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LEVERAGING MACHINE LEARNING FOR VIDEO MATCHING ON ONLINE PLATFORMS: A COMPREHENSIVE REVIEW AND ANALYSIS

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Abstract : In recent years, the exponential growth of online video content has driven a significant need for efficient video matching techniques to address issues like copyright infringement, inappropriate content distribution, and digital piracy. This research paper offers an in-depth examination of the application of machine learning algorithms for video matching on digital platforms. We provide a comprehensive review of existing methodologies, covering both traditional approaches and cutting-edge deep learning techniques. Moreover, the paper explores various challenges inherent in video matching. Through extensive experimentation and analysis, we assess the performance of different machine learning models, focusing on their matching accuracy, resilience to content variations, and real-time processing capabilities. Additionally, the paper underscores the effectiveness of machine learning in meeting the complex demands of video matching on online platforms.

I. INTRODUCTION

The outbreak of the COVID-19 pandemic has ushered in an unprecedented era of reliance on online platforms for communication, entertainment, and information dissemination. As people around the world adhere to social distancing measures and remote work policies, the consumption of digital media, particularly video content, has skyrocketed. Consequently, online platforms face a myriad of challenges, including the need to efficiently manage and monitor the vast volume of videos being uploaded daily.

One critical aspect of online content management is video matching, which involves identifying and categorizing videos to ensure compliance with copyright laws, community guidelines, and content policies. Traditionally, video matching has relied on manual review processes and rule-based algorithms, which are often labor-intensive, time-consuming, and prone to errors. However, the advent of machine learning (ML) techniques has revolutionized this landscape, offering scalable, automated solutions for video matching tasks.

LITERATURE REVIEW:

The world's biggest video database, YouTube uses its Content ID system for video matching. It automatically scans uploaded videos against a vast database of copyrighted content provided by rights holders. When a match is found, rights holders can choose to block the video, monetize it through ads, or track its performance.

Amazon Rekognition is a deep learning-based image and video analysis service provided by Amazon Web Services (AWS). It offers capabilities such as object and scene detection, activity detection, celebrity recognition, and face detection. These features can be leveraged for video matching and content moderation on online platforms.

IBM Watson Media provides a suite of AI-powered video analysis tools, including speech-to-text transcription, face recognition, and content classification. These capabilities can be utilized for video matching and content moderation on online platforms.

All these systems use Machine Learning as and deep learning techniques to analyze and match videos based on their content, metadata, and other features. While they offer powerful solutions for video matching, it's important to note that no system is perfect, and manual review and human oversight are often necessary to ensure accurate and fair content moderation. Also, all these are systems are effective after the video is uploaded on the platform which is where the proposed work comes into action.

PROPOSED WORK:

Designing a system for matching videos before uploading them to any platform involves several components, including video analysis, matching algorithms, database management, and integration with the platform's upload process. Here's a high-level overview of such a system:

1. Input Module: The system begins by accepting video files from users who intend to upload them to the platform.
2. Preprocessing: Upon receiving a video file, the system preprocesses it to extract relevant features and metadata. This may include extracting frames, audio features, and other characteristics of the video content.
3. Feature Extraction: Next, the system extracts features from the preprocessed video data. These features could include visual features (e.g., object detection, scene recognition), audio features (e.g., speech recognition, music identification), and textual features (e.g., closed captions, metadata).
4. Matching Algorithm: The extracted features are then compared against a database of reference videos using matching algorithms. These algorithms may include similarity measures such as cosine similarity, Jaccard index, or neural network-based approaches for more complex matching tasks.
5. Reference Database: The system maintains a database of reference videos, which may include copyrighted content, restricted content, or content flagged by previous moderation processes. The database should be regularly updated and curated to ensure accuracy and relevance.
6. Matching Decision: Based on the results of the matching algorithm, the system makes a matching decision for the uploaded video. If a match is found with a reference video, appropriate actions are taken according to platform policies, such as blocking the upload, flagging it for manual review, or applying monetization rules for copyright holders.
7. Feedback Loop: The system incorporates feedback from users, moderators, and copyright holders to continuously improve the matching algorithms and update the reference database.
8. Integration with Platform: Finally, the system integrates seamlessly with the platform's upload process, providing real-time feedback to users about the status of their uploads and enforcing content policies before publishing.
9. Scalability and Performance: The system should be designed to handle large volumes of video uploads efficiently, with scalable infrastructure and optimized algorithms for real-time processing.
10. Privacy and Security: Privacy and security considerations are paramount, particularly when handling user-generated content. The system should adhere to strict privacy policies and implement robust security measures to protect sensitive data.
11. By implementing such a system, online platforms can ensure compliance with copyright laws, community guidelines, and content policies while providing a seamless user experience for uploading videos. Additionally, it helps mitigate the risks associated with unauthorized content distribution, copyright infringement, and inappropriate content dissemination.

