



VIDEO-BASED AUTOMATED GENERATION OF COMMENTARY IN CRICKET

Prathibha.M^{*1} Sheena Anees²

^{*1}Department of Computer Science and Engineering, KMEA Engineering College, India.

²Department of Information Technology, KMEA Engineering College, India.

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ABSTRACT

Throughout a cricket match, commentary entertains the viewers and gives updates about the game. Quoting pertinent stories associated to the current game situation makes the game more fascinating. The system proposes a solution which is an AI based approach that will assist the color commentators in effective storytelling that is interesting to the audience, and related to what is actually happening in the game being broadcast. The aim of the system is to retrieve and suggest stories that will assist the color commentator to describe appropriate remarkable incidents all through the course of the game. The system returns list of stories while a video is being played, based on how suitable they are for the game state. The methodologies used for system are video processing, video dataset, processing the dataset, Construction of a set of candidate stories, matching of video events and stories and finally generating commentary.

INTRODUCTION

Numerous studies have been done to find out the implication of commentary during sports broadcasting. The words of the commentator are often given most attention when watching a game on television. The commentary has the effect of attracting the attention of the watcher to the picture that value closer attention, Altman called this effect as italicizing. Commentary also sets mood during a broadcast. A sports commentator gives a running commentary of a game or event in real time. He is the person who is saying what is happening in the game. A commentator who builds up a hostile mood in the course of a broadcast often makes the viewing experience more enjoyable and pleasant for the viewer. The descriptions given in a broadcast are so helpful that fans often sit in front of radios to live games in order to listen to the interpretations of the commentators. Also, there were some sporting venues that supported a handheld video device that provides the onlooker with in-game commentary. The intention of commentators is to facilitate the viewer track the game and also adds entertainment value.

There is a play-by-play commentator and color commentator in very commentary. A play-by-play commentator is the primary speaker on broadcast who describes each play or event. A color or analyst commentator provides background information. After a play is over, colour commentators analyze what has happened beyond the surface. For instance, if a player swings awkwardly at a pitch and misses, the color commentator may point out that the reason for the hitch in his swing is that he has an ankle injury, and is unable to plant his foot when swinging. This gives the viewer some extra information beyond what he or she can see, or is told by the play-by-play commentator. One of the immense things about broadcasting cricket is that there is time to reflect, to reside on some other parts spaced out from the game, for the reason that there is always a gap between action and non-action, specially when the fast bowlers are in force. It is a magnificent scene for any person who needs to enjoy language and methods, giving enormous span for colour commentary. It is about telling stories. People remember a narrative, a moment that is odd in the game. There are a lot of people who track the game. To narrate stories, colour commentators have to be experts in the game, having followed it closely for several years. Hence, many a times, they are former cricketers. Now Saurav Ganguly is a commentator who is a former cricketer. Even such players allegedly practise by reading and absorbing, interviews with the people in the game, the players occasionally, in the lead-up to the match. R.K Krishnaswamy who was an English cricket commentator in AIR tells that for commentary you have to telescope yourself into a single dimension where you and game are the only reality. One way to adjoin entertainment to a broadcast is to say attention-grabbing, fascinating relevant stories from the sport's history. The sport of cricket is selected for storytelling.

The necessity for commentary is generally to tot up color to the game and also to inform new fans about the facts of the game. It allows you to keep track of things you may not necessarily pay interest to, or the visual is not focusing on. It provides outlook. It provides humor. It can provide situation framework. It provides insights, often from experts. It also provides that human element company, while watching the sport. It provides soothe when we hear a recognizable and trusted voice. The aim of the system is to retrieve and suggest the stories that will assist the color commentator to describe appropriate remarkable incidents all through the course of the game. The



methodologies used for system are video processing, video dataset, processing the dataset, Construction of a set of candidate stories, matching of video events and stories and finally generating commentary.

