

## The Generation of Reusable and Secure E-learning Content

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### ABSTRACT

With the advent of digital technologies and e-learning techniques we need to optimize digital and particular e-learning content.

In this paper , a new reusable method with watermarking scheme based on Sharable content object reference model named SCORM standard is proposed. experimental results are shown to demonstrate the validity of the proposed scheme. There are four major stages in the content :

(1).Dividing content to sections (learning object) (2). Generating each section separately (3). Watermarking each section (4). Packaging under SCORM standard and represent to users .With above stages we earn standard reusable watermarked content.

Keywords: e-learning; watermarking; SCORM standard ; copy protection

### I. INTRODUCTION

In recent years e-learning and use of digital technologies advances.

Since knowledge has become a crucial resource for the success of a company, it has also become a product and an object of trade. Therefore; there is also a substantial market for e-learning.[1]

The aim of this paper is to propose a method for the development of e-learning contents for the use in different levels and occasions, for new learning courses different types of users and occasions through spending minimum cost and time . After, solving above problem we see content still has problem . Content is easily recorded and backed up and copied. Therefore, it is very important protect the property rights of the true owner of digital information . We introduce a method can solve above problems .

#### a. The importance of use standards

Difficulty, before apparent of standards:

1. It is impossible traverse of educational course from one system to another systems .

2. 1. It is impossible reuse e-learning object in several educational course.

3. It is impossible search e-learning content from content library or by course management systems.

#### 1.2 The importance of generating reusability

1. It is impossible for learner that use from learning object with personal attitude.

2 . For generating the similar educational course partner contents should generate separately to , to cause spending cost and time .

3.Generated contents after maximum 2years become un useable.

#### 1.3 The importance of generating security for e-learning

The target of security is protecting from e-learning content for example e-learning

content should protect from copyright ,etc.

## 2.THE PROPOSED REUSABILITY SCHEME

In this section reusability scheme based on SCORM standard is clearly proposed .

The SCORM standard is first described to introduce the proposed reusability. .

### 2.1. Scorm

The Shareable Content Object Reference Model (SCORM), published by the Advanced Distributed Learning (ADL) project, is a de facto standard for e-learning content.

#### Some advantages of scorm are:

- Publish once, play everywhere.
- Content can last longer because it is easier to justify ongoing compatibility with standard content.
- More places to play the content, and longer life for the content contribute to better returns on investment. This mean that publishers can afford to produce better content.
- The same standard supports content that is very simple and inexpensive to produce, as well as content with very high production value.
- SCORM specifies a minimum set of metadata that makes it practical to build catalogs of content, regardless of where the content comes from.

### 2.2.The reusability based on scorm

In propose method with divide the contents to small and individual section and generate each section separately under SCORM standard many difficult of above will be solved therefore; it will be possible common objects. Once time generate and reuse again and again .

Learning object s is learning package consist of learning content .

We can use them to make lessons.

Each learning object can make from one or composite from different medium for production of specific learning goal..

With use of SCORM we are archiving properties consist of:[2]

- 1.Reusability
- 2.Achievability
- 3Interoperability.
- 4.Durability.

Nowadays for present a text content ,we use word pdf formats and for use these formats by user should install Microsoft word and adobe acrobat reader in own computer but we prefer use swf format support with nowadays browsers. Swf has very advantages :for example :small size and use of vector technique for store information and searching word or group of words in text .For making a swf file we use macromedia flash paper .

For generating content in slide format we can use power point software .For this reason for , taking a slides no need for install power point ,we save a slide files in a html format and present them.

For presenting multimedia in execution time I write a program with action script in Flash that execute a file in execution time.

Then make a files (learning objects)if we want present them in a lesson structure and preventing scattered, package them with reload editor software in a lesson format .under SCORM standard.

In this propose method we create metadata for each learning object and each learning object describe with key words in own metadata with search algorithm for metadata .Then if necessary we generate a content can search by metadata to find a content if previous was made and it is not necessity to create again.

Experimental sample :

We are generating same section in three lesson which have similar content we are generating same section once and calculate time spend for generating them in two case ( with reusability and without it ).

