Computational Intelligence Based Color Commentary System in Sports

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Abstract

In a cricket match, commentary entertains the viewers and gives updates about the sports. Stories associated to the current game make the game more fascinating. The system is an AI based approach that will help the color commentators in efficient storytelling that is fascinating to the audience, and correlated to what is really happening in the game being broadcast. The aim of the system is to retrieve and propose stories that will help out the color commentator to explain proper notable incidents all through the course of the game. The system returns list of stories while a video is being played, based on how appropriate they are for the game state. The methodologies used for system are video clip processing, video dataset, processing the dataset, Construction of a set of candidate stories, matching of video events and stories and finally generating commentary.

Keywords: Color commentary, Play-by-play commentary, Candidate stories, dataset

1. Introduction

Artificial Intelligence is the brainpower exhibited by machines or software. It is infiltrating our everyday lives. In some domains AI systems are already more skilled than humans. In the coming years AI will recast strategies across many industries. Sports' broadcasting is a huge industry of billion-dollars. It is the live coverage of games and broadcast them as television program on TV or other media sources like radio. The broadcasting usually involves two or more commentators describing the event that has happened. The first broadcast of a sporting event i.e. boxing match took place in 11 April 1921. Now most of the professional sports are broadcast to the public on telly, reaching millions of homes. However the television experience differs in several ways from the live viewing experience, most significantly through its commentary. A commentary is a line-by-line or even word-by-word explication. There are different forms of commentary like audio commentary, video game commentary, sports commentary etc. In sports broadcasting, a sports commentator is also known as sports announcer, sports caster or play-by-play announcer who gives a live commentary of a sport or event in real time, mostly all through a live broadcast. The comments or the remarks are usually a narration, with the sounds of the action and audience also heard in the background. In television commentary, the commentators are on display infrequently if at all during the event. Commentary in cricket includes many types. Cricket is a game played between two teams. There are 11 players each. This is played on a ground at the centre of which is a rectangular 22-yard long pitch. The game is played by 120 million players in numerous countries. It is the world's second most accepted sport. There are different phases in playing the game. First there will be a toss between the two teams deciding which of them needs batting or bowling. The decision will be based on the team captains of the two teams. Each one takes its turn to bat. They attempt to score runs, while the other team fields. There will be a striker and non-striker of the same team. Each turn is known as an innings. The bowler throws off the ball to the batsman who attempts to strike the ball with his bat away from the fielders so that he can run to the other end of the pitch and score a run. Each batsman will continue batting until he is out. The batting team continues batting until ten batsmen are out, or a specified number of over's of six balls have been bowled. The teams swap roles and the fielding team comes in to bat. In cricket the length of a game ranges from 20 over's per side to Test cricket is played over five days. The commentary in cricket is much difficult because of many elements in the game.

Play by play and color commentator are the major ones. The other commentators in cricket are sideline reporter. A sideline reporter assists a sports broadcasting group with sideline reporting of the playing field or court. The sideline reporters normally makes live updates on injuries and breaking news or perform player interviews while players are on the field or court because the play-by-play broadcaster and color commentator must continue in their broadcast cubicle. Sideline reporters are frequently permitted inside information about a vital update, such as injury, because they have the credentials necessary to do so. In many big events, teams consisting of many sideline reporters are positioned deliberately so that the main commentator has many sources to turn to. In sports broadcasting, the presenter of sports broadcast is normally diverse from the commentator, and frequently based in a remote broadcast television studio away from the sports site. The on-air personality based in the studio is called the studio host. During their shows, the host may be

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connected by extra analysts, especially when screening highlights of numerous other matches. A sports caster is a broad term for any type of commentator in a sports broadcast. It may also demote to a sports talk show host or a newscaster covering sports news.

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 humour. 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. Audiences identify with these. As per today no automatic color commentary systems are existing for cricket. The computational intelligence based automated color commentary system is a new system which automates the task of color commentary and provides very accurate information for the commentators so that they will be able to perform well. The system proposes a solution which is AI based approach that will assist 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 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.