MATERIALS AND METHODS

Related works

Watching Sports or game actions on the screen is more interesting when there is additional commentary with the pictures. Even if we are playing video games, playing with commentary and sound effects is more exciting than the ordinary ones. This is the case for many game genres. For example, in a game like GTA san andreas the recorded speech helps you to identify locations and at the same time it gives instructions of different movements. There will be also interaction speech between the players in the game. Some approaches deliver stories to non-sports video games while others deliver live play-by-play commentary, with some added colour. But there is no existing work that delivers story-based colour commentary to a live game. The greatest challenge in narrating or storytelling is player's mindset.

Watching a movie or reading a book means we are putting ourselves into a relaxed state where we are making the conscious decision to sit back and watch what's been presented. But in a game player may make different commitments. In a video game the player's motivation is to overcome the challenges centered on them or presented to them in the game. Game design teams and story design teams have to work together figuring out matching instances. Ryan in 1993 put forward a method in which human commentator's attempts to merge a story with a coherent plot through unpredictable sports games.

Real Time Commentary System for Shogi is another commentary system developed for shogi game by Tomoyuki Kaneko. The goal in developing this real time commentary system is to provide further information for those who are watching a shogi via the Internet. In Automated Event Recognition for Football Commentary Generation system, the system provides in-game commentary in real-time for virtual or simulated football games. Byrne, Rocco and MIKE are three systems that produce automated play-by-play commentary for RoboCup simulator league games. The three systems obtain their data from the Soccer Server which summarizes the game play's main features – the player locations and orientations, the ball location and the score of the game. Sports commentary recommendation system (SCoReS) was able to attain significant improvements in overall enjoyment and rising interest in watching baseball. The system includes two types of stories.

- 1) Game story
- 2) Candidate story

Design layout

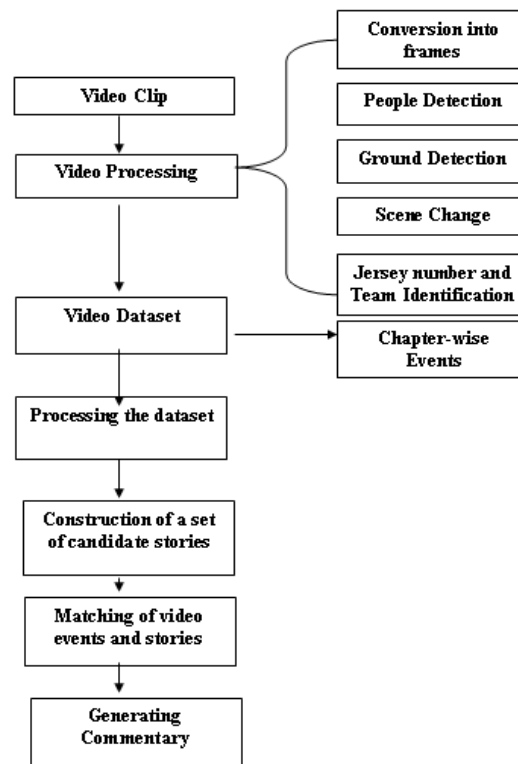


Figure1: Architecture

Implementation

The system uses a methodology to resolve the problem of conveying story-based color commentary to a cricket game. We make use of several methods and several algorithms. The implementation of the design phase starts with a video clip. Here the system generates automated commentary for a video clip. In case of huge database it is possible to generate the color commentary lively. So the length of the video clip must be small, otherwise it will consume more time for processing. So here a video clip of 7 minutes and 10 seconds is taken. The format of the video clip used here is mp4. The format can be found in matlab. The system counts the number of frames detected. In the video processing almost 4 types of features are detected and extracted. People detection, ground detection, scene change detection, jersey number and team identification are the features. Then in the second module the information is retrieved and matching of the information with the video is done.

