A Study on the Security Warning Algorithmfor Copyright Protectionin Network Environments

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ABSTRACT : *Recently, with the infinite power that media contents possess, actions of illegal digital content copying are highlighted as a critical social problem. Therefore, we need DRM technology to protect and promote fair use of copyrighted items. But there is no way to stop illegal copying fundamentally, even though we possess tracking technologies such as digital watermarking, digital fingerprinting, and content recognition technology to find unauthorized replicas. In this paper we discuss about a problem caused when print screen key is used to capture the screen, causing illegal copying. For this case, we wish to solve such problems by implementing algorithm in which opens a window warning about DRM and illegal screen capturing. In overall, we wish to suggest the expected outcomes of such security warning algorithm, along with the formation of such algorithm.*

KEYWORDS :*Piracy Deployment, Illegal reproduction of digital contents, Copyright protection technique, Screen capture for print screen key, Watermarking*

I. INTRODUCTION

Recently, web users exchange and share information about their hobbies or interests. Also, they collect information for educational and social purposes as well. However, during the process of doing such, web users tend to use illegal methods, such as using capture tool, print screen and drag&save. This causes a huge social problem of copy rightness, which may eventually lead to lawsuits. As internet network holds great influence in current society, one should know that one's small action not only can cause violation of law, but social confusion as well.

In modern network environment, digital watermarking, digital fingerprinting and content recognition exists as a form of digital copyright protection technology.

Since 1995, a year in which concept of digital watermarking was introduced; lots of its uses were introduced. For example, to check copy rightness, to track illegal distribution, to monitor broadcasts, and to control accessibility[1].

Among such actions taken for protection, technologies already adopted by image contents are: prevention technology such as prohibiting screen capturing and tracking technology such as watermarking or key point.

However, technologies to prevent screen capturing come to no use, when URL source has already been exposed. Additionally, tracking technology works after acts of illegal copying has been discovered. Thus, it has a huge drawback, in which: It is unable to solve the root problem [2].

Like how the current situation is, there are no absolute solutions to perfectly protect online contents and copyrighted data. Thus, this paper suggests an algorithm to alert the web users and to remedy their behavior on using the internet network, thus solving the root cause of the problem. Thus, we are suggesting the use of existing technology called 'Watermarking' to actualize the pop-up warning to prevent the acts of illegal. For that, we present the generation method of the algorithm, and the expected outcomes of it.

II. EXPERIMENT DIRECTION

As the digital communication systems vitalizes, issue of protecting multimedia contents is being highlighted. With just one click, a digital content can be reproduced infinitely and be spread over the web, with its quality unaffected. Therefore, if projects to prevent illegal replicating of digital contents are not carried out efficiently, it will be difficult for markets related to multimedia contents to be invigorated. [3]

With the development of digital networking society, both internal and external markets for watermark technology have been increasing. For the case of internal market (Korean market in this case), the digital content industry showed superb growth of average 50% per year, since 2000.In 2005 alone, the estimated total production output was about 3.3 Billon USD. [4]

With this under consideration, pop up warning that cautions the user when one's use of print screen key is detected is required, alongside with watermarking. Therefore, in this paper we suggest that if print screen key was utilized in the communication network system, followed by watermark being detected, "SW security dialog" which was handled in this paper would be activated. By such, the users will be notified and warned about their wrong actions of illegal copying. Additionally, copyrighted digital contents will be protected

2.1. protect digital copyrights in watermarking

Watermarking technology represents a device in which records the copyrighted data of the copyrighted contents. Watermarking technology is indistinguishable to a human eye. By inserting data to the original item of certain contents, it is used to distinguish the originality of the images or text. It is a technology in which aims to protect the copyrighted claims. They do so by comparing the inserted data of the original item with its replicas.

