

# Criminological Instruments through Characteristic Fingerprints Using Naïve Linear Search Method

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**Abstract:** Late improvement in interactive media preparing and organize advances has encouraged the conveyance and sharing sight and sound through systems. To expand the security requests of sight and sound substance, customary picture content insurance plans utilize outward methodologies, for example, watermarking or fingerprinting. In any case, under numerous conditions, extraneous substance assurance is unimaginable. To take care of these issues criminological instruments through characteristic fingerprints are created. Source coding is a typical advance of common picture securing. To center the advanced picture source coder legal sciences by means of inborn fingerprints, the one of a kind inherent unique mark of numerous well known picture source encoders are taken as the proof for security. In view of the inherent unique finger impression of picture source coder, criminological finder recognizes which source encoder is connected, what the coding parameters are, alongside certainty proportions of the outcome. Subsequently the picture will be verified.

**Keywords:** Multimedia processing, network technologies, image acquisition, water marking.

## 1. INTRODUCTION

The copy recordings have turned out to be intense issue for the regularly developing on the web video archives. Recordings on business destinations e.g., metacafe.com, youtube.com, are fundamentally literarily labeled. These are little help in observing and averting copy recordings. Shading design Descriptor is utilized to distinguish the copy recognition in video database.

## **2. RELATED WORK**

A decent overview for video duplicate recognition strategies can be found in[5]. Numerous plans utilize worldwide highlights (e.g., shading histogram processed over the whole video) for a quick introductory look for planned copies .Then, key frame-based highlights are utilized for a progressively refined pursuit.

### **2.1 Background of Detection of Duplicate recordings:**

In an early copy location work by Joly et al[2], the key frames relate to extreme in the worldwide force of movement. Neighborhood intrigue focuses are distinguished per key frame utilizing the Harris corner locator and nearby differential descriptors are then processed around each intrigue point. These descriptors are thusly utilized in other copy recognition works .In PCA-SIFT highlights are registered per key frame on a large group of neighborhood key points got utilizing the Hessian-Affine detector[7].

A blend of visual similitude (utilizing worldwide histogram for coarser hunt and neighborhood point based coordinating for better inquiry) and transient arrangement is utilized to assess video coordinating for copy location in . VQ based procedures are utilized in [4] to fabricate a SIFT-histogram based mark for copy location.

### **2.2 Global Image Features**

In a few methodologies, the copy recognition issue includes finding the similitude between sets of time-successive video key frames. A mix of MPEG-7 highlights, for example, the Scalable Color Descriptor (SCD), Color Layout Descriptor (CLD)[3] and the Edge Histogram Descriptor (EHD) has been utilized for video-cut coordinating , utilizing a string-alter separate measure. For picture copy identification, the Compact Fourier Mellin change (CFMT) has additionally been appeared to be exceptionally successful in and the smallness of the mark makes it reasonable for fingerprinting.

### **2.3 Entire Video Based Features**

The advancement of "ordinal" highlights offered ascend to extremely smaller marks which have been utilized for video arrangement matching[8] . Li etal[2]. utilized a double signature to speak to every video, by blending shading histogram with ordinal marks, for

video cut coordinating. Yuan et al. likewise utilized a comparative blend of highlights for strong comparability inquiry and duplicate location. UQLIPS, an as of late proposed continuous video cut identification framework , utilizes RGB and HSV shading histograms as the video highlights.

## **2.4 Indexing (Ordering) Methods**

Each key frame is spoken to by a large group of highlight focuses, each having a descriptor. The coordinating procedure includes correlation of a substantial number of intrigue point sets which is computationally thought.

A few ordering strategies have been proposed for effective and quicker pursuit. Joly et al[2]. utilize an ordering strategy dependent on the Hilbert's space filling bend rule. In , the creators propose an improved list structure for video fingerprints, in light of Statistical Similarity Search (S3) where the "factual question" idea depended on the appropriation of the pertinent comparative fingerprints.

