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Video Copy Detection Using Machine Learning Techniques

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Abstract
The main aim of our project "A Novel Approach for Video Copy Detection Using Machine Learning Techniques" is to detect the illegal copies of videos using machine learning technique. In this approach we use CNN algorithm for video copy detection. First, we have a tendency to divide every video into multiple clips and sample the frames of every video clips. Second, the sampled clips area unit fed into CNN model to get convolution feature maps. Third, supported CFMs, we have a tendency to extract the CNN options. Finally video copy detection is completed supported extracted CNN options. In this project we have used a database which consists of original videos. We have used our own dataset in this approach which consists of frames of each video to demonstrate that the projected model performs well in aspects of each accuracy and potency.

Introduction
The present quick growing digital world, there'll be a large variety of videos uploaded in numerous websites. the initial videos are changed and these changed videos are uploaded in multiple sites. In common, a video copy is a segment of video that has been copied from another video at the side of making different changes to the original video, such as cropping, scaling, inserting logos, adding subtitles, and so on. once these modifications are performed, a duplicate may be a remodeled into video sequence and not the same one. the problem of copyright can arise once the derived videos are uploaded on the sharing sites. so, to safeguard the copyright of digital mediaIt is necessary to have a video copy detection system that detects derived videos close to analysing and comparing them with original content. Within subject of digital copyright protection, video copy detection has emerged as a major challenge. Because a video detection sequence typically comprises a large amount of data, extracting the video alternatives is the most important challenge in achieving cost-efficient and successful copy detection.. during this analysis work we have a tendency to planned a model video copy detection system exploitation machine learning algorithms.

Gabriela Csurka[11] et al., had explained the evolution of local features from handcrafted to deeplearning-based methods. Their investigations square measure driven by 3D reconstruction issues, wherever the precise location of the options square measure necessary. That paper discusses each detection and outline. the most plan is to optimise the parameters of a network employing a combination of 3 losses. The keypoints detected by the homographic adaption of the bottom keypoint detector, that the authors decision pseudo-ground truth interest purpose locations, square measure collected and used as coaching information for the SuperPoint network. The authors propose a brand new benchmark known as HPatches. This benchmark includes an outsized new dataset appropriate for coaching and testing trendy descriptors. the very best mean average preciseness on patch verification, matching, and retrieval tasks

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was earned by DOAP, that directly optimises the typical preciseness rather than employing a pairwise or triplet loss. The applications of laptop vision square measure various and also the associated information is to an outsized extent unpredictable, They argue that learning detectors and descriptors is desirable to manually planning them. Gourav Bhatnagar [12] et al., Recommented A New Robust Reference Watermarking Scheme Based On DWT-SVD.In this paper, Watermarking algorithm is proposed. It consists of embeddding and an extraction processes. Spatial and Transform methods are used in this watermarking algorithm. The proposed algorithm protects multimedia data. Digital Watermarking process is used and The authors describe a semi-blinded reference watermarking system that gives a high frequency of information. The suggested technique is resistant to a wide range of assaults. Binu A [13] et al., described An investigation into a variety of video copy detection strategies.In this ppaer,different video copy detection techniques are used to secure the video applications. A video fingerprint algorithm is applied to search the fingerprints from a large database. Watermarking approach and image based approaches are applied. Content based video copy detection techniques much more better performance than the other techniques. CBVD deals with large amount of data and, also it searches the data faster. A video fingerprint has some properties like robust nature, Independent pairwise, Efficient database search, Lower complexity, Compact.

Literature Survey

Chih-Yi Chiu [1] et al., planned a framework for handling spatiotemporal variations in video copy detection. The ways we tend to used here square measure key frames and candidate segments that square measure wont to extract applicable frames for matching, that square measure collected from giant video information.. It not solely handles spatial-temporal variations, however additionally reduces the computation price considerably. Extracting content primarily based videos guarantee content security of digital videos.

Mani Malek Esmaeili [2] et al., planned a sturdy and quick video copy detection system exploitation content- based process. during this paper, the fingerprint extraction algorithmic program is employed to extract content primarily based signature from special pictures made from the video. The planned process algorithmic program TIRI-DCT extracts fingerprints from video in a very reliable fashion. it's a real positive rate of ninety eight.2% and false positive rate of zero.97%. to seek out whether or not, a video is derived or not, the fingerprints of all videos square measure extracted and keep prior to. TIRI-DCT establishes 3D-Dct algorithmic program.

C. Kim [3] et al., planned a rotation invariant BSIF descriptor for video copy detection employing a ring decomposition. the most part of CBVCD is to construct a brand new matrix supported ring decomposition. The planned system relies on binary applied mathematics image options (BSIF) descriptors employing a ring decomposition. This model is evaluated beneath the TRECVID 2009 information and compare to the algorithms logical binary pattern (LBP), native section quantisation (LPQ). This model is economical for all the attacks like movement and flipping attacks.

