A Design of Contents License Verification Method using CLXF Interpreter

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ABSTRACT

The metaverse environment refers to a virtual space in cyber that is connected to reality. Broadcasts and performances performed in the metaverse environment are called virtual performances, and the contents used for virtual performances have respective ownership and copyright. However, the concept of ownership and copyright in the metaverse may be interpreted differently from the real world. In this study, to solve this problem, we propose CLXF, a technology that can manage and verify copyrights on the metaverse.

KEYWORDS

Metaverse, Copyright, Virtual Performances, CLXF

1 INTRODUCTION

The meta bus environment means a cyber virtual space linked to reality. Commonly used AR (Augmented Reality), VR (Virtual Reality), MR (Mixed Reality), XR (Extended Reality) can perform interactions between the real world and the virtual world. Various activities that can be performed in the real world can be performed in a method that is the same or specialized in metaverse. Among them, activities such as performances, broadcasts and exhibitions in the real world are limited to time and space. In addition, performances and broadcasts are characterized by difficult or impossible to duplicate professional manpower, technology, and physical elements for the activity, and in the case of the exhibition, ownership and copyright have a limited time because they cannot have the same value when replicating the exhibits. none. On the other hand, virtual performances performed in a virtual world, such as metaverse, are easy to replicate and use because they follow the method of simulating the virtual world using the elements of digital data.

Virtual performances in the meta bus environment have recently attracted attention as an alternative to carry out real activities with infectious disease pandemic. For example, Travis Scott is a performance in the Fortnite game. The event is characterized by embodying the real-world activities in the virtual world without the constraints of time and space. Like this, it can be used as a space that can expand the area that humans can lead to the restrictions of the real world. However, the virtual world consists of digital data, and all the activities in that space consist of digital data. Therefore, as described above, all data is easy to replicate, and anyone can use it by replicating and modifying the data once released. In order to solve this problem, the concept of copyright in the real world must be introduced to limit the use of unauthorized use and allow only the users who have acquired the license can use the contents.

This study proposes and analyzes the structure of the CLXF (Contents License Exchange Format), a format that can be structured and verifiable to solve the above problem.

2 RELATED WORKS

This chapter describes related works to understand this study.

2.1 Copyright and Ownership

Copyright refers to the rights that creators have with respect to works such as poetry, novels, music, art, and movies. In general, the creator has the ownership and copyright to the creation at the same time as the creator creates the work, and the copyright and ownership can be delegated to a third party through a separate contract. However, copyright and ownership are completely separate rights, and copyright and ownership can be owned and exercised separately. The following are definitions of copyright and ownership.

- **Copyright:** The right of the creator to a work such as poetry, novel, music, art, film, play, computer program, etc.

- **Ownership:** The right to use, profit, and dispose of an object as one's own, with direct, exclusive, and total control over it.

As such, copyright and ownership are different rights, and even if the creator transfers the ownership, the copyright is not transferred. In addition, copyright can be divided into moral right and economic right in detail, and the elements included in each right are shown in Figure 1.
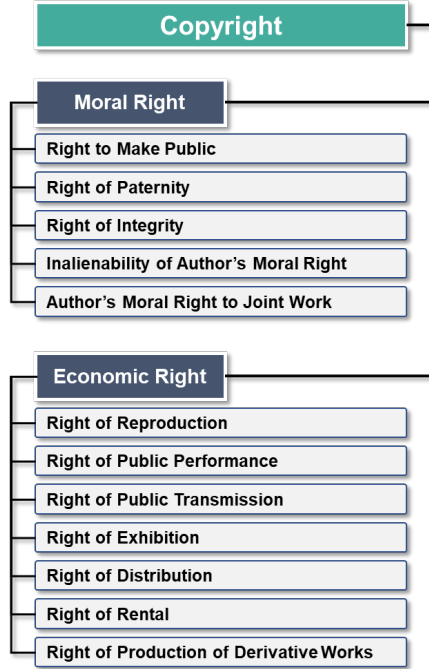

Figure 1: Detailed structure of copyright

However, since the existing copyright is configured according to the real world, there is a possibility of entering into a wrong license agreement when performing a contract based on the existing copyright law in the metaverse environment.