## **2.5 Hash-Based Index**

The previously specified ordering techniques are commonly contrasted and territory delicate hashing (LSH), a prevalent surmised look strategy for L2 separations. Since the proposed separation work is non-metric, apart from that LSH can't be utilized in the setup as the region delicate property holds just for metric separations. Rather, the as of late proposed separation based hashing (SBH)[1] conspire, which can be utilized for subjective separation measures is tested.

## **2.6 Final Confirmation of duplicates**

After the best recovered hopeful, the copy identification framework needs to approve whether the question has for sure been got from it. That the key frames for a copy video can by and large be coordinated with the relating outlines in the first video utilizing reasonable spatio-fleeting enlistment strategies. The estimated NN results are present handled on register the most all inclusive comparable applicant dependent on an enlistment and vote technique. In[4] , Law-To et al. utilize the intrigue focuses proposed for direction working along with the video succession. A hearty casting a ballot calculation uses the direction data, spatio-fleeting enlistment, just as the marks figured amid the disconnected ordering to settle

on the last recovery choice. In this copy discovery framework, a "separate limit based" and an enrollment based system to decide whether the inquiry is really a copy gotten from the best-coordinated model video.

- In current copy discovery strategies, the question is expected to consist of huge division of the first referral video outlines. Henceforth, the inquiry signature, registered over the whole video, is thought to be like the input typical video signature.
- A lot of proficient questioning strategies with proposed separation measured or quantified which accomplishes much preferred to prune the dataset[5]. Over separation based hash (DBH) - DBH is the cutting edge strategy for questioning in non-measurable space is created.
- In the enrollment step is done between question outlines and over other model edges to affirm whether the inquiry is a copy gotten from the model video. The separation calculation methodology will finish up in processing which show vector fills in as the best counterpart for a question vector, this between vector communication helps in quicker ID of best coordinating model or referral key frame for the given inquiry key frame .

## **2.7 Sub Trajectory-Based Video Indexing and Retrieval**

This is a methodology for recovering recordings dependent on article directions and sub directions. To begin with, directions are divided into sub directions as per the qualities of the development. Effective direction division depends on an emblematic portrayal and utilizations chose control focuses along the direction[9]. The chose control focuses with high ebb and flow catch the direction different geometrical and syntactic highlights. This emblematic portrayal, past the underlying numeric portrayal, does not super from scaling, interpretation or revolution. At that point, so as to look at directions dependent on the sub directions, a few coordinating procedures are conceivable, as per the recovery objective from the client[10]. Also, directions can be spoken to at the numeric, emblematic or the semantic dimension, with the likelihood to go effectively starting with one portrayal then onto the next.

This methodology for ordering and recovery has been tried with a database containing 2500 directions, with promising outcomes. Advances in PC innovations and the

coming of the World Wide Web have made a blast of mixed media information being created, put away, and transmitted. For dealing with this measure of data, one needs creating proficient substance based recovery approaches that empower clients to seek data specifically by means of its substance. At present, the most widely recognized methodology is to abuse low-level highlights. When working with recordings, movement is likewise a vital component[11]. When perusing a video, individuals are increasingly intrigued by the activities of a vehicle or an on-screen character than out of sight. Moving articles pull in a large portion of clients' consideration. Among the extricated highlights from article development, direction is increasingly utilized[12]. So as to utilize the direction data in substance based video ordering and recovery, one must have an effective portrayal strategy permitting not exclusively to file directions. yet in addition to react to the different sorts of questions and recovery needs.