II. Related works

Many studies have been done to find out the insinuation of commentary during sports broadcasting. In 1993 Ryan promoted a method in which human commentator's attempts to combine a story with a coherent plot through sports games. Plot is a complicated narrative measurement for the broadcast team, as they don't have an idea about the result at the end of the game.

The three Robo-Cup simulation league commentator systems are Rocco, Byrne and Mike**.** The Rocco commentator system is a recreation of an early research prototype called Soccer which was built in the late 80s for the automated interpretation and natural language description of time varying scenes. Byrne can make use of any modular game analysis system as its contribution module.

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. The game story includes different game states.

Temporal Classification of Events in Cricket Videos segments a cricket video into shots and identifies the visual content in them. Using sequential pattern mining and support vector machine, the series of shots are classified into four events, namely run, four, six and out. The cricket video is then summarized based on some parameters. The performance and working of the system has been tested on numerous cricket video clips and has an accuracy of more than 87.8%.
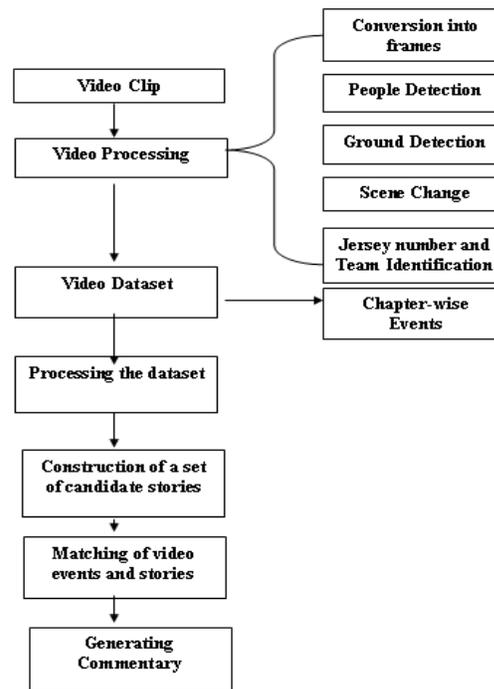
III. Design layout

Figure 1: Architecture

IV. Proposed system

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. There are two modules. First is the video processing module and second is the information retrieval and matching module. The first module involves many steps.

Video analysis of sports events is an increasingly common tool at several points in the video production and consumption cycle. However, commercial broadcast video, is the most prevalent form of video available. At 25 fps or 75 thousand frames per hour, the sheer magnitude of video data can be overwhelming. Further, broadcast

videos typically combine shots from multiple cameras placed at different locations around the ground. Frequent switching between cameras, as well as action replay scenes, display of on-screen advertisements, information panels (scores, player statistics) etc. add considerable complexity. At the same time, one can bring to bear additional sources of information, such as audio commentaries, close captioning, and online text commentary to help search the video for content. In video analysis, it is important to understand some distinct terms like frame, view, shot, scene and clip. The video dataset consists of half an hour of video (more than 51500 frames at 25 fps) or 10 over's of the game from a cricket match .This dataset has abrupt and gradual shot changes including action replay scenes. The first feature extraction is the people detection. Both detection and tracking people are challenging problems, especially in complex real world scenes that commonly involve multiple people, complicated occlusions, and cluttered or even moving backgrounds. People detectors have been shown to be able to locate pedestrians even in complex street scenes, but false positives have remained frequent. The system has the advantages of both detection and tracking of players in a single framework.

The next feature extraction is the ground detection. The ground is detected in each frame. The scene change detection is also an important step. The model segments the video using the steps. First, it finds the edges in two consecutive video frames, which makes the scene change detection algorithm less sensitive to small changes. Another feature extraction is the jersey number and team identification. The number is typically displayed on the rear of the jersey, often accompanied by the surname. Sometimes it is also displayed on the front and/or sleeves, or on the player's shorts or headgear. It is used to identify the player to officials, other players, official scorers, and spectators, in some sports, it is also indicative of the player's position. The jersey numbers are identified via the Optical character recognition using diagonals. The color of the shirt is extracted using histogram of oriented gradient technique. Based on these two properties the commentary is randomized. These are included in the first module. The information retrieval and matching module involves a video dataset, construction of candidate stories, matching the stories with the video and then generating commentary.

