



Classification of views and super imposed score board Analysis Technique for Goal Event Detection

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Abstract - The games fans want to watch highlights of the game event since viewing the entire match is tedious and furthermore the individuals who have missed the LIVE match or to replay some intriguing events amid the match either as a major aspect of News or highlights session of the match. Customarily, sports recordings are investigated physically, however this costs profitable time. In this manner, it is important to have a device for doing the video investigation and synopsis work naturally. Programmed wear video highlight is about extricating critical events from particular matches to deliver general synopses for the most essential minutes in which brandish watchers might be intrigued. In this course it is arranged gadget an instrument for event identification from games video. Event identification will help clients in many required applications, for example, video ordering, video outline, improvement in video content, assessing about opposite group and their strategies, arranging a statistics insights for the group, helps in ref for basic leadership and so forth. Many methodologies make utilization of various modalities of video, for example, sound and video for their examination and execution procedure. Few methodologies will utilize multi-modalities for event detection. The proposed framework utilizes grass-predominant proportion for identifying distinctive edges of camera positions and arranges the perspectives as long, medium, closer and audience. This paper presents event detection technique for games video utilizing view classes and score caption (the subtitle shown on screen for score). The proposed system incorporates an algorithm for distinguishing widespread shade of the area and recognizing a shot boundary. At last, the event is recognized in soccer match.

Keywords - soccer video; grass dominant ratio ; caption based; goal post; view classification

I. INTRODUCTION

An event is "something happening at that instance and drives attention". Thus Event detection systems are built on event of interest, categorizing them as interesting or non-interesting. There are many common problems that need to be addressed as part of event detection such as modelling of an event, quality of the video taken to model the event and so on. Still a larger amount of effort has to be put in to resolve many such problems although many researchers already have contributed their work towards this. The intension of event detection in video is the need of search in large collections of video data. In order to make it possible, a system has to be made which would be able to automatically extract useful information from given data and analyse it so that it can understand what the data represents for humans. Representation for humans refers to the highlights that any user want to watch instead of watching the whole video as they have time constraint, which is called as summary of the video.

Instead of watching the entire game, most of the audiences prefer to watch only highlights of the match which is called as summary of the game. Most of the people have the habit of watching all kind of sports such as cricket, soccer, football, basketball, volleyball etc. But they can't watch each and every match by sitting in front of the TV; rather they wish to watch most exciting occurrences of the game. So to enable this requirement of each user, there is a continuous research on getting important events of each one the above said games where at the end these detected events will be taken together and can be used in many different application such as indexing of important events, for analysing the opposite team's tactics, for improving own team's strength accordingly. Hence, proposed a model, which detects goal event in soccer video by using caption in the video which gives information about the goal and also by view classification. Here a survey has been done on different ways of detecting an event in sports video.

An event is "something occurring at that event and drives interest". Along these lines Event detection frameworks are based on events of enthusiasm, ordering them as exciting or non-exciting. There are numerous regular issues that should be tended to as a major aspect of event detection, for example, displaying of an event, nature of the video taken to

demonstrate the event and many more. Still a bigger measure of effort must be placed into resolve numerous such issues even though numerous scientists as of now have contributed their work towards this. The intension of event identification in video is the need of search in extensive accumulations of video information. Keeping in mind the end goal to make it conceivable, a framework must be made which would have the capacity to naturally remove helpful data from given information and break down it with the goal that it can comprehend what the information needed for people. Description for people means to the highlights that any client need to watch as opposed to viewing the entire video as they have time imperative, which is called as summary of the video.

Rather than viewing the whole match, the vast majority of the crowds want to observe just highlights of the match which is called as summary of the video. The greater part of the general population have the tendency for observing all sort of games, for example, cricket, soccer, football, basketball, volleyball and so forth. Be that as it may, they can't observe every single match by sitting before the TV; rather they wish to observe most energizing events of the video. So to empower this prerequisite of every client, there is a persistent research on getting vital events of every one the above said recreations where toward the end these distinguished events will be taken together and can be utilized as a part of a wide range of utilization, for example, ordering of vital events, for assessing the opposite group's strategies, for enhancing own group's quality in like manner. Thus, proposed a model, which identifies objective events in soccer video by utilizing caption in the video which gives data about the objective and furthermore by view classification. Here a review has been done on various methods for distinguishing an event in games video.

