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Online Detection of Copyright Protection System for Videos Streams Using Cloud

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Abstract— **With Digital revolution, content creator space has increased and many content owners create video contents and publish on streaming sites like YouTube. These contents can be stolen on internet and published in some other sites completely or partially. To detect this online copy, a copy right protection system is need which can detect if content is copied to some other site and its URL and the percentage of copy. If this information is available, the content owner can sue the copier and the sites hosting copied information. With increasing lot of online videos there must a way to identify the copy with a reasonable amount of time. In this paper, we propose a copy right detection system which works fast and on online.**

I. INTRODUCTION

Advances in processing and recording equipment of multimedia content as well as the availability of free online hosting sites have made it relatively easy to duplicate copyrighted materials such as videos, images, and music clips. Illegally redistributing multimedia content over the Internet can result in significant loss of revenues for content creators. Finding illegally-made copies over the Internet is a complex and computationally expensive operation, because of the sheer volume of the available multimedia content over the Internet and the complexity of comparing content to identify copies.

We present a novel system for multimedia content protection on cloud infrastructures. The system can be used to protect various multimedia content types, including regular 2-D videos, new 3-D videos, images, audio clips, songs, and music clips. The system can run on private clouds, public clouds, or any combination of public-private clouds. Our design achieves rapid deployment of content protection systems, because it is based on cloud infrastructures that can quickly provide computing hardware and software resources. The design is cost effective because it uses the computing resources on demand. The design can be scaled up and down to support varying amounts of multimedia content being protected.

II. RELATED WORK

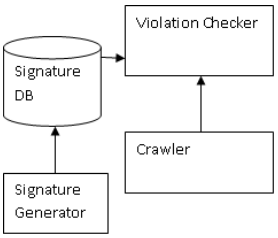
The problem of protecting various types of multimedia content has attracted significant attention from academia and industry. One approach to this problem is using watermarking [10], in which some distinctive information is embedded in the content itself and a method is used to search for this information in order to verify the authenticity of the content. Watermarking requires inserting watermarks in the multimedia objects before releasing them as well as mechanisms/systems to find objects and verify the existence of correct watermarks in them. Thus, this approach may not be suitable for already-released content without watermarks in them. The watermarking approach is more suitable for the somewhat controlled environments, such as distribution of multimedia content on DVDs or using special sites and custom players. Watermarking may not be effective for the rapidly increasing online videos, especially those uploaded to sites such as YouTube and played back by any video player. Watermarking is not the focus of this paper. The focus of this paper is on the other approach for protecting multimedia content, which is content-based copy detection (CBCD) [15]. In this approach, signatures (or fingerprints) are extracted from original objects. Signatures are also created from query (suspected) objects downloaded from online sites. Then, the similarity is computed between original and suspected objects to find potential copies. Many previous works proposed different methods for creating and matching signatures. These methods can be classified into four categories: spatial, temporal, color, and transform-domain. Spatial signatures (particularly the block-based) are the most widely used. However, their weakness is the lack of resilience against large geometric transformations. Temporal and color signatures are less robust and can be used to enhance spatial signatures. Transform-domain signatures are computationally intensive and not widely used in practice. For more details, see surveys for audio fingerprinting [5] and 2-D video fingerprinting [15]. YouTube Content ID [9], Vobile VDNA,1 and Mark Monitor [17] are some of the industrial examples which use fingerprinting for media protection, while methods such as [12] can be referred to as the academic state-of-the-art. Unlike previous works, the contribution of this paper is to design a large-scale system to find copies that can be used for different types of multimedia content and can leverage multi-cloud infrastructures to minimize the cost, expedite deployment, and dynamically scale up and down. That is, we design our system such that previous content-based copy detection methods for creating and matching signatures can be implemented within our system

III. PROBLEM DEFINITION

Given a video with N number of Frames and content owner wants to find all contents on sites where his 50% of N frames are copied and new content is created.

IV. COPYRIGHT PROTECTION SYSTEM

The architecture of the proposed copy right protection system is given below



Signature generator generates the video signature of a video file.

Violation checker matches video got online from crawler against video signature in DB and reports violation more than 50% of copy.

Crawler crawls the online sites and downloads video from it and calculates video signature of the video and invokes on Violation checker.

The way of signature generation and matching is the important part in our proposed solution.

The signature generation works as follows

1. Identify the significant frames in the video
2. For each significant frame do following
3. Resize the frame to 300 * 300
4. Split the frame to 5 * 5 blocks
5. For each blocks calculate the average R,G,B
6. For the frame calculate average R,G,B
7. Write the average RGB of each block to a file.

The signature matching works

1. Identify the significant frames in the video
2. For each significant frame do following
3. Resize the frame to 300 * 300
4. Split the frame to 5 * 5 blocks
5. For each blocks calculate the average R,G,B
6. Compare the average R,G,B of frame to frame in signature DB and distance is less than threshold of 300 pixels and find matching blocks and increment count if match more than 50%
7. Match per = count *100/ No of frames
8. Return the Match per

The advantages in the proposed solution are

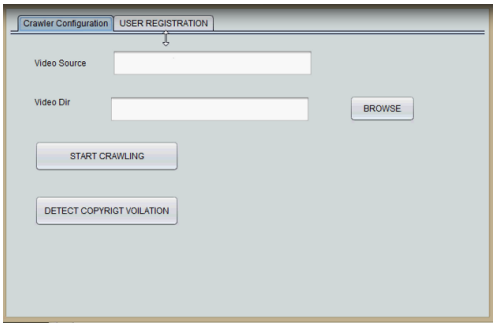
1. The blocks are compared for match only if frame average is less than threshold, by this way we have reduced the matching time and unnecessary checking for match.
2. The matching is all done on significant frames and not on all frames, thereby we have reduced the matching time.