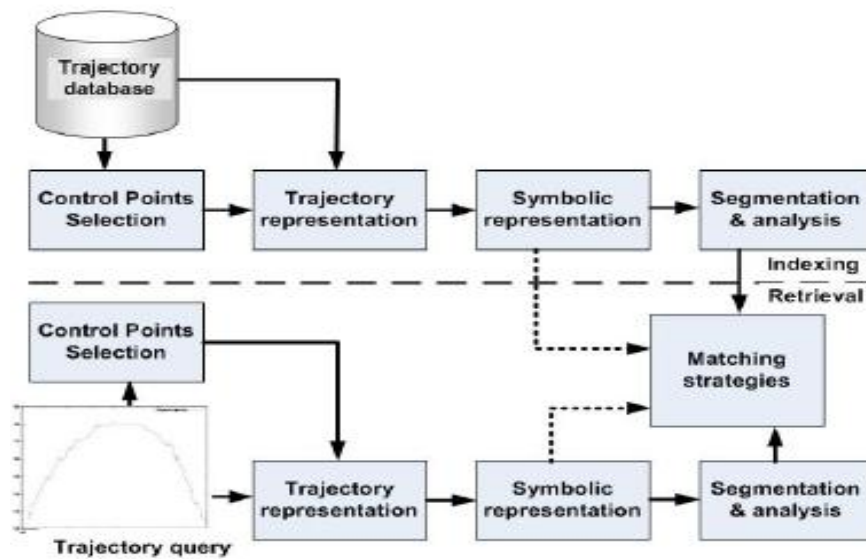


Figure 2.1 Architecture for sub trajectory-based video indexing and retrieval

For ordering, all article directions are prepared through four modules as depicted in Figure 2.1. The yield is an emblematic portrayal of the worldwide direction or its sub directions or just some chosen control focuses along the direction.

## **2.8 Problems in Existing System**

COPYRIGHT encroachments and information robbery have as of late turned out to be not kidding worries for the consistently developing on the web video vaults. Recordings on business destinations e.g., metacafe.com, youtube.com, are for the most part literarily labeled[13]. These labels help in observing the substance and avoiding copyright encroachments. Methodologies dependent on substance based duplicate discovery (CBCD) and also watermarking has been utilized to distinguish such encroachments .The watermarking method tests the nearness of a specific watermark present in the video to choose on the off chance that it is restricted to copy. The other methodology (CBCD) finds the copy by looking at the unique mark of the inquiry video having fingerprints which are in copyrighted recordings.

A "copy" video is one comprising altogether is subset of casings in the first video, the separate individual edges might be additionally changed and the fleeting request differed is characterized[14]. The supposition that a copy video consists of outlines just from a solitary video was utilized in different duplicate recognition works, here it is appeared for a lot of 24 questions sought in Google, YouTube, and Yahoo Video, about 27% of videos returned significant recordings are copies. In each web video in the database is accounted for to have a normal of five comparable duplicates - the database comprised of around 45000 clasps worth of 1800 hrs substance. Additionally, for some prevalent questions to the video in Yahoo web crawler, there were a few copies among the main ten recoveries.

## **3. Naive Linear Search (NLS)**

The NLS calculation realizes about two-pass technique with no pruning phase. In primary pass, it recovers best K applicants dependent over the littler question signature Q of by playing out of complete dataset filter utilizing a rising need line L is the length of K. The need line is additionally utilized for other rough inquiry calculations in this segment to monitor the best K-NN hopefuls. The kth passage in L have the video that is to be searched in the list (Lk,1) and it is get separated from the inquiry (Lk,2)[4]. A model mark is embedded into L if the measure of L is not as much as K or its separation from the inquiry is littler than the biggest separation in the line. In second iteration, NLS registers the separation of the K applicants from the bigger inquiry signature Qorig in order to locate the best coordinated competitor[15].

- Stage 1: Select model video  $V_i$  from Video Database. Sub test the decoded video Casings
- Stage 2: Extract Features for these casings. Group video outlines.
- Stage 3: Store the group focuses as video unique mark.
- Stage 4: Compute the separation frameworks
- Stage 5: Select inquiry video from Video database. Sub inspecting the Video.
- Stage 6: Feature Extraction for inquiry outlines.
- Stage 7: Cluster  $Q_{orig}$  and store the groups.
- Stage 8: Compute the separation grids.
- Stage 9: Naive direct pursuit is connected on top  $k$ -neighbors utilizing  $Q_{orig}$ .
- Stage 10: It restores the best coordinated video  $V_i$ .
- Stage 11: Decides whether the best coordinated video is copy.