II. LITERATURE SURVEY

Literature Survey gives the knowledge about different methods that are proposed to implement the defined problem.

A technique of tactical behaviour recognition is proposed [1] which is based on the local spatio-temporal regression kernel according to the activity of the players who execute tactics on the playfield. Firstly, detected the playfield and divided it into some parts. Secondly, an active discrimination model has used for local spatio-temporal regression kernel as a future detector for the detection and location of active players, and constructing future bag models. Finally, the tactical behaviours are divided into six classes to realize automatic recognition of them.

A structure has been proposed which depends on a Bag-of-Words (BoW) approach. Spatio Temporal Interest Points (STIP) or directions of moving items are identified independently [2]. Nearby descriptors are registered around these identified intrigue focuses. Fisher Vector encoding is utilized to build a component vector for every video. This element vector is utilized to take in a classifier.

Another system for highlight of soccer video has been displayed. This system permits soccer highlight discovery for video by utilizing video content investigation and online networking streams examination (Twitter) [4]. A few techniques, for example, the sound substance examination by utilizing EMD, visual substance investigation and the calculation of moving limit burst discovery used to identify the blasts of tweets on Twitter were portrayed. Content examination of soccer video that permits the location of highlights in the soccer matches by utilizing two distinct techniques:

- 1) The principal in view of the review and the investigation of score-box in soccer video, with a specific end goal to identify the objectives in a soccer matches;
- 2) The second in view of the examination of the sound vitality movement in the observers' discourse inside the goal of discovery of highlights in the soccer matches.

A techniques has been proposed, in which step overwhelming shading (field shading) is extricated from an edge which has enough grass [3]. At first, casing is changed over to the HSI organize then the shading mean is figured from histogram in every part. In each information outline, pixels which their tube shaped separation with this shading mean are not as much as a limit are considered as field pixel. In the event that grass proportion for an edge is more noteworthy than an edge, at that point it is given to the classifier; else it is considered as out-of-field and checked in the event that it is shut everything down not. At first out-of field shots, in light of a limit are isolated from in-field ones, at that point for grouping long, medium, and close-up shots among in-field sees, SVM classifier is utilized. Three elements which utilized are: 1) Number of associated segments which are adequate as player, 2) Maximum shirt shading per cent in four covered vertical strips in centre rectangle 3) mean of shirt shading per cent in two flat strips. They are all new and displayed here interestingly. For recognition of close-ups in out-of-field shots, a novel approach in light of shade of shirts in two flat strips is exhibited.

A structure has been presented which utilizes time requirement as essential component for location. [4] This framework is made out of four key building stages; 1) shot limit stage that portions the entire video stream into little video shots, 2) event location stage come about because of the shot limit stage, 3) task weighting shot, 4) creating a clasp utilizing time

limitation. The yield highlight is a total of clasps containing an arrangement of intrigue events from a client viewpoint, specifically objectives, corner kick, red card and punishment.

Ways to deal with decide the event limit in view of attack protection move investigation in soccer video has been proposed. It acts as takes after. A histogram based kick off circle identification calculation is proposed to encourage the field zones segment. The proposed calculation is quick and strong contrasting and the current techniques. By the removed mid-level elements, the soccer playfield is isolated into various zones, which suggest distinctive semantics in soccer match [5]. Besides, the far view shot is sectioned into sub-shots with caught zones, which advantage the highlight event and event limit recognition. The highlight events limits are precisely controlled by attack safeguard change focuses location joined with love excitement bend.