The characteristic watermark should possess is that: Watermark inserted to the contents should be absolutely invisible. Also, as it is a form of general contentmodification, its effect should not be faded with the content undergoing filtration, modification and rotation. For watermark to be utilized effectively, it must have characteristics of invisibility, tenacity andclarity. By invisibility, after inserting watermark, no clear and observable changes should be made to the original data, thus hiding the presence of it to the web users.By tenacity, watermark is to be inserted to the important area of the signal, so that in any case ofmodification or attack, the watermark will not be damaged, and be available for extraction. By clarity, it means that the extracted watermark provides an absolute proof to pursue one's ownership of the data. [5]

2.2. Associated with watermarking algorithm

What we discuss in this paper is that linking algorithm should be adopted for the items with watermarks, to prevent it being illegally replicated through abuse of "printscreen" in keyboard.Images and contents especially, require watermarking technology that uses pixels,with space areas.
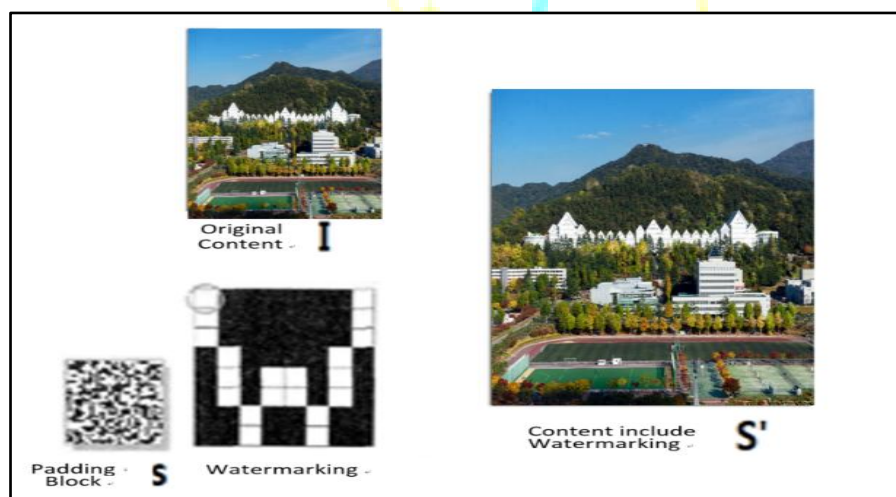

Fig1. Watermark example

Like figure 1, if insertion of watermarking or detection algorithm are inserted to given original video I through encoding process E, video I'=E(I,S) with watermark will be obtained. The process to decide on the ownership of the test video J, is through receiving entry of J or I, followed by the decoding process D, to extract label S=D.[6]

At this periodof time, if the use of "print screen" has been detected and the capture has been successfully made, label S and label S' will undergo comparison to detect whether it is copyrighted. In a case where it seems to be a copyrighted item, "SW Security dialog" warning system will pop up on the user's window. Even though it is a simple warning using dialog resource, by such warning, it would make the users to think about protection of rights.
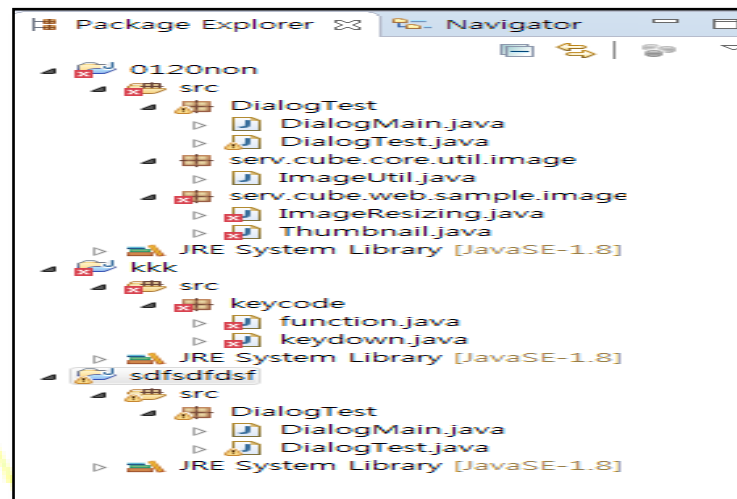
2.3. How to create