#### 4. Experimental Setup and Results

Shading Layout Descriptor (CLD): The CLD is conservative and goals invariant portrayal of shading for fast picture recovery and it has been intended to effectively speak to the spatial dissemination of hues

- Image-to-picture coordinating
- Video cut to-video cut coordinating

Comment that the CLD is a standout amongst the most exact and quick shading descriptor.

#### Extraction:

In this procedure of shading descriptor comprises of four phases:

- Picture parceling
- Representation of shading choice
- DCT change

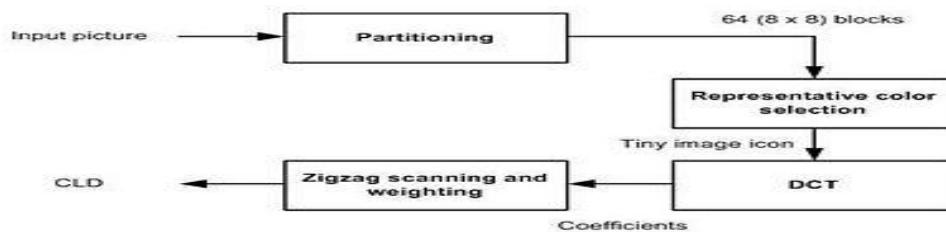


Fig4.1 Extraction process of the CLD.



#### 4.1 Image Segregation (Partition)

In this picture parceling stage, info picture (over RGB shading space.) is isolated into 64 squares to ensure that invariance of achieving goals or scale. The sources of information, yields of this stage-1 are noted in table 4.1 :

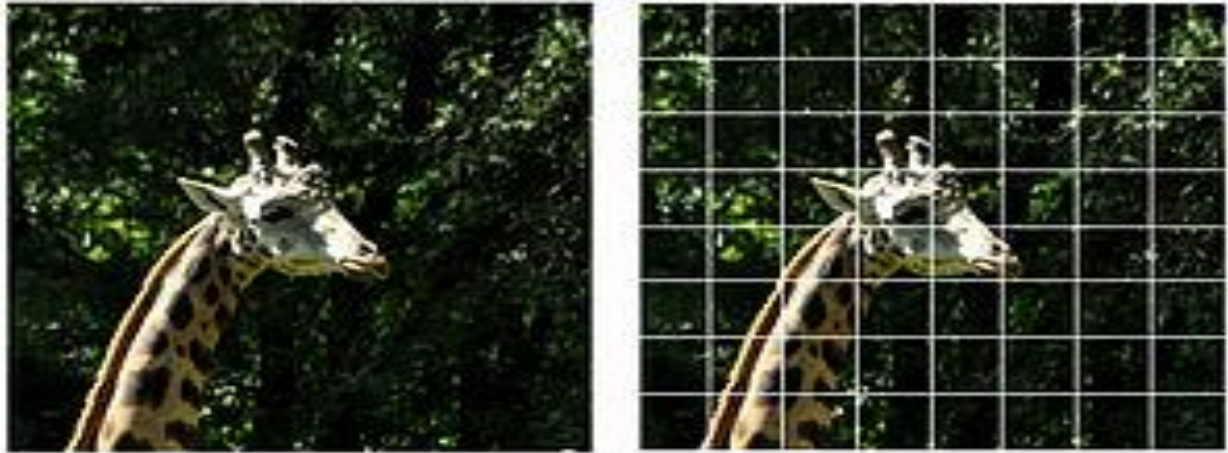


Fig 4.2 Image partitioning.

#### 4.2 Representation of Color Selection

The next, after picture parceling stage, a solitary delegate shading is chosen by each square. The technique to choose the agent shading can be connected, however the standard suggests the utilization of the normal of the pixel hues in a square as the comparing delegate shading, since it is more straightforward and the portrayal exactness is adequate when all is said in done.