The novel approach for event discovery in games recordings by subject based graphical model learning is proposed [6]. The qualities highlights characterizing different game events are separated by relevant gathering of low-level video and sound elements utilizing theme demonstrating. Event location is performed by taking in the structure of setting based dissemination of trademark elements by CRF based graphical model. Exploratory assessment of the proposed idea is introduced on recorded video of Handball and Soccer diversion. For instance, nearness of objective post in a soccer video portion suggests the begin, break, guard or offense event. In any case, every one of these events requires nearness of ball close goalpost aside from amid break. In such setting, regulated getting the hang of utilizing probabilistic chart model can take in the point grouping arrangement and their relevant conditions.

A strategy which isolates investigation into three classes: low, centre and high is proposed. Essential images acknowledgment (field, lines, curves, and goalmouth) are situated on low-level examination. It enables one to perform larger amount examination, for example, objective, punishment, offside, and kick recognition. For most programmed parsing frameworks, the initial step is to concentrate low-level components, for example, line imprints was proposed [7].

A novel strategy utilizing spatio-temporal examples to break down event strategies in games recordings is presented [8]. The proposed technique intends to comprehend strategies of events, for example, appropriations and paces of players, or attacking/protective developments all through a period when such events occur without following articles. The real commitment of the proposed strategy is to model event strategies by utilizing succession of images. Every image speaks to a circulation of players in a specific timeframe. In this way, an arrangement of images characteristically is worried as spatiotemporal examples. By utilizing these examples, an event strategy is identified, clarified, and incorporated into an event video to make a picturing dynamic. This envisioning dynamic is extremely valuable to enable clients to comprehend an event strategy without observing entire clasp.

A half breed approach, which incorporates insights into consistent lead based models amid highlight discovery, is proposed [9]. They likewise effectively spearheaded the utilization of play-break portion as a general extent of discovery and a standard arrangement of components that can be connected for various games, including soccer, b-ball, and Australian football. The proposed strategy utilizes a restricted measure of area information, making this technique not so much subjective but rather more vigorous for various games. To catch these examples, an audit of option methodologies is given to portray the utilization of manual heuristic standards and machine learning.

A novel technique utilizing spatio-temporal examples to demonstrate visual data custom fitted to dissect event strategies in games recordings without following items has been proposed [10]. The significant commitment of the proposed strategy is to speak to visual data by utilizing an arrangement of images. By taking after developments of players or ball with uncommon activities, for example, crossing, zooming, rolling or titling, camera movements lead gathering of people's enthusiasm into a match cadence, particularly when events happen (i.e. timeframes that can draw in and energize gatherings of people). Comes about because of camera movements, camera shots with a capacity of review a playfield with very much characterized three levels (e.g. Longview, medium, shut everything down), will have a striking and multi-levels picture of progressing match. Among three said see sorts, long-view could be viewed as a view with rich data, particularly a dispersion of players in a specific event. Along these lines, an arrangement of constant long-see edges of one event can give a creative energy of an event strategy.

A probabilistic Bayesian belief network (BBN) based system for semantic investigation and outline of video utilizing event identification is proposed [11]. The approach is modified for soccer however can be connected to different sorts of games video successions. We separate energy cuts from soccer sports video groupings that are contained various sub cuts relating to the events, for example, replay, field-see, goalkeeper, player, official, onlooker, players' social affair. The events are recognized and ordered utilizing a various levelled grouping plan.

A novel approach is exhibited which will separate the strategy data from the attack events in communicate soccer video and present the events in a strategy mode to the mentors and games experts [12]. We separate the attack events with far-view shots utilizing the examination and arrangement of web-throwing content and communicate video. For a recognized

event, two strategy portrayals, total direction and play area arrangement, are developed in light of multi-protest directions and field areas in the event shots. In light of the multi-question directions followed in the shot, a weighted diagram is developed by means of the investigation of temporal-spatial cooperation among the players and the ball.

