedia contentto other unauthorized users.

Privacy: Privacy is sometimes related to anonymity, the wish toremain unnoticed or unidentified in the public realm.When something is private to a person, it usuallymeans there is something within them that isconsidered inherently special or personally sensitive.The degree to which private information is exposedtherefore depends on how the public will receive thisinformation, which differs between places and overtime. Privacy can be seen as an aspect of security – onein which trade-offs between the interests of one groupand another can become particularly clear. Almost allcountries have laws which in some way limit privacy.An example of this would be law concerning taxation,which normally requires the sharing of informationabout personal income or earnings. In multimediainformation systems, some personal information isprivate, such as user login information, subscribeinformation, user profile, and interaction records.Additionally, in some social networks, such as UserGenerated Content sharing networks, users canproduce or post some multimedia content that isshared with other users. The user generated contentsmay be also private.

III. APPROACH

One of the most important types which was introduced by Oracle InterMedia inorder to manage

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the image data is OrdSysOrdImage. Its design can be seen below inFigure 1. OrdSYS.OrdImage Data Design .

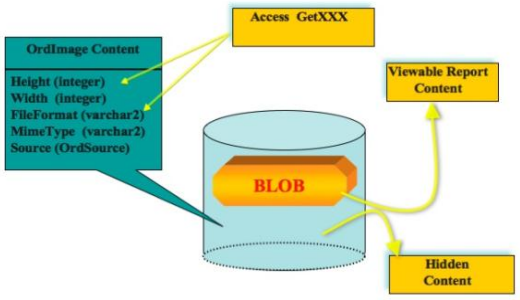

Figure 1.OrdSYS.OrdImage Data Design

As it is a Java based object, besides the Get Methods, OrdImage has as well a setof Set Methods and in all multimedia processing these GET/SET methods appear in pairs, asshown in the below sample PL/SQL procedure:

contrast.prc

```
create or replace procedure contrast(p_cod test_inter.cod%type) is
Image ORDSYS.ORDImage;
begin
SELECT photo INTO Image FROM test_inter t where t.cod=p_cod FOR UPDATE;
Image.process('contrast = 50');
Image.setProperties;
UPDATE test_inter SET photo = Image WHERE cod=p_cod;
COMMIT;
end contrast;
/
```

Figure 2. The content of "Contrast" procedure

Most of the important characteristics of Oracle InterMedia are:

1).Searching and indexing/archiving of images records will be most useful if theirmetadata can be searched. Searching the large images can be efficient only if indexesare available to support the search. In a common way, index searching have beenaccomplished by complex algorithms that parses image metadata and load it into aseries of indexed tables. Oracle InterMedia extract metadata from an image into anXML document, which can be stored in a single XMLType column, in the same tablethat contains the image column. Indexing this text column offers the robust searchcapabilities which lead to a faster DML;

Flexibility: Just after the images are stored in the database, these can be manipulatedlike any other relational data. Set of images can be updated, deleted, copied toanother table(s), by using simple SQL queries or as well PL-SQL code;

Image manipulation: Once an image is stored in the Oracle Database as anInterMedia object, it can be manipulated easily: the image format can be changed, RGB (red green blue collorpallete), image scaling, image cropping, image resizing, or image rotation/inversion.

Space management: Even if the hardware limitation is not anymore problem, still howmuch space these data is using. Reducing the storage is a requirement forperformance feature of data access as well for backup and recovery solutions. WithinOracle Database, this management includes: compressing images; changing theformat, will decrease the size of the image, like changing a bitmap image to a jpegone; remove and check the unused space; resizing and shrinking data files.

It has to be mentioned that all the features of the database itself can be applied tothe InterMedia as well, like encryption, auditing access, backup and recovery, datareplication, archiving. One of the most important operations in managing high amounts of multimedia data is the creation of data warehouses features like materialized views andinstantaneous management offer a very high speed in information analysis and retrieval.

Multimedia processing: Multimedia processing has always been based on the pixel mapping matrix. Thiscan be achieved by sequential access, which means that each pixel is saved with itscharacteristics: RGB, lightness and color intensity. The image is first divided in groups ofpixels, then the splitting process goes deeper to the pixel level.Another method used more frequently because of the way graphic information isstored and as well as for the shorter processing time.Types of sections that are used by

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OCR software arepresented in Figure 3. Graphic Sections Used by OCR .