Stage-1 I/p (Input)	Stage-1 O/p (Output)
[M x N] I/p(input) Image	Input image is partitioned into 64 blocks of [M/8xN/8] size.

Table 4.3: The table of summarized inputs and outputs of stage-3

The determination results in a little picture symbol of 8x8 sized matrix. The following figure demonstrates this procedure[16]. Note that, the goals of the first picture



has kept up just so as to encourage its portrayal. The information sources and yields of stage-2 are condensed in below table4.2:

### 4.3 DCT Transformation

In DCT Transformation the luminance is represented by Y, In this transformation the blue chrominance(Cb) and red chrominance (Cr) are transformed into [8X8] matrix of coefficients of DCT [17]. From this transformation we obtain three [8X8] sets DCT coefficients of 64 each. The formula to calculate 2D array of DCT coefficients stated as in the following.

Stage 4 I/p (input)	Stage 4 – O/p (Output)
[8x8] Small image icon in Y,Cb,Cr color space	Three 64 coefficients formed in [8x8] matrix of (DCTY, DCTCb, DCTCr)

The stage-4 I/ps and O/ps are tabulated as in table 4.4:

$$B_{pq} = \alpha_p \alpha_q \sum_{m=0}^{M-1} \sum_{n=0}^{N-1} A_{mn} \cos \frac{\pi (2m + 1)p}{2M} \cos \frac{\pi (2n + 1)q}{2N}, \quad \begin{matrix} 0 \leq p \leq M - 1 \\ 0 \leq q \leq N - 1 \end{matrix}$$

$$\alpha_p = \begin{cases} \frac{1}{\sqrt{M}}, & p = 0 \\ \sqrt{\frac{2}{M}}, & 1 \leq p \leq M - 1 \end{cases} \quad \alpha_q = \begin{cases} \frac{1}{\sqrt{N}}, & q = 0 \\ \sqrt{\frac{2}{N}}, & 1 \leq q \leq N - 1 \end{cases}$$

Formula used to calculate the 2D array of DCT Coefficients.

### 4.4 Zig-zag Scanning

The DCT co-efficient plays a vital role in zig-zag scanning. We use 3 [8x8] different sets of sixty four coefficients are used. The main aim of this kind of scanning is to make the lower frequency coefficients as a group.

Stage-5 I/p and O/p are summarized in table 4.5

Finally, these three set of matrices correspond to the CLD of the input image.

Input Stage 5	Output Stage 5
3 [8x8] matrix of 64 coefficients (DCT <sub>Y</sub> , DCT <sub>Cb</sub> , DCT <sub>Cr</sub> )	3 zigzag scanned matrix (DY, DC <sub>b</sub> , DC <sub>r</sub> )

Table 4.5: The inputs and outputs of stage-5 .

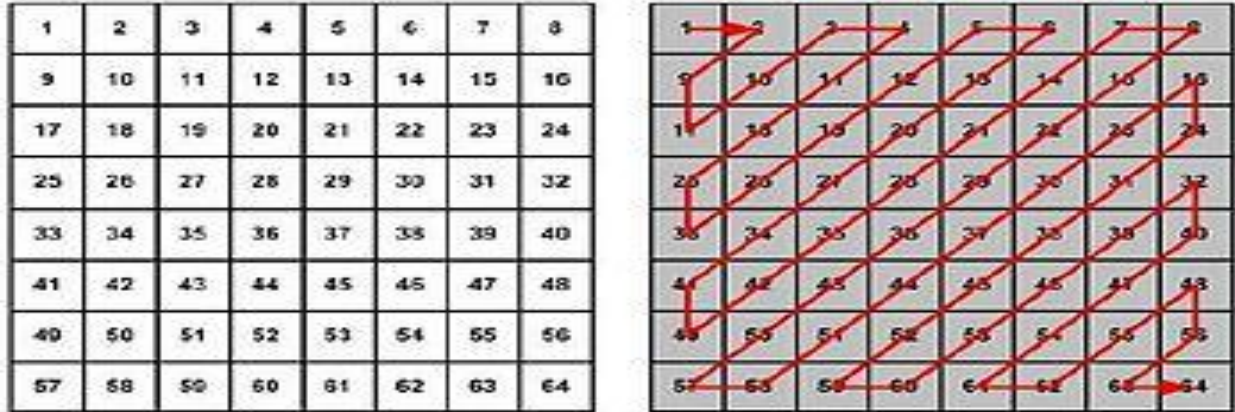


Fig 4.4 Zigzag Scanning.