Hongmei Liu [44] et al., Proffered A Robust DWT-Based Video Watermarking

Algorithm. Some features are secure key is needed in watermarking, interleaving technique, reduction of error by BCH code, LL subband, Develop temporal Synchronization. By applying this algorithm, bit rate is high and robust. Here,128 bytes are embedded into a single frame. HVS characteristics are taken considered to improve the robustness. Uncompressed-domain video watermarking algorithmic rule is employed for NTSC video and it consists of 518 bytes.

Hong Liu [5] et al., has planned a video sequence matching methodology in order to describe video copy detection. SIFT descriptor are used for video content description. Since the SIFT points quantity extracted from video is giant, that the copy detection exploitation SIFT options has towering process price. Experimental output displays that methodology will acquire much trade off between the detection effectiveness and time price.

Shan He et al. [6] investigated a method to employ the combined commitment to writing and embedding framework and construct sensible algorithms to fingerprint video in such tough conditions as accommodating over 10 million users and resisting collusion by multiple users. The analytic and experimental results suggest that joint commitment to writing and embedding has a great potential to meet the needs of real-world large-scale procedure applications.

Gitto St. George Thampi [7] et al. devised a separate riffle rework for content-based video copy detection. Using Daubechies riffle rework, the feature descriptor from video frames is obtained. The CIVR 2007 video copy detection information, MUSCLE-VCD-2007, is used as a back-up. It achieves better results than a number of current international descriptor-based methods. By utilising this technique, a detection rate of hr has been achieved.

Zhili Zhou dynasty [8] et al. devised a strategy for detecting video copies. It is planned to use a spatio-temporal convolution neural network (CNN). The video is first divided into numerous clips. Second, the captured video frames are fed into a CNN model that has already been trained to generate convolutional feature maps (CFMs). The CNN options wrested from supported CFMS. The detection of video copies is now complete. This method makes use of the TRECVID 2008 video dataset. This approach delivers outstanding results in terms of potency and effectiveness..

Daniel Zhang [9] et al. devised a method for detecting infringement in live video streams using crowdsourcing. The goal of this subject is to solve some difficult problems by examining a popular group of useful clues from live chat comments. CCID was tested using two global live video datasets obtained from YouTube. As a result, this method is more practical and cost-effective than Content ID. The planned model is effective in supporting the valuable clues from the audience's sobbing live chat messages.

Ying Yan [10] et al. devised a method for detecting ongoing content-based copying in streaming videos. First, the video sequence similarity is defined, followed by a hash-based video sketch for cost-effective sequence similarity computations. The associate index structure is designed for question sequences to support several continuous requests at the same time. Experiments were carried out using real videos.

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Existing System

Content based video copy detection using discrete wavelet transform. It containing two tasks feature extraction and similarity search.

In the first step the videos are divide into 1 sec period. In the next step the feature extraction is performed using DWT (discrete wavelet transform**)**. Each frame of video is act for using feature vector. The same process is applied on the both original video and modified video. At last, the similarity is performed to detect the video is copied or not. The Existing system has low detection rate and less accuracy.

Proposed System

The proposed system will solve the problems existed in existing model. The main objective is to increase the accuracy and precision by predicting the copied videos. In this approach we will use machine learning algorithms to detect whether the video is copied or not.

In this approach we use CNN algorithm for video copy detection. First, we tend to divide every video into several clips and sample these frames of every video clips and next the sampled clips square measure fed into CNN model to come up with convolution feature maps. Third, supported CFMs, we tend to extract the CNN options. Finally video copy detection is finished supported extracted CNN options.

i. Grouping Frames

In this module input video will be converted into clips which contains group of frames. Each clip is passed to features extraction module to extract features from clips. As videos may contains huge number of frames and processing all those frames may increase computation time and to reduce computation complexity we are dividing video into clips.

ii. Features Extraction

using this module we will extract Spatio Temporal features from video as video contains moving objects due to that reason it will called as Spatio Temporal features.

iii. CNN Module

The Convoutional Neural Network takes an image as input and nominate priority to numerous items within the image, permitting it to distinguish amongst them. The CNN role is cut back the pictures into a kind that is simpler to method, while not losing options that square measure essential for obtaining sensible postulation. The pre-processing needed in CNN is way lower as compared to alternative classification rule.

Working of CNN

We will develop a 6-layer neural network that will identify and differentiate one video frame from another to demonstrate how to build a convolutional neural network based video copy detection. This network that we will construct is a very modest network that can also be run on a CPU. Traditional neural networks, which are excellent at picture classification, contain many more parameters and take a long time to train on a standard CPU. However, our goal is to demonstrate how to use TENSORFLOW to create a real-world convolutional neural network.