For Human Detection in cricket video, the method consists of the following steps: Firstly, detection of people in the video by the improved HOG. Secondly, we employ Kalman filter as predicting and estimating people's position and covariance, besides the Kalman filter can revise the speed of moving human constantly, enhancing the accuracy of tracking. The HOG (Histogram of Oriented Gradients) feature describes the distribution of gradient magnitude and gradient orientation in the local area of the image. First of all, it extracts the histograms of oriented gradient feature from local image, through training sample, and then classifies the object by classifiers in pattern recognition in order to achieve human detection. It is unique that HOG features describe the distribution of gradient strength and gradient direction in local area, which is a good characterization of appearance and shape. Here Kalman filter is used into human detection and tracking. It not only decreases the range of human detection, which enhances detection speed, but also improves the accuracy of human tracking. The people detector object detects people in an input image using the Histogram of Oriented Gradient (HOG) features and Kalman filter.

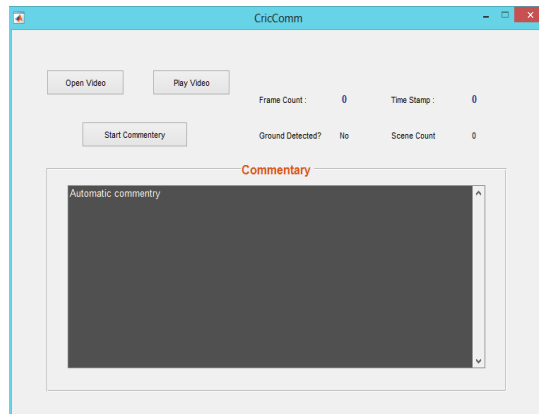


Figure 2: Output Screen

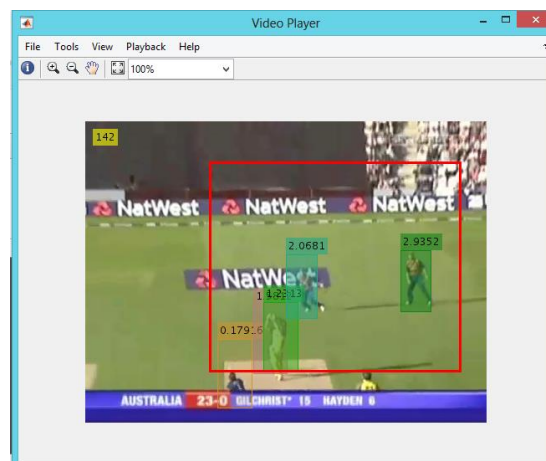


Figure 3: Human Detection

Background subtraction, also known as Foreground Detection, is a technique in the fields of image processing and computer vision where in an image's foreground is extracted for further processing. Generally in cricket video an image's regions of interest is the ground. So we need to separate ground from the audience. After the stage of image object localization is required this may make use of this technique. Background subtraction is a widely used approach for detecting moving objects in videos from static cameras. For scene change Detection, first it finds the edges in two consecutive video frames, which makes the algorithm less sensitive to small changes. If the number of different sections exceeds a specified threshold, the example determines that the scene has changed. So accordingly the system will count the scene change automatically. For Jersey number identification and team identification optical character recognition (OCR) is used. This method is based on the diagonal sum-up. The main functional modules in our OCR systems are:

1. Browse: The function browse is to browse an image. This image is then pre-processed.
2. Crop: From the image previously loaded, crop the portion that has the jersey number. Here the aim of the system is to identify jersey numbers and then using the number, provide commentary for that person. The original image will be resized.
3. Grayscale: Grayscale images have many shades of gray. Grayscale images are the result of measuring intensity of each pixel. For achieving accuracy input document should be gray scaled. The RGB image is converted into grayscale image.
4. The grayscale image is then converted into binary image. Im2bw produces binary images from indexed, intensity, or RGB images. To do this, it converts the input image to grayscale format (if it is not already an intensity image), and then converts this grayscale image to binary by thresholding. The output binary image BW has values of 0 (black) for all pixels in the input image with luminance less than level and 1 (white) for all other pixels.