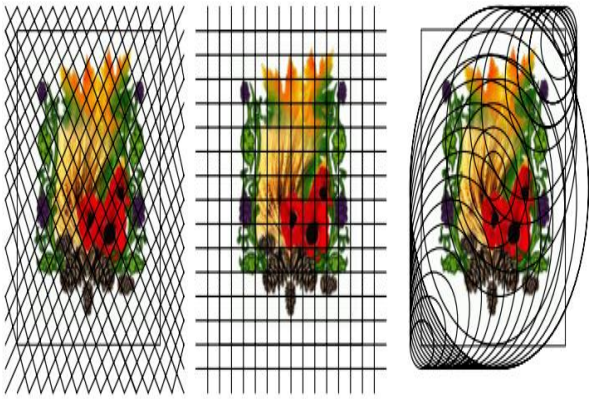

Figure 3. Graphic Sections Used by OCR

Other graphics processing operations are related to altering the color palette of theimage resource, the orientation, translation, resizing:
Transforming the image to grayscale is presented in Figure 4. Image GrayScaleProcess:

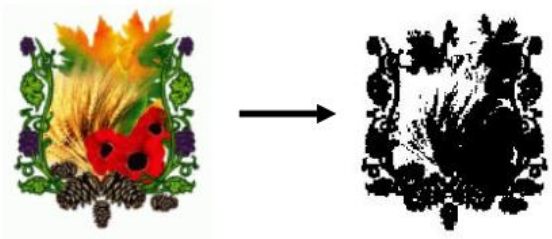

Figure 4. Image Grayscale Process

Multimedia Security System

The issue of multimedia security resources is a subject that has to be taken intoaccount by multimedia application developers administrators as well by the users. This canbe achieved both on the database level and on the GUI level.On the database level, security can be achieved by the following:

On the user level:

o With the database mechanism of managing users: by granting/restrictingaccess, creating roles, privileges at DDL operations, or/and at DMLoperations;
o With LDAP mechanisms by integrating LDAP users into the database. Inorder to achieve this, Oracle Database comes with the facility of anintegrating technology called Enterprise User Security.

On the data level:

o Using watermarking as a means to generate modified images;
o Embedding links on metadata level.
Watermarking is the process of embedding information in content. Whenwatermarking is done by digital means we refer to digital watermarking.Watermarking classification is achieved by the level of visibility, so as:

Visible watermarking, where the watermark is visible to the user when the image isread (it can be read through the same means as the image);
Invisible watermarking, where the watermark is invisible to the user (it cannot be readthrough regular image reading).
Invisible watermarking can have one of two purposes:

- To transmit the information to the user by indirect means, which assumes that theimage reading software is used in conjunction with other software which has thepurpose to read the additional information;
- To function as a preconstituted means of proving ownership of the multimedia contentin the event that some user might decide to infringe on the rights of the owner (this isusable in a court of law by the means of a technical expertise).

Implementation of embedded links on metadata level can be done throughmetadata stored in the database. Just as the graphic information is already provisioned inthe watermarking implementation, the metadata information is required to be provisioned inorder to provide the source information for embedded links. Why is necessary to createprovisioning tables for the metadata information? As a standard for security of databaseinformation XML, metadata information created by Oracle InterMedia should not be altered

directly, so that the information generated by the system will remain the same as it was atthe time the image was stored in the database, so called T0. After the metadata informationwas provisioned it can be used to create a specific repository for all images that aremanaged in the database. Also, since the information is XML organized, it can be easilydisplayed in a web page based form, which can be used afterwards for the embedded links.

IV. CONCLUSION

In an enterprise organization the requirement of archiving the documents in thedatabases, not only the textual information, but as a scanned copy as well appears moreand more frequently. The requirement of using multimedia databases in documentmanagement has thus improved as well. Solutions for the archiving of business documentsare taken into consideration as well multimedia databases as a way to implement them. For the moment the only way to search for specific multimediainformation is by interrogating the metadata information of the multimedia information. Thisfeature of interrogating the databases records by a multimedia filter would increase thesecurity of multimedia information

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