The dataset contains all the information's that are in the video. A data set is a set of data. Most commonly a data set corresponds to the contents of a single database table where every column of the table indicates a particular variable, and each row corresponds to a given event of the data set. The data set lists values for each of the variables, such as scores and details of a match, for each player of the data set. Each value in the dataset is known as a datum. The data set may contain data for all the players of a team. The phrase data set may also be used more freely, to refer to the data in a collection of closely related tables, corresponding to a particular experiment or event. Several characteristics define a data set's structure and properties. These include the number of players, position of players, jersey numbers, scene change, umpire details, strike rates, player statistics, types of the attributes or variables, and various statistical measures applicable to them. The values may be numbers, such as real numbers or integers, for example representing a player 'score, position but also be nominal data that is not consisting of numerical values. The dataset is processed for the play-by-play commentary. So with automated color commentary the play by play commentary can also be generated.

For each game state a set of stories are prepared. Numerous stories are arranged for each game state. For example, if the match is between England and Australia, the details about the previously played series and about the winners of each match, the details of best players, the strike rates, average, balls face, scores of each player likewise stories are collected and arranged. This is the crucial phase of commentary. The color commentary is based on these stories provided. Based on the current game, matching is made between the current situation and the previously collected stories. If there is a huge database then numerous stories can be stored. The stories can be retrieved accordingly. From the given video several features are extracted. Many stories are stored in the database. The aim of the system is to automate the color commentary for the video and generate play-by-play commentary. The features extracted and the stories in the database are matched in the video. When matching is done properly color commentary is generated. The output will be in the form of keywords so that the commentator finds it easy to explain the details based on that.

V. Conclusion and future work

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:

Automating sports commentary and thus automating narrative in a special case and 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.

REFERENCES

[1] Greg Lee, Elliot Ludvig and Vadim Bulitko, "Sports Commentary Recommendation System (ScoReS): Machine Learning for Automated Narrative", *The Eighth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*

[2] Allen, Frankel "Narrative Science and Statsheet", 2012

[3] "GPS Multilingual Commentary System"

[4] Tomoyuki Kaneko, "Real Time Commentary System for Shogi"

[5] Maliang Zheng1, Daniel Kudenko, "Automated Event Recognition for Football Commentary Generation",

[6] M. Kory, "Out of left field: Scouting the scout," *Baseball Prospectus*, May7, 2012

[7] E. Andre, K. Binsted, K. Tanaka-Ishii, S. Luke, G. Herzog, and T. Rist, "Three RoboCup simulation league commentator systems", *AI Mag.*, 2000.

[8] M. Riedl, A. Stern, D. Dini, and J. Alderman, "Dynamic experience management in virtual worlds for entertainment, education, and training," *Int. Trans. Syst. Sci. Appl.,* 23–42, 2008.

[9] Elisabeth Andre, Kim Binsted, Kumiko Tanaka-Ishii, Sean Luke, Gerd Herzog, Thomas Rist ,"Three RoboCup Simulation League Commentator Systems"

[10] Greg Lee, Vadim Bulitko, and Elliot A. Ludvig, "Automated Story Selection for Color Commentary in Sports", *IEEE transactions on computational intelligence and ai in games*, june 2014

[11] Josh McCoy, Mike Treanor, Ben Samuel, Noah Wardrip-Fruin, and Michael Mateas, "Comme il Faut: A System for Authoring Playable Social Models", *Expressive Intelligence Studio,* 2009

[12] E. Andre, K. Binsted, K. Tanaka-Ishii, S. Luke, G. Herzog, and T. Rist, "Three RoboCup simulation league commentator systems", *AI Mag.*, vol. 76, pp. 57–66, 2000.

[13] H. Kitano, M. Asada, Y. Kuniyoshi, I. Noda, E. Osawa, and H. Matubara, "Robocup, a challenge problem for AI", *AI Mag.,* vol. 18, no. 1, pp. 73–85, 1997.