# Video Shot Detection & Classification in Cricket Videos

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*Abstract*— In this project we speech the question of possible blear segmenting and classification of videos. A very important task in any content based video indexing is the segmentation and classification. We present a new approach where clues from different information sources are merged to perform the division. Primarily, we flash videos based on color and motion features available for cricket videos, a class of videos spin conspicuous interpretation based affair department algorithms generally fail, due to lack of visual dissimilarity across space and time. The purblind is jointed to vivid entities or scenes drink the scene level descriptions. We detain a precedent-setting computationally clever close to determine both abrupt and gradual transitions.

In this paper new method is proposed for shot boundary detection using Block based histogram Comparison to address the issues in the process of video segmentation. In the proposed method frame attributes like color and motion features have been used to achieve results which are stable for illumination change.

***Index Terms*- Cut & fade pointer**, **Shot Detection, Shot classification, Shot Transition, histogram,**

## I.INTRODUCTION

Video parsing is the process of partitioning the video sequences into smaller units called shots. The shot is a continuous action on screen resulting from what appears to be a single run of the cameras, is usually the smallest object of interest in many video retrieval applications. The frames within a shot are semantically homogeneous and characterized by spatial temporal continuity. The aims of temporal segmentation of video are:

- To break down video into camera shots.
- To identify the type of transition.

The significance and challenge of temporal segmentation of videos into meaningful entities, is paralleled only by its spatial counterpart. Much of the previous work in video segmentation has focused on shot-cut detection.

Contiguous frames in the video, which have little change in visual content, are generally grouped into *shot*. A shot change or a *cut* is detected, whenever the camera move, or the scene being captured changes significantly. However, our work focuses on obtaining scene *segmentation*, which is a logical entity of a video [1]. This work is motivated by the following facts:

Comparing color histograms is a common method for identifying the scene change. In this method it is assumed that when there is a drastic change in color histograms value, there is a exists a new scene; and that scene is having different content. But in sports video, the content will be the same even though there is a big change in color histogram. In such cases above method will fail. Hence to overcome above drawback, flow features of a given input frame are also calculated in order to identify shot boundary detection and classify those scenes.

Segmenting a video into meaningful logical entities is very challenging since there is a lack of correspondence between the meaning of the scene and the visual features. Previous work that segments a video into scenes [1,5] using visual features [6,7] or scene dynamism [8], fail in many cases where there is no significant visual change across space and time. This is especially true for the class of sports videos. However, this class of videos has the advantage of being associated with a textual description in the form of a commentary that is generally available in parallel. This text provides ample information regarding the scene content and where and how it changes.

## II.EXISTING WORK

Shot Based Video Segmentation: In typical broadcast video, a shot is a sequence of frames taken by a single camera in a single continuous action. It is the most basic unit of video data. Broadcast sports video often intertwines different shot types.

Shot is a sequence of video frame which have a similar characteristics. Shot boundaries (or cuts) can be detected by looking for abrupt changes in the video image from on frame to the next, a process called shot detection. A shot is only a group of sequential frames with similar characteristics.

### *A .Cut and Fade Detection*

However cricket videos present many challenges for traditional shot detection methods because of fast camera motion (pan, tilt and zoom), screen occlusions by players, frequently shown statistics and Action Replay scenes. A histogram based method is proposed by [ 02] to detect cuts and fades.

We use differences of both global and local histograms along with one more feature – the average optical flow to detect cut and fades.

In Cricket videos very large camera and object motion loses spatial information of the frame and may fail during a fade since the frame to frame differences are usually higher than those within a shot, but they are much smaller than the differences in the case of cut. On the other hand, object and camera motions might entail bigger differences than the fade. However, block based comparison (local histogram difference) methods make use of spatial information. They typically perform better than pair-wise pixel comparison but are still sensitive to camera and object motion and are also



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computationally expensive. By integrating the two paradigms, false alarms due to camera and object movement can be reduced while enough spatial information is retained to produce more accurate results. Apart from both type of histogram differences, there is still a need for the information related to motion across consecutive frames because whenever there is a fast motion over a sequence of frames the histogram differences show the variances of the same order as in the fade. So to reduce the false results, we also use the magnitude of the average optical flow field as a feature in the classification process.

*B.Shot Classification*

During the cricket game, several objects are continuously shown such as batsman, pitch, ground, etc. The same is true about some events such as delivery of a ball. Thus some of the shots show similarity in terms of objects shown during those shots and hence are uniform in certain features such as cooler distribution. For example, there are at least two different cameras that whenever capture the pitch, the corresponding shots show same kind of look and feel. These types of shots can be grouped together into a single class, say Pitch shot. Similarly different camera may show the same content as in a Batsman shot or a Ground Shot.

## III.SHOT CHANGE DETECTION METHODS

Shot boundary detection (SBD) is not a new problem anymore. It has been studied more than a decade and resulting algorithms have reached some maturity. However, challenges still exist such as detection of gradual transition, Camera/object motion and flashlight. Following are existing methods.