## 4.5 Matching

It is necessary to compare, match and evaluate the two images are equal or how far they are near to each other. This needs a measure to quantify the similarity between two elements[18]. To find the similarity between color images it requires color descriptors for matching. The similarity can be measured by calculating the distance between two images.

$$D = \sqrt{\sum_i w_{yi}(DY_i - DY'_i)^2} + \sqrt{\sum_i w_{bi}(DCb_i - DCb'_i)^2} + \sqrt{\sum_i w_{ri}(DCr_i - DCr'_i)^2}$$

The application takes an image as input and it calculates the distance to each image in the image database.

Two Colour Descriptors is considered:

{ Dis Y, DC<sub>b</sub>, DC<sub>r</sub> }

{ Dis Y'', DC<sub>b</sub>'', DC<sub>r</sub>'' },

The distance from one color descriptor to another color descriptor can be measured.

In Zig-Zag scanning the order of scanning coefficients is represented by the subscript  $i$ .  $W$  represents the weight of the coefficients. With  $w$  we can adjust performance of matching algorithm. These weights will give some important features or components that they can extract.

- Distance = 0 if two images are equal
- Distance  $\rightarrow 0$  It means distance tends to 0, they two similar images.

## Extracting Clip video Frames

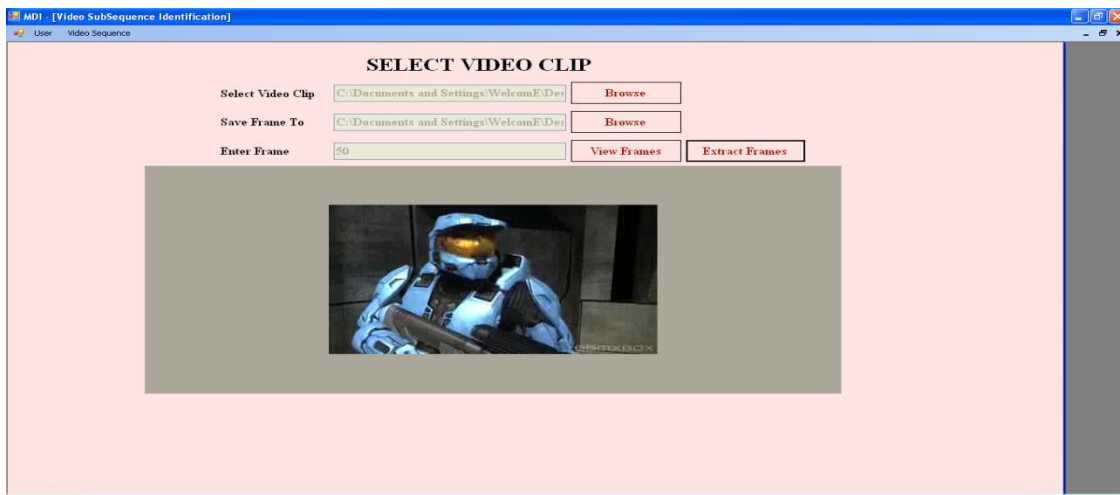


Figure 4.7: Extracting clip video frames

Figure 4.7 shows Extracting clip video frames, the user will select video clip by browsing from the database and save this clip video to specified location in database.

Divide this video into image frames by giving specific number.

Extract frames are used to extract image frames and stored at specific location.