These lesson were

1. system design
2. software engineering
3. extend software engineering .

In addition 46 section were selected .In four formats, we produce them .

In Table1 result are shown.

Table1.comparing 3 lessons cost

lesson	Without reusability	With reusability	Thrift with reusability
System design	900	900	0
software. engineering	900	525	245
Extend software. engineering	990	600	275
Total time	2790	2025	520

#### 1.block diagram of watermark system

### 3. THE PROTECTING OF INTELLECTUAL PROPERTY

One approach to protect intellectual is therefore to extend the control of the copyright holder to the entire lifetime of digital data. In bellow we explain one method .[1]

#### 3.1.How to make security for own content and digital watermarking?

The digital content is in a form that changing and exporting these electronic contents are very easy and can be done very simply and because of this some people can still the information and use it as they want. So that is why engineers are looking for a solution and ways to

control and prevent these kind of using information . One of the ways that we can do this is using a new method named watermarking which is a new technique and can be used in different solutions .

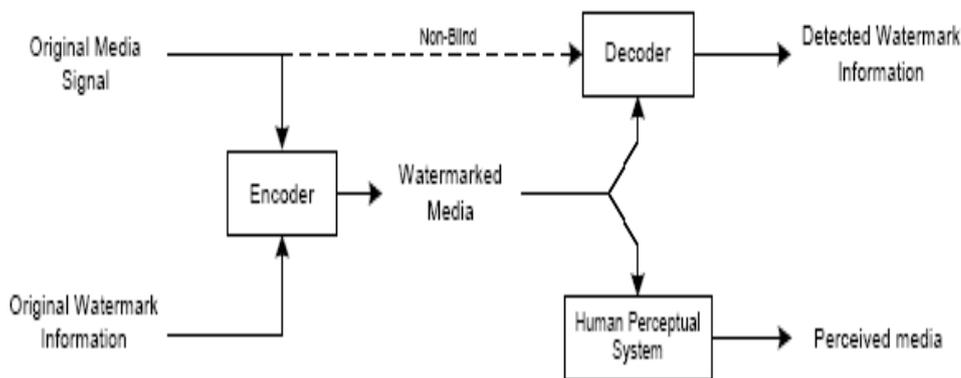
Watermarking is a method for increasing security for digital information against forging content and forbidden copyright . We can use the information are invisible and hidden and are in different kinds of files such as sound and scene files and even digital text we can extract these files when ever we want without having a problem and nothing would happen to our information. We now discuss about the basic facts of the method any watermarking system is made of two parts :

#### 1. Watermark place system

this system is known as encoder . the input data of this section are covered signal , watermark ( information hide in data) and security key that can be used and its not necessary . Watermark contains any kinds of information like text number or even images because each of this contents can be putted as information bits. Security key can be used for increasing security of the system .

#### 2. Decoding or recovering information

the input data of the system when we are decoding can be different and it depends on the algorithms and the time we are coding the system . the security key and watermarks can be the decoder inputs. The output of the system are the watermarks of the media.



### 1. block diagram of watermark system

### 3.2. Watermarking systems

The techniques of the watermarking are different and it depends of the kind of function of the technique . So we don't have only one way of using the technique watermarking system are divided into three groups.

#### 1. Private watermarking

In this system we need the main data for recovering we call this method non blind .

#### 2. Half private watermarking

In this system we don't use the main information for decoding but the output of the system is substitution or denying one kinds of watermarking.

#### 3. Public watermarking

This kind of watermarking is called blind which is the most complicated kinds of watermarking because for decoding we don't need the main media or watermarking information . we extract some bits as watermark from the media.

### 3.3. Watermarking functions

#### 1. Supporting the property rights

In this kind of function the main aim is putting the information about the owner of the media in the main data. For

example another man cannot say that the information belongs to him .

#### 2. Protection of abuse (misuse)

The aim of this function is fitting contents and information about the receiver of this information that instead of receiving the main information . The watermarked information can be received.