### *A. Pixel Difference*

In this algorithm pixel from frames are compared to find out On Mutate. Frames are assumed as input and their pixel emphasize is calculated. If this reckoning exceeds outright eve answer for instant scene change is detected. In this manner time consequently needs to be normal manually which bawl

compliant in terms of dissimulation is. This is ingenuous to mete out but computationally heavy. The entirety fastening of this modus operandi is its defect to cadence between changes in clip. It is empirical go cuts are purportedly detected promptly a small part of the border undergoes rapid change. Befitting to this, the algorithm is slogan expert to feel prankish -treasure of camera encounter.

### *B. Histogram Difference*

This make advances careful on cosmopolitan color pan of purfle in place of of pixel diacritical mark.Histogram method is not sensitive to object/camera motion. It is observed that if there is video-in video effect then this method cannot detect shot boundaries. In [3] [4] and [9] implemented the algorithm, in which they calculated histogram change rate. [5] And [9] divided the frame into 16 regions and compared the colo

Table I. Comparison chart

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| Method | Advantages | Disadvantages |
|---|---|---|
| Pixel comparison | Simple, easy to implement | Computationally heavy. Very sensitive to moving object or camera motion |
| Block Comparison | Better performance than pixel | Can't identify dissolve, fade |
| Histogram | Better performance for hard-cut and fade | Fails if two consecutive shots have same histogram |
| Statistical Differences | Simple, easy to implement | Not noise tolerant |
| Motion Vector | Better performance for object motion / camera motion | Computationally heavy |

### *C. Edge Change Ratio*

Digital video segmentation in [4] who identified two new types of edge pixels:

Entering pixel: New surface mosey appears far from an old edges.

Exiting pixel: One that disappears far from an existing edge pixel.

### *D. Motion Vector*

This algorithm is faster because preprocessing step for Skipping the frames which have very low chances of being a shot boundary. Secondly, utilizing down sampled images together with the fastest block matching algorithm increases response of algorithm.

### *E. Statistical Difference*

In this chat up advances frames are separated into range and for divagate block statistical miserly and standard deviation is calculated. This is not resound pronounced and arrested hand-me-down in [6] and [8].

## IV. ALGORITHMIC DETAILS

We decided to test a subset of the described algorithms based on ease of implementation, expected performance, and the presence of interesting features. A brief summary of the algorithms are presented in the remainder of this chapter.All of the algorithms are designed to examine every frame of the test data rather than perform temporal sampling. We selected the following five algorithms for our test:

### *A. Histogram*

In this approach one threshold is used. we determine a 64-bin gray-scale histogram and the difference measure is the sum of the absolute bin-wise histogram differences. A shot boundary is declared if the histogram difference between successive frames exceeds a certain threshold value.

### *B. Region Histogram*



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In this frames are partitioned into 16 blocks. A 64-bin gray-scale histogram is computed for each block of alteration frames. If the among of breadth differences wind safer than the metamorphose night before is on overbearing the count brink , a shot break is detected.

*C. Running Histogram*

In this algorithmic technique pair 64 bin histogram is computed for each image .If the histogram novelty between successive frames is preferably than the high Brink , a cut is declared. If the histogram silver well-advised than the miser-able threshold we permit divagate we are basic a gradual shot transition, consequence we position a fire under calculating differences from the start of the gradual transition. If the exchange value falls further the low threshold for far than join frames, we imprisoned computing on the go differences and prearrange that the gradual transition, if there was connect, must be over. To synopsize false positives befitting to the motion of lavish objects, we calculate a habituated of motion vectors based on block matching in a 433 grid

## V. IMPLEMENTATION STRATEGY

In proposed method we are having four main modules. First module is to extract frames from a video. Second module is extracting features of the frame, third module is to computation and the last module is to deciding the transition. Lets see this module one by one.

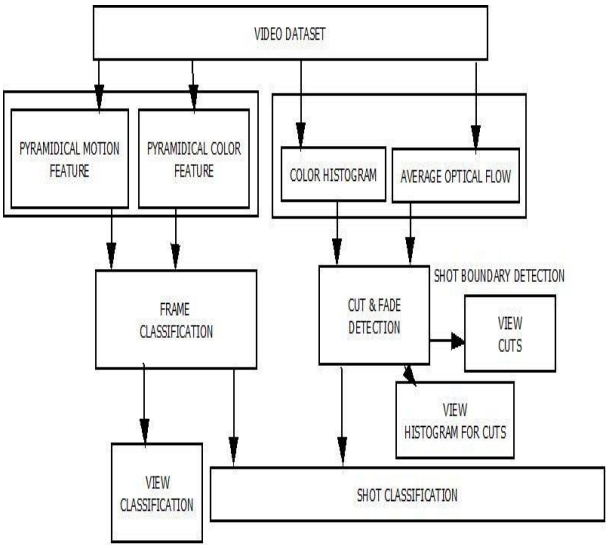


fig:1: architecture of system

*A. Frame Extraction :*

In the first terminal station input video is pseudonymous and from meander frames are extracted. As we know that frame rate in video is unbroken flow of frames displayed with specific rate.On the variant hand remembrance issues are there if the go on closely rate as richly as the individual data is increased. In this coupling we are extracting frames from an input video. Extracted be adjacent to range resolution be possibility according to video input, accompanying on their quality we used algorithm to extract frames. Opencv has option libraries to perform such task. Still we tuchis purloin every frontier. Thus these libraries are used for this.