A coordinated system for games video event identification in light of the play-by-play content webcasts and rationale based synopsis is proposed [13]. Structure comprises of five modules interfacing through a facilitator. 1. The primary module is a Graphical User Interface (GUI) module gives a simple and adaptable route for collaboration between the client and the centre preparing modules. 2. The plain content extricated by the HTML parser in second module and after that sent to the third module. 4. The fourth module is the video handling module. The video preparing module recovers the video casings and sound information from the video database. 5. The fifth module is system of the rationale motor. The rationale motor uses an arrangement of consistent standards to induce the event rankings, and to extricate the diversion synopsis records.

A method is proposed which will naturally identify just video outlines that contain substantial overlaid content. By and large, content showing up in video can be isolated into Scene and Graphic/Overlaid-content [14]. Scene Text (ST) is content actually happening in the recording condition, whereas Overlaid-content (OT) is content graphically superimposed onto the video itself by utilizing devoted equipment as well as programming. Since OTs contains and passes on data identifying with the particular video kind within reach, OT examination is more suitable than ST. This is particularly valid for games video as OTs is broadly used to pass on current happenings of a diversion.

An approach of metadata extraction from match reports for soccer area is introduced [15]. Utilizing general expressions, clarified these match reports and afterward disconnected events from commented on match reports. In the event that a related match video is accessible, the video partitions that compare to the discovered events could be played. For sight and sound information without semantic substance labels, it is important to extricate the metadata consequently. Web substance is ordinarily inside XML or HTML records, which contain extra data that can be utilized to get the metadata by applying common dialect handling methods and data extraction calculations.

In [16] a novel approach for sports video semantic event detection based on analysis and alignment of webcast text and broadcast video is presented. Webcast text is a text broadcast channel for sports game which is co-produced with the broadcast video and is easily obtained from the web. Initially analysed webcast text to cluster and detect text events in an unsupervised way using probabilistic latent semantic analysis (pLSA). In light of the recognized content event and video structure investigation, utilize a restrictive arbitrary field show (CRFM) to adjust content event and video event by identifying event minute and event limit in the video. Consolidation of webcast content into games video examination fundamentally encourages sports video semantic event identification. Incorporation of webcast text into sports video analysis significantly facilitates sports video semantic event detection.

III. PROPOSED SCHEME FOR EVENT DETECTION

The proposed model in Fig. 1 is based on event detection for emphasizing significant events during soccer game. The whole video is segmented into smaller shots initially and then classifies them according to different shot type classes. Then it will apply machine learning methods to identify caption area that describes regarding the score of the game. Later, it will detect vertical goal posts and net. As a final point the system will highlight the most vital events during the game.

ALGORITHM FOR GOAL EVENT DETECTION

The following steps describe the proposed algorithm.

Step 1: Segment the whole video into frames at the rate of 25frames/sec.

Step 2: Classify view in each frame.

Elongated: $G_E \geq 0.55$;

Middle: $G_M \geq 0.15$ and $G_M \leq 0.55$

Nearer: $G_{N/A} \leq 0.15$ and $B_A < 0.8$

Audience: $G_{N/A} \leq 0.15$ and $B_A \geq 0.8$

- Uses grass dominant ratio which converts each frame to HSV and calculates percentage of green color using below range.

$$([H(i, j) \ S(i, j) \ V(i, j)] > [0.15 \ 0.1 \ 0.2]) \ \& \ ([H(i, j) \ S(i, j) \ V(i, j)] < [0.4 \ 1 \ 1])$$

This converts all green color in the frame into white and other colors to black.

Step 3: If the view identified is nearer, then, goal post and net is detected using canny edge detection algorithm.

Step 4: Then super imposed score board is detected in the frame which describes regarding the score of the game using background removal method.

Ib = background image

I = input image

im = background removed image

➤ Applies ANN algorithm for feature extraction.

Step 5: If super imposed score board is available, then declares it as goal event else attack event.

Step 6: In step 3 if there is a view other than closer then declare it as other event.