5. Edge: Edge detection is the name for a set of mathematical methods which aim at identifying points in a digital image at which the image brightness changes sharply or, more formally, has discontinuities.
6. Dilate: Dilating of an image includes image dilation and image filling. Dilation adds pixels to the boundaries of objects in an image. Number of pixels added to the objects from an image depends on the size and shape of the structuring element.
7. Find objects: Finding objects include blob analysis and plotting the object location.
8. Save objects: The character recognized is saved.

Reading a handwritten text from a picture: This phase includes another 4 steps. First one is loading a test image. This step involves loading. So in this system the OCR is helpful in identifying the jersey numbers of players. Using the jersey number identification the commentary can be generated for players. In the second module, initially a dataset is constructed the information's in the dataset are processed. The datasets for the system are downloaded from cricsheet.com. Cricsheet is retrosheet for Cricket. The data format is provided in YAML format, a human-readable data format. There are libraries available to parse this in multiple languages. The data in the dataset is stored in excel file format. The video is analysed. The events in the the video are recorded according to a specific timestamp. First we will analyse each frame and note the particular events like out, batting, balling. The time is in the format h: m: s. The events in each second are recorded. When the video is played the system generates play by play commentary in accordance with the time. According to the event data the player identification and team identification is updated. For each event, candidate stories can be prepared. The color commentary means providing background details. Different stories are built. Stories about the players, their batting averages, bowling averages, and the series played between different teams are collected as candidate stories. Candidate stories for color commentary includes the player details, the number of matches the player had played, his ODI career, best scores. Like for play by play commentary automation is not possible while playing a video so from the video itself a general score updates, player statistics are generated.

RESULTS AND DISCUSSION

When a video is played, in each frame different objects will be there like players, umpire, bat, ball, stump, audience etc. So according to the video processing stage, from each frame the players are identified. With the OCR method the jersey numbers in the player's jersey is identified and the commentary is played regarding the matching of jersey number with the particular player. So color commentary will be automatically generated in each frame for particular players. When the frame is detecting ground or if the scene is regarding a ground view, at this time the color commentary about the series played between the teams, and some other general information's will be shown. After each over, the total score and the status of the game will be displayed as play by play commentary. If a player is out, then the statistics of the player and the details regarding the out will be shown as commentary from the video being played. From a video identifying the events like toss, batting is difficult. So generating commentary is a huge task. So the only method to generate commentary is matching the features identified with the frame. Likewise for each frame the system generates commentary. The commentary will be generated in the form of text.

Tables:

Table 1. Comparison table

Existing System	Proposed System
1) Commentary system for football, other games etc is there. No video based commentary system for cricket	Video based commentary system
2) Automated color commentary	Automated color commentary and play-by-play
3) Simulation or based on only one particular feature	Extract Different features
4) Output is in the form of audio or keywords	Output is in the form of Text



CONCLUSION

Storytelling is believed to be a cognitively rich and creative task. In order to excel in storytelling, an innate aptitude and training are required. Skilled storytellers including writers, poets and color commentators are recognized and famed. In this work, a step has taken towards automating this task by building the AI story selector for color commentary in cricket. It was able to achieve significant improvement in overall enjoyment and increasing interest in watching cricket. To a realistic deployment, it would further improve the entertainment value of sports broadcasts. It also offers many possible future applications along the lines of fully automated commentary. Sports story selection can be computerized with AI. An AI system is developed to attain this objective that conveys stories in the framework of cricket. To place forward suitable stories to a (human) broadcast team this can be used throughout cricket games that output a relevant story to the audience. It was effective in performing two separate tasks:

1) Automating sports commentary and thus automating narrative in a special case and 2) Assisting human commentators. Storytelling is believed to be a cognitively rich and creative task. In order to excel in storytelling, an innate aptitude and training are required. Skilled storytellers including writers, poets and color commentators are recognized and famed. In this work, a step has taken towards automating this task by building the AI story selector for color commentary in cricket. It was able to achieve significant improvement in overall enjoyment and increasing interest in watching cricket. To a realistic deployment, it would further improve the entertainment value of sports broadcasts. It also offers many possible future applications along the lines of fully automated commentary.

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