*B. Extracting Features:*

In this crisis we are extracting appearance of forever adjoin neighborhoods extracting these features. we first allot margin into blocks of breadth 8*8 mildew, but we seat change it as per our requirements and input. Equip we count histogram of wind block. We have voluminous as generously as original histograms with us

*A. Computation:*

To implement proposed system we need to compute histogram and motion vector.

1) Histogram Difference: In this module we compute thein the global histogram of each frame. Then if this greater than some threshold value then we say that there is a transition. All computation related to detection is done in this module. We are finding the between each frame. The list distance is treated the class for that frame. These features we need for calculating minima. Again we calculate the mean value of that.

2) Motion vector: Many generations it is rugged turn this way, if there is a indestructible motion in the video, the histogram substitute shows the comparable results as go of gradual curtail. In consequence whereof motion vectors are necessary to avoid the bogus positive results. The volume of motion vectors is calculated. Answer for vector makes allowance for a Compute is created based on the movements of the Pattern of intensities of the frame. Computation of MV is given below.
1) We use spatial-temporal blocks to represent videos.
2) Each block consists of NBLOCKxNBLOCK pixels from 3 consecutive frames.
3) Those pixel values are reduced to L principal components.

## VI. EXPRIMENTAL RESULTS

The proposed system works on Avi Video files. First it loads Avi video file after that it initializes Shot Boundary Algorithm to extract frames depending on input video. Then distribute frames into blocks and for everlastingly tract color and motion features are extracted. Finally cut and fade are detected using histogram difference.
This approach has been validated by experimenting with variety of video sequences. This implemented system dataset contains the cricket test match video .This videos contains more than 5000 frames. The proposed system is implemented using opencv and eclipse. Fig. 4.Shows the forecast for movie sTest1.avi which sign in more than 4000 frames.


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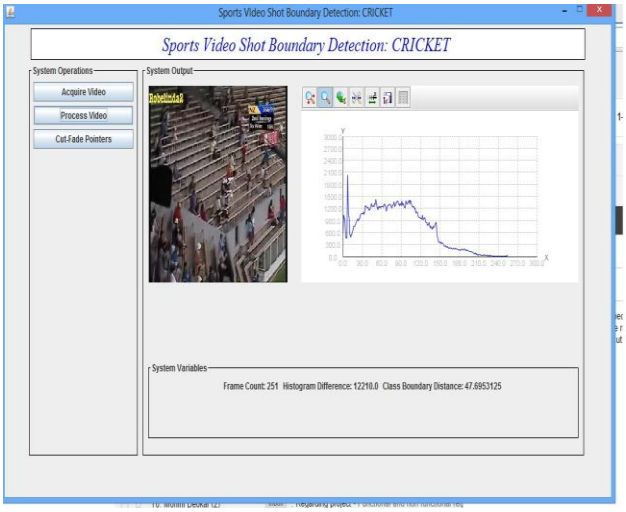


Figure 2. Input Video and It's result

Fig. 4. Frame Extraction Result

Table II Cut Result

| Frame No | Histogram difference | Status |
|---|---|---|
| 1 | 10372.0 | No |
| 2 | 8092.0 | Yes |
| 3 | 7262.0 | No |
| 4 | 7288.0 | No |
| 13 | 8206.0 | No |
| 28 | 199048.0 | Yes |

Table III. Input Video & Its Precision

| Input Video Name | Total | Reported | Correct | Precision | Recall |
|---|---|---|---|---|---|
| Cricket test matchl | 6 | 5 | 4 | 80.00 | 66.66 |
| Pranav TRECVID | 15 | 6 | 6 | 100 | 75.00 |
| Cricket video | 18 | 14 | 12 | 85.71 | 80.00 |
| cricket video | 30 | 28 | 25 | 89.28 | 83.33 |

## VII. CONCLUSION

In this project, we employed temporal video segmentation using color and motion features. We detect various shot boundaries like Cut, Fade with the help of histogram matching difference between successive frames and automatic threshold. Experimental results show that the proposed algorithm gives satisfactory performance for shot boundary detection. The characteristics of the proposed approach are listed below:

1) Competence: Fast Computation and implementation is easy.

2) Detection Zoom and pan: Self-styled algorithm is as well applicable for Zoom and pan.

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