Theoretical framework

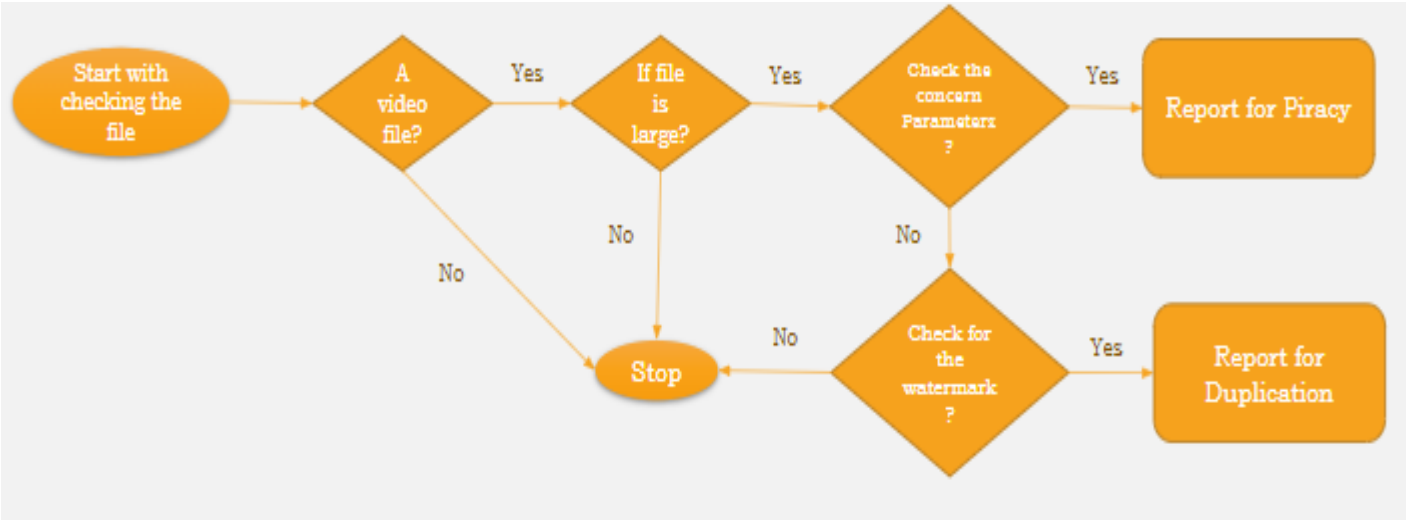

Fig 1. proposed methodology

The file which is to be worked on has to be a video file. It can be of any popular format with one of the popular picture quality dimensions. Also, the work will try to explore the possibility of any user uploading a file in parts which will be an additional challenge for the designing of algorithms. The probability of files with different file size of same pixel dimension of the same length is also one of the challenges if the compression technique used is altered by the user.

REFERENCES

[1] Intelligent System Design. Advances in Intelligent Systems and Computing, vol 1171. Springer - 2020, Singapore.

[2] Multimed Tools Appl 79, 25215–25236 (2020). Springer

[3] Ambient Intelligence – Software and Applications. ISAml 2020. Advances in Intelligent Systems and Computing, vol 1239. Springer, Cham.