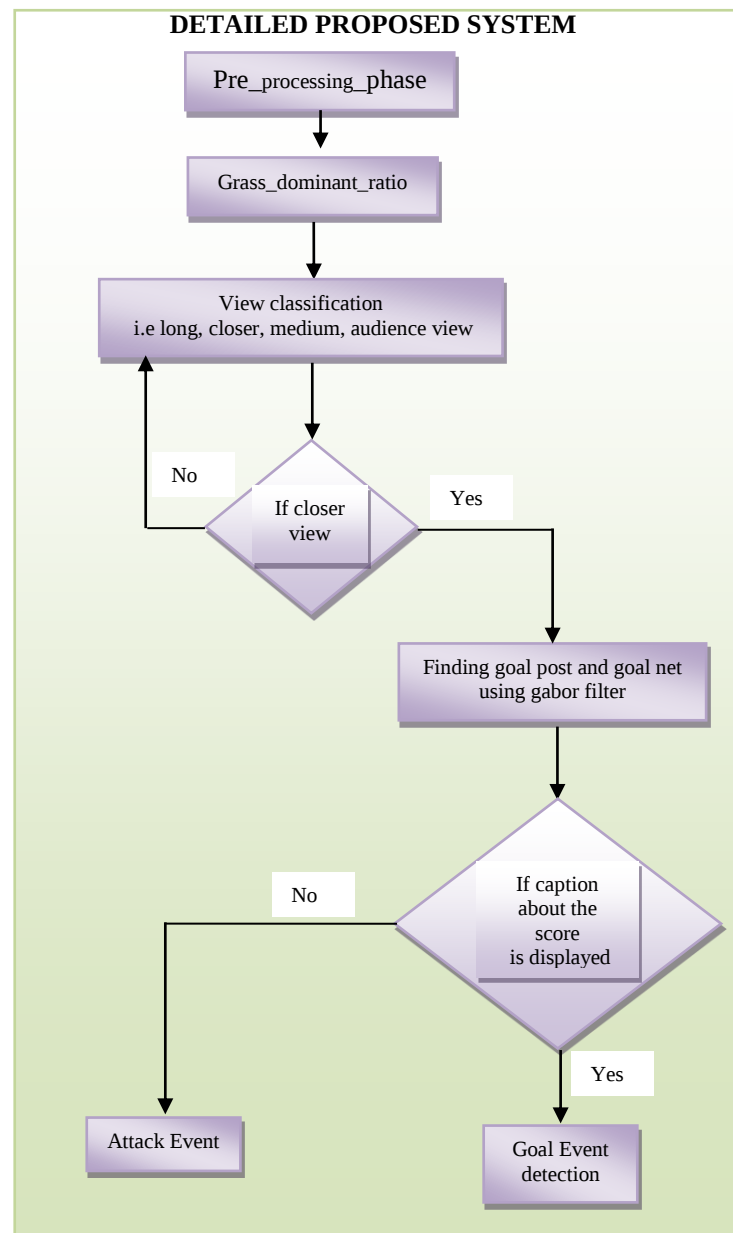


Figure 1. Block diagram for event detection

A. Pre-processing Stage

In this stage the given video is fragmented into smaller video shots. Initially grass dominant ratio is applied for each of the frames and then boundary detection by shot classification is done for segmentation.

B. Dominant color extraction in the frame

The color that covers major part of the area is called as dominant color and it is different for different sports. Since the sport chosen for this paper is soccer the major color that appears is always green because this is the color of the ground.

There will be always many challenges in the process of getting dominant color in each frame such as lighting effects, shadow of the players, different resolutions of cameras and many other ecological factors.

C. classifying views

Different views come from different cameras that are kept in different locations around the playing ground. While changing view of one camera to the view of another camera new shot will appear and that defines the boundary of new shot. Single shot is always a set of frames that are taken out of single camera in a continuous action that lies in a specified time and space. Shot transition will be instant or gradual. Instant are more accurate than gradual shot change.