## Extracting Main video Frames

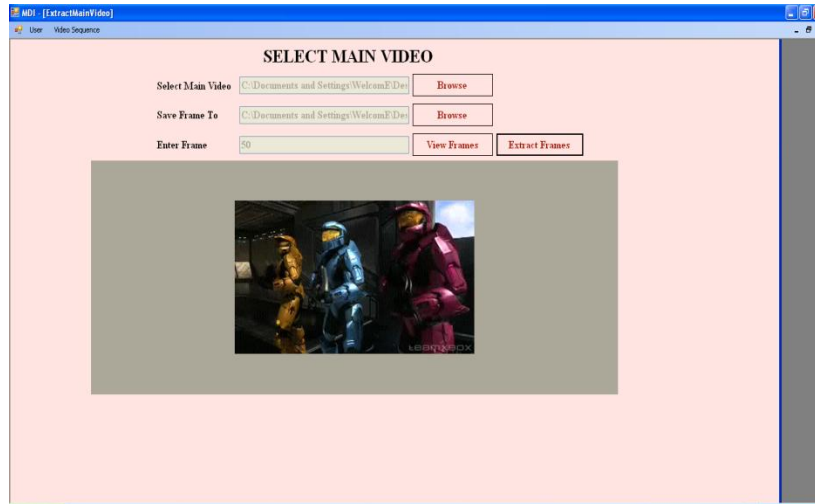


Figure 4.8: Extracting Main video Frames

Figure 4.8 shows Extracting Main video Frames, the user will select main video by browsing from the database and save this main video to specified location in database.

Divide this video into image frames by giving specific number.

Extract frames are used to extract image frames and stored at specific location

## One – One Mapping



Figure 4.9: One to One mapping

Figure 4.9 shows One to One mapping, the clip video and main video image frames are taken from the specified location and one to one mapping methodology is applied. Search by mapping is done with the frames on both image frames.

If any image is found that it is matched with main video image frames then it shows selected clip occurred in the main videos.

### **Filter and refined search**

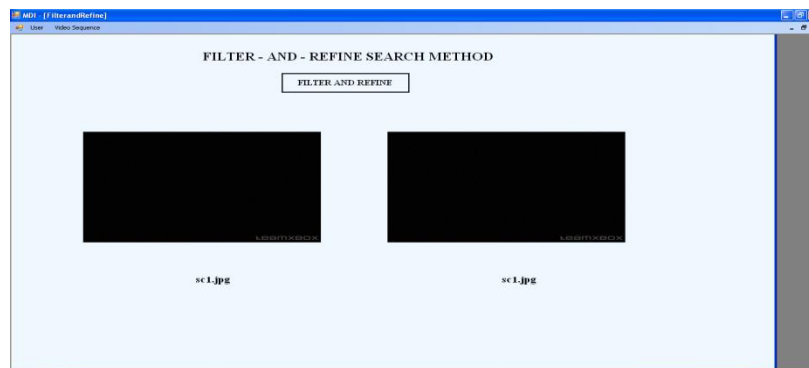


Figure 4.10: Filter and Refine method

Figure 4.10 shows Filter and Refine method, the Filter and Refine method is applied so that it will trace out the image frames which are being matched from both the image frames. The traced image is shown, that which is matched with main video image frames by this it can detect the duplicate video detection.

## **5. CONCLUSION**

The issue of quick and ongoing copy recognition in a huge video or image database is examined through a suite of effective calculations. The copy video for about a moment long question with normal location precision is recovered. The chose CLD(Color Layout Descriptor) for fingerprinting as it was vigorous to the duplication assaults. Be that as it may, if there is broad trimming, cushioning, or pivot/shear, striking point based descriptors can be progressively compelling. Another non metric separation quantification that is viable for short or smaller inquiries as long as the inquiry is an uproarious subset of a model video and key edge based marks are created. The computational intricacy of the separation measure utilizing pre processed data, PDP

(Partial Distance based Pruning) and dataset pruning is diminished. This separation measure can be investigated in different areas which require subset coordinating.

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