Fig. 2. Watermarking source created in java

Current this way is using physical pixel what invisible humans' eyes likes outlines brightness.
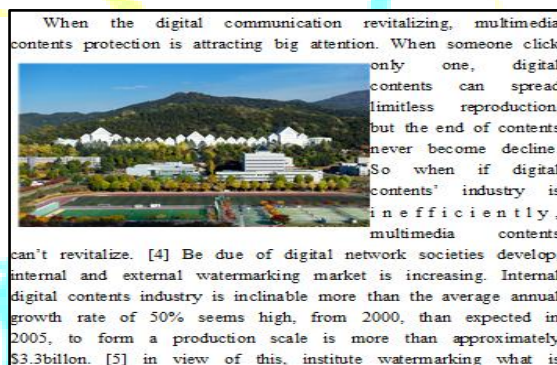
2.4.Compare result screen
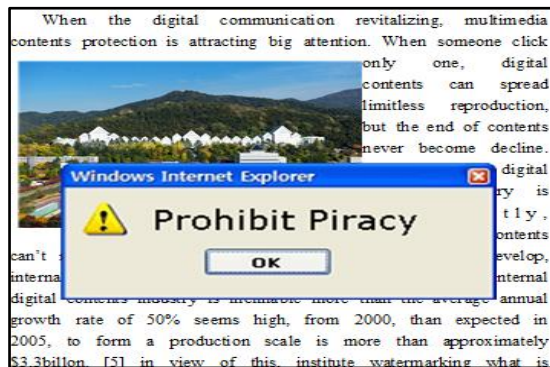

Fig. 3. Example capture before extract watermarking

Fig. 4.Example capture after extract watermarking

Fig. 5. Print warning dialog

When the use of "print screen" in keyboard is detected but no watermark has been found in the image captured, image captured will be downloaded, without any restriction. However, when the watermark is detected in the image captured, proving that the data is copyrighted, pre-realized pop-up warning will appear. The pop up warning will show "Prohibition of illegal duplication.". Followed up, if the user clicks on "ok", the message from the developers will be shown to the users who attempted illegal duplication. With these, we expect users that had shallow information on protecting copyrights will have a chance to learn more about protecting such items, and to be cautious.

III. CONCLUSION

3.1. Achieve effective

In future, web communications will provide greater amounts of multimedia contents and its size will grow rapidly. Therefore, the influence of web communications on people is expected to be greater, as well. Despite communication networking system is being well utilized, its drawbacks of copy rightness is not under absolute control. Thus, it is most important to remedy the users' behavior and thoughts on using the internet, and encourage them to thinkconscientiously and ethically.

What this paper suggests even though "SW security dialog" algorithm simply works by giving pop up warning, it is not only able to prevent spreading of the illegal replica of the copyrighted item, but able to promotehealthy use of the digital contents as well, which are shared through communication media. By preventing the abuse of print screen, one'swork would be protected. Additionally, it will prevent social andcommercial confusion, caused by cybercrimes. Unlike the old school method of sharing through copying URL can be tracked, the recent method of copying through print screen cannot be tracked. Thus, what we suggest in this paper will show greater effect in treating illegal copying.

If online service providers adopt "SW security dialog" technology which was handled in this paper, there will be no further duplication of copyrighted items, using print screen. They will only be allowed to duplicate under the permission of the owner. Additionally, duplicators will notice that the action of using the "print screen" key to copy materials is an act against of copyright and are expected to behave appropriately in

future. Furthermore, we expect to see some improvements being made in the quality of contents, as content creators' will to produce new contents increases.

3.2.Future Direction.

There is a greater need to prevent the circulation of the illegally replicated material, before, handling the problem of thoughtless replication of the materials. Also, to handle the explosively increasing the number of copyrighted items, government's firm support and consistent research is required. Beside the support from the government we think that it is most important to naturally lead the users to think more ethically.

By adopting network ethics in the school curriculum, not only the abuse of print screen key or other forms of capturing tool will be reduced, but, users will fully understand the copyright laws, and will be encouraged to share contents in a rightful way.

To add on, if the online contents providers adopt the watermarking technology one by one as a from to prevent illegal duplication, by domino effect, it will provide a pathway for watermarking technology to be generally adopted. in the whole networking system. Doing such, web users will find the pop up warning more applicable to their situation, rectifying the unsound usage of network.

To end off, if "SW security dialog" isgenerally adopted by all digital gadgets such as smartphones, we expect to see a clean society in which every user having clear information in handling the data online and to behave ethically in daily life.

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