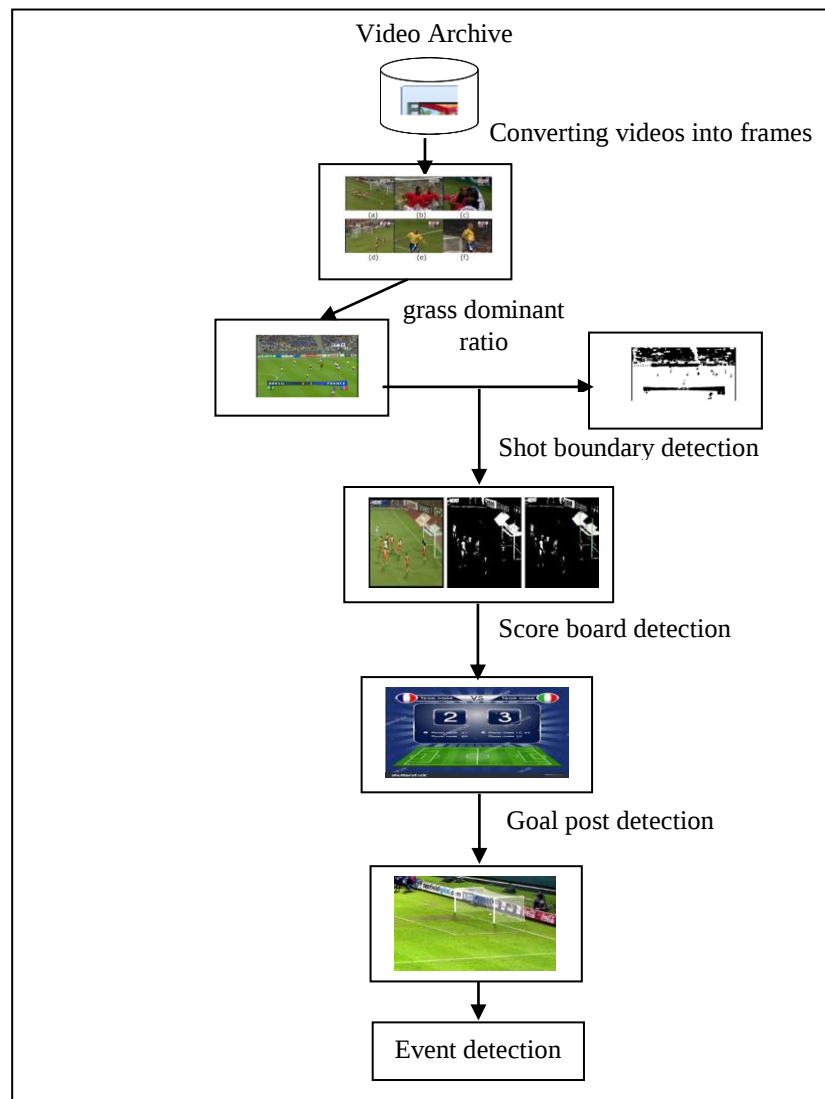


Figure 2. Pictorial representation of event detection

D. Event Detection stage

Soccer specific events will be more thrilled only nearer the goal mouth. Such events include goal, foul, penalty, direct kick, free kick and shooting. Thrill event detection is rely on three features; Namely, 1) Score detection using super imposed text on the frame, 2) Detection of goal post near goal mouth, 3) Detection of goal net.

1) *Score detection using super imposed text on the frame:* The super imposed text is a caption area which is differentiated from the surrounding region, which provides details about the score of the game. The super imposed text is often called as caption and will show at the floor part of image whenever there is an occurrence of event such as goal and it will disappear soon after displaying the results within few seconds.

2) *Detection of goal post near goal mouth:* Goal posts are the vertical pillars that appear at the goal mouth. Since they are of white in color, canny edge is applied to each frame for detecting them.

3) *Detection of goal net:* Even though the goal posts are detected, it is not enough to finalise whether the event is thrilled or not. Hence the goal net is also detected to conclude the event is nearer to the goal mouth.