2.2 Copyright of Contents in Metaverse

Although the metaverse environment lies on the connecting line of the real world, it has a structure that is quite different from the real world. Most notably, there is no space constraint. This is because performances, broadcasts, and exhibitions in the real world are based on physical movements, actions, and forms by people and objects. it becomes impossible Also, even in the case of exhibition, it is impossible to reproduce the exact same thing, so a user who has not obtained a license cannot possess the original of the object according to the due process. However, since data on the metaverse is loaned to a third party and data is copied at the same time, abuse due to duplication of objects can be easily accomplished. In addition, there is a possibility that the limitations of the scope and place of performances, broadcasts and exhibitions may be ignored

because the metaverse environment does not have physical space restrictions. Therefore, in order to perform a virtual performance that complies with the copyright law in the metaverse environment, it is necessary to manage and verify the ownership and copyright of content in accordance with the metaverse through a license management tool suitable for this.

3 PROPOSED METHOD

This chapter describes the method presented in this study.

3.1 Design of CLXF

CLXF (Contents License eXchange Format) refers to a format for exchanging contract contents and usage environment information, and an interpreter and environment to handle it, in order to check whether the contents license agreement is complied with between the virtual performance platform and the contents market. The composition of CLXF technology is shown in Table 1.

Table 1: CLXF technology configuration

Item	Description
LRCAM Framework (License & Rights Contract Automated Management)	1. Rights and Licensing Agreement Automation Technology Framework
CLXF Language	2. License Agreement Expression Language
CLXF Result	3. Execution result of CLXF interpreter
CLXF Interpreter	4. License Agreement Interpreter 5. A program that judges compliance with the license based on CLXF contract information and virtual performance environment information
CLXF Protocol	6. Information exchange protocol between virtual performance platform and contents market using CLXF

3.2 Structure of CLXF

The structure of CLXF presented in this study was designed in the nested method to handle the n-th work. Accordingly, the information structure was designed by dividing it into the final work information part and the license agreement information part. Among them, the final work information unit serves to record meta information including identification information

of the final work. On the other hand, the license contract information section includes only the license information of the work separately from the work information. Each component according to this is shown in Tables 2 and 3.

Table 2: Final Works Information Part

Data Item	Type	Description
Asset ID	[String]	Can have multiple IDs. Expressed in URN (Uniform Resource Name) method

Table 3: License Agreement Information Part

Data Item	Type	Description
Final fee calculation unit	[String], Base64-encoded CLXF script	Programming language department of CLXF that calculates usage fees for works
Environmental information required to calculate the fee	[String]	Key value of environmental information required for fee calculation
Payout information	[String]	Final payout information
Attached license fee calculation contract	[String], Base64 encoded	License agreement for fee calculation of used n-1 works
Terms of Use Verification Department	[String], Base64 encoded	Key value of environmental information required for condition verification
Condition Verification Required Environment Information	[String]	Key value of environmental information required for condition verification
Attached License Condition Verification Agreement	[String], Base64 encoded	License agreement information for condition verification of n-1 primary works used

4 CONCLUSIONS

In this study, research related to copyright management and verification was conducted so that various contents can be used legally in virtual performances performed on the metaverse. Copyrights in the real world may be interpreted differently on the metaverse, which may lead to incorrect license agreements and, as a result, license violations. In this study, CLXF was proposed to solve this problem. CLXF specifies the ownership, copyright information, and license information of digital content so that appropriate rights can be exercised on digital content in accordance with legal procedures on the metaverse. Through these studies, it is possible to provide a basis for safer and more appropriate copyright exercise in environments such as metaverse and digital twins in the future.

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