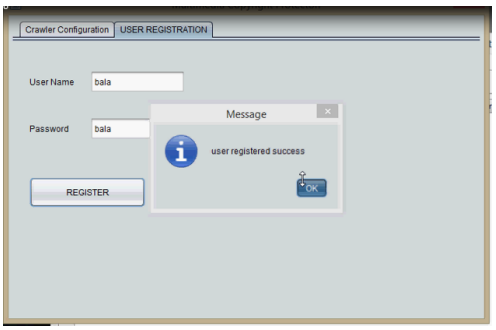
V. RESULTS

The proposed solution was implemented JAVA. The GUI was done is Swings and back round in core java. The program is made multithreaded to increase the speed of match.

From the result, the capacity used by proposed solution is less indicating with this solution we can add more instance of workflow.

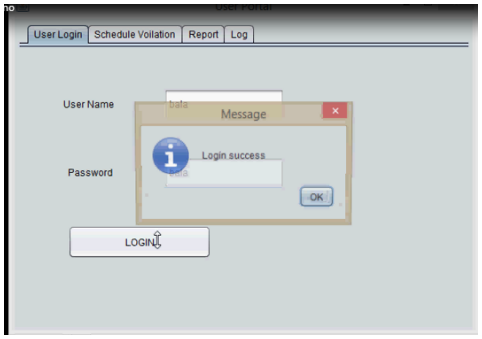
The copy right detection system main GUI has two options one for user registration and crawling and copy right detection.

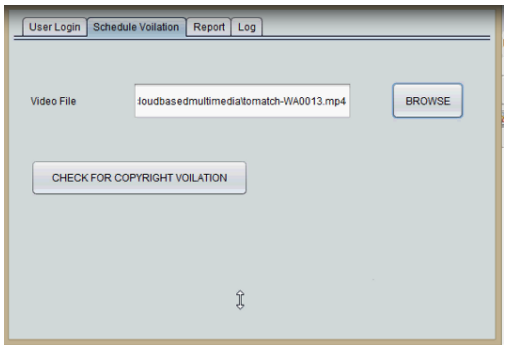


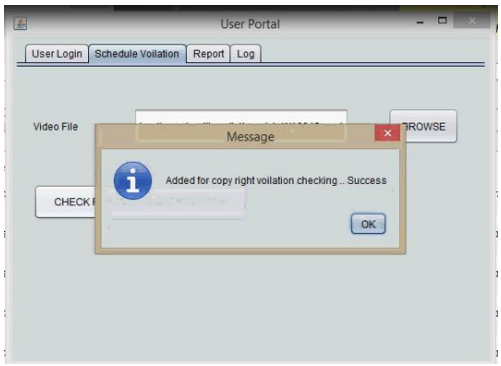


User who can access the system must register first to the system.

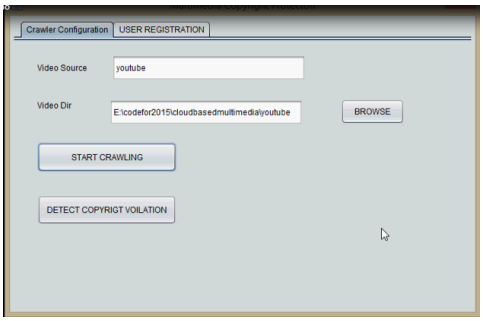
Registered user can login to the system and can schedule any video to be checked for violation.





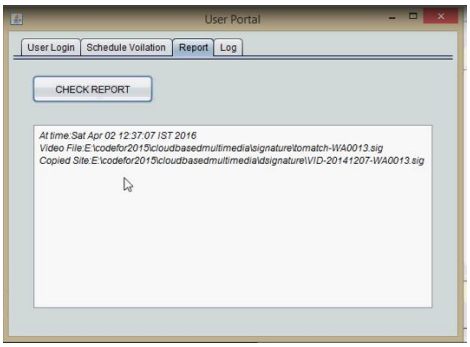


Video can be crawled on internet and signature created in the folder configured by the copy right protection system.

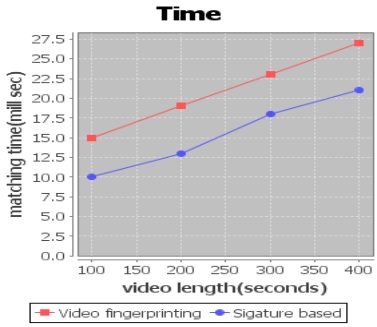


Copy right can be detected by pressing detect copy right violation button

User can check the report of copies



We measured the time taken for matching videos of different length between proposed signature based matching and finger print matching method and the result is below



The proposed signature based scheme consumes less time for detecting copy than the video finger printing scheme.

VI. CONCLUSION

We have proposed and implemented a copyright projection system in this work. We have also compared our approach with finger printing scheme in terms of matching time and proved that our proposed solution takes less time compared to finger print scheme.

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