Figure 3. Examples of captions describing about score of the game

E. Artificial Neural Network (ANN)

In the proposed framework ANN is utilized for preparing purposes. Utilizing ANN adequate number of preparing set will be given to prepare the framework and are at long last tried by utilizing testing set.

IV. RESULTS

The proposed framework was assessed utilizing recordings for soccer matches from various Championship Leagues. All soccer recordings are in Audio Video Interleave (AVI) design with an edge rate of 30 fps. For various soccer coordinate recordings from the distinctive titles has been tried, and it demonstrates the accuracy with respect to goal event detection in table 1.

	Actual Goals	Detected as Goal	Not detected as goal	Accuracy	Recall	Precision
Video 1 - 6500 frames	6	5	1	83.33%	100%	83.33%
Video 2 - 1457 frames	2	1	1	50%	50%	100.00%
Video 3 - 4908 frames	3	2	1	66.66%	100%	75.00%
Video 4 - 7210 frames	4	4	0	100%	100%	80.00%

Table 1. Result analysis for goal event detection

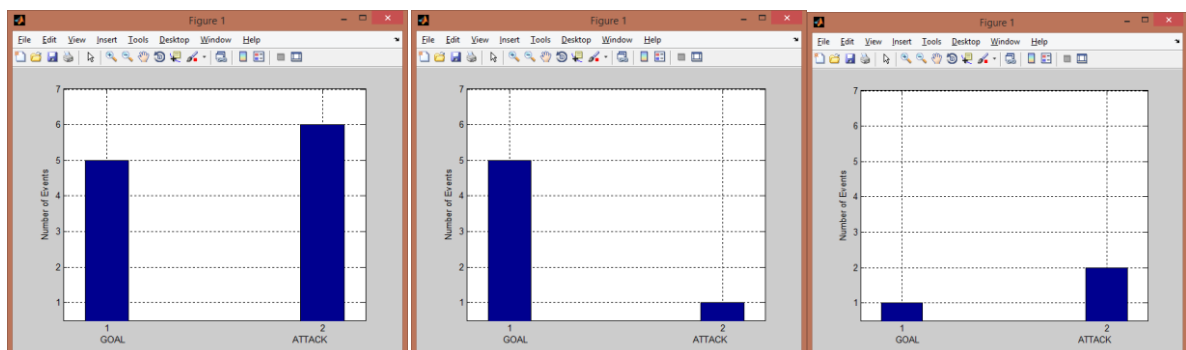


Figure 4. Depiction of bar graph to display number of goals and attacks

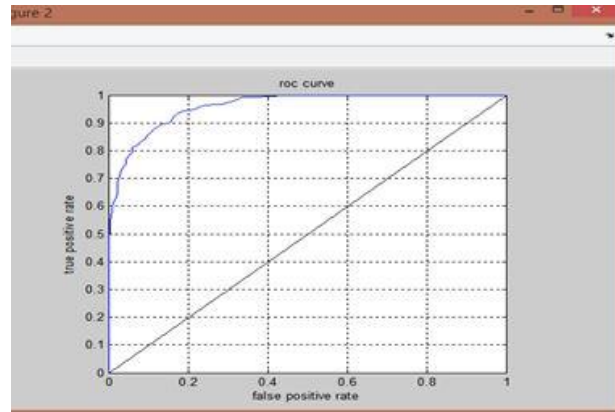


Figure 5. Depiction of roc curve

V. CONCLUSIONS

The view classification and super imposed score board based analysis system for event detection in soccer recordings is assessed utilizing recordings for soccer matches of five global soccer titles. The proposed technique is made out of four stages; specifically, pre-handling stage, view classification stage, goal post and net identification stage, caption based score board recognition stage, and declaration of event. The proposed technique performs extremely well as its investigation comes about accomplish high exactness. Tests demonstrate that the technique has achieved reasonable precision and recall ratios and accomplished great ANN-based execution comes about concerning recall and precision ratio. The experimentation has proved the efficient detection of goal event in soccer video. The efficiency attained is 80% on an average.

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