#### 3 .Security of publication

What we need the most and is very important for us is that we have a secure system that prevents division of the copyrights. For example a DVD set that has the ability of processing watermark information prevents copying a Disk that has a “ copy never “ font. Or a Disk that has “copy once” we can only copy once and it can't happen the second time .

### 3.4. Text watermarking systems

Like other watermarking system its made of a encoder and a decoder .The encoder uses one or a few techniques fits the information or words or codes , and the decoder analyses the receiving data and extracts the code words the encoder receives text information word codes and key and gives us watermarked text .

#### 3.4.1. Watermarking techniques

##### 1. Coding line shift

In this method some of the lines of the text shift up and down according to the input bits of the information after they

are extracted by the profiles of the lines are divided into two groups, control groups and carrier groups.

The carrier lines are the kind of lines that shift up and down according to the watermarking bits. For example if the input bit is zero (0) the line shift up and if the bit is one (1) the shift down. So for one carrier line one bit appears hidden and so these lines are carrier information.

control lines stand in their places and have no move and stand steel and have different uses. Dividing the lines can happen in different ways. In the primary way the first and last line of each paragraph are the control lines and the lines between this two lines are the carrier lines. In this way we have a lot of carrier so the code word is long but for increasing the resistance we need more control blocks. The best form is that from each three lines that we have the line which is the middle is used as the carrier line and the other two lines are the control line so in one text which lines that have normal length the odd lines (first, third, fifth) are the control lines and the even lines (second, fourth, sixth) are the carrier line.

The shift of the lines depends on different facts like quality, distance between lines, format resolution and so. For the scene of the text with 300 dpi quality and standard distance using the shift between one and two pixels and this is less than looking view of a human eyes. When the

distance between lines increases noticing the number of the shift becomes harder.

## **2. Coding word shift**

This method is very similar to the line shift but the difference is that instead of crossing up and down this time they go left and right.

## **3. Distance coding**

One of the details of any text is the distance between words. In new techniques of watermarking we do not have control words and we use the distance between words and that is like this the distance of words change by the algorithm and watermarking bits. And by changing the distance the words move to left and right.

## **4. Coding details**

In this method the visage of characters from the text change according to the input bits for example when we want to code a text we can change the size of characters so we have different ways to do and use the methods.

Today the US copyright office is a major service unit of the library, providing services to the congress and other institution in the US and abroad. It administers the copyright law, create and maintains public records, and serves as a resource to the domestic and international copyright communities. Table 2 shows some of the copyright milestones in the US for the last two centuries. [4,5,6].

Table 2  
Notable dates in the US history of copyright

Date	Event
May 31, 1790	First copyright law, derived from the English copyright law (Statute of Anne) and common law, enacted under the new constitution.
April 29, 1802	Prints added to protected works.
February 3, 1831	First general revision of the copyright law.
August 18, 1856	Dramatic compositions added to protected works.
March 3, 1865	Photographs added to protected works.
July 8, 1870	Second general revision of the copyright law.
January 6, 1897	Music protected against unauthorized public performance.
July 1, 1909	Third general revision of the copyright law.
August 24, 1912	Motion pictures, previously registered as photographs, added to classes of protected works.
July 30, 1947	Copyright law codified as Title 17 of the US Code.
October 19, 1976	Fourth general revision of the copyright law.
December 12, 1980	Copyright law amended regarding computer programs.
March 1, 1989	US joined the Berne Convention.
December 1, 1990	Copyright protection extended to architectural works.
October 28, 1992	Digital Audio Home recording Act required serial copy management systems in digital audio recorders.
October 28, 1998	The Digital Millennium Copyright Law (DCMA) was signed into law.

### DISCUSSION

A good way of reducing the costs for learning material is to reuse learning material created before or by others. Besides preventing the same content from being re-implemented over and over again as a training sample in table1 were showed .Then we use methods to have secure content for this

reason we introduce watermarking techniques and use them.

### CONCLUSION

We have reviewed the reusability and security of e-learning content from creation to consumption .Our conclusions are summarized as follows:

- With reuse object prevent the same content re-implement over and over this cause to reduce cost.
- Four interacting mechanisms are available to protect intellectual property in digital form.

We described methods and we can use a composite of methods .

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