Mathematical models called neural networks are utilised to solve optimization problems. Neurons are the basic computing units in neural networks, and they make them up. Neuron receives an value (say p), performs a few calculations (for example, multiplying by a and adding another variable d), and then

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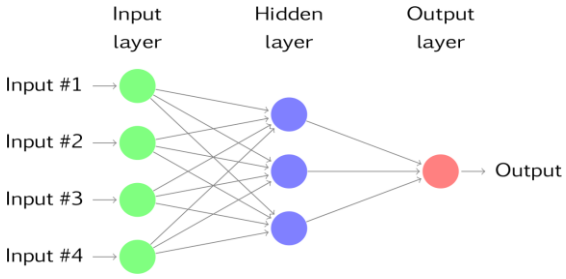
produces (say, q= ap + d). This value is passed activation function to create the output of a neuron (f). Activation functions are available in a wide range of sizes and shapes. The sigmoid activation function is a well-known activation function.. A sigmoid neuron is a neuron that activates by using the sigmoid function. Neurons are named based on their activation functions, and there are many different types, such as RELU and TanH.

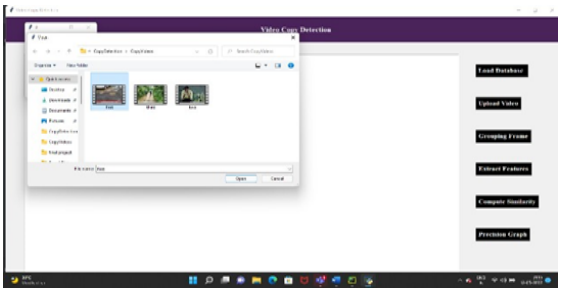
A layer is the following building component of neuralnetworks, and it is formed by stacking neurons in a single line. Layers can be seen in the image below.



Similarity Computation

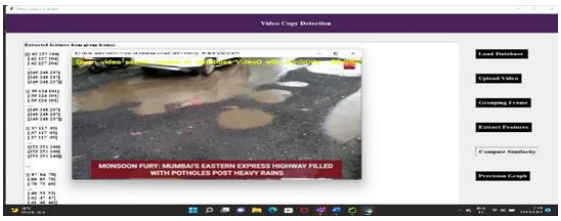
Using this similarity computation module will be called which compute similarity between database video and input video. If input video contains similarity greater than 90% then video will be marked as Copied. Similarity will be calculated by using database videos inverted index and input video vector. Centroid of database videos inverted index and input video vector will be used to compute similarity.

Result Screens



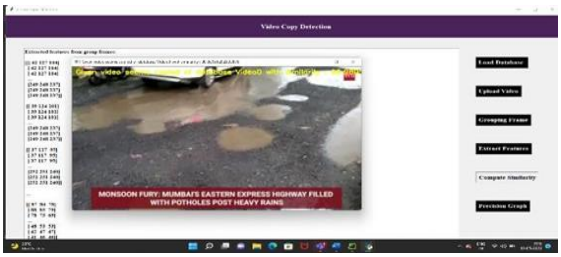
Screenshot 1

In the above screen we can see uploading of video from copied videos.



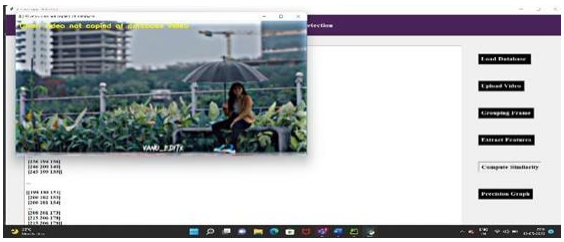
Screenshot 2

In above screen we can see frame in input video is copied of database video.



Screenshot 3

In above graph we are calculating precision value for last 6 input video clips and maximum clips has similaritynearer to 100 and we can conclude this video is copied.



Screenshot 4

In above screen we can see the input video is not copied video of database video.

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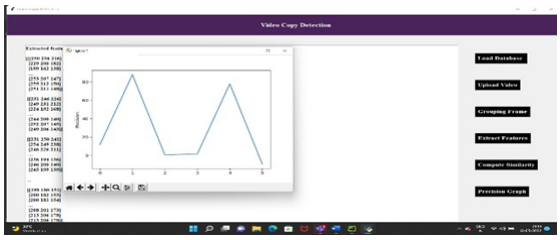

Screenshot 5

In above graph no clips are nearer to 100% match so we can say that video is original not copied.

Conclusion

In this project "A Novel Approach For Video Copy Detection using machine learning techniques is to detect whether the video is copied or not. We have proposed this model using CNN features. In conclusion we believe that the method proposed in this project has a potential to detect copied videos very efficiently and effectively. one will gain a higher understanding of why CNN is utilized in various applications and facilitates in many machine learning fields.

Future Scope

In future, our model will be very useful for detecting the copied videos for solving the problems of copy right issues and also for the protection of the original content.

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