

Basketball Shots Prediction

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Abstract - In current sports training, collecting and analyzing basketball player’s posture data is of great significance for enhancing the scientific of the trainer’s training plan and enhancing the athlete’s training effect. The existing basketball action recognition technology has numerous challenges similar as low effectiveness and high error rate. In order to effectively identify the basketball player’s sports posture and to make better the athlete’s training effect; this paper proposes a basketball throw gesture recognition approach to find a basis on image point birth and machine learning. First of all, the action posture data of basketball players is collected by image feature extraction approach, and multi-dimensional movement posture features are extracted from time area and frequencies area. Also, through the approach of feature selection and Gaussian secret variables, the accurate category and recognition of basketball shooting gestures are realized. The effective case analysis and the assessment of shooting action recognition effect show the superiority of the achieved basketball shooting action recognition technology. This approach can feed scientific reference and base for the development of current basketball training.

Keywords: Basketball shooting, image features, machine learning, Gaussian hidden variables.

I. INTRODUCTION

In the process of basketball training and competition, trainers need to formulate corresponding training plans according to the individual conditions of different athletes to make better the basketball talent of athletes (1),(2). The traditional training system is predicated on the trainer’s own training proposition and training experience, combined with the basketball player’s skill position to develop a training plan. This training mode is actually individual, and the trainer needs to spend a lot of time to break down the athlete’s posture, and it’s delicate to objectively estimate the athlete’s training effect (3). The core of current sports training is accuracy and efficiency. However, it can greatly upgrade the training effect, if the trainer can exactly control the athlete’s movement posture. thus, collecting and breaking down basketball player’s posture data and precisely feting the sport posture are of great significance for perfecting the scientific of the trainer’s training plan and enhancing the athlete’s training

effect Basketball gesture recognition is a kind of natural gesture recognition. At present, the approaches of natural body gesture the associate editor coordinating the review of this handwriting and recognition basically include two types. The beginning idea of inertial detector recognition is that the athlete’s body wears a simple and light data collection detector, sends the collected data to the processing terminal in real time, and recognizes the athlete’s posture predicated on colorful posture data. Even so, the disadvantage of this type of approach is the large amount of outfit, which isn’t conducive to popularization and application (6). Posture recognition to find a basis on image accession can be divided into monocular videotape recognition and multi-eye videotape recognition according to the number of image accession bias. The general idea of image accession gesture recognition is to first use the camera to collect the athlete’s image or videotape, also pull the movement features hidden in the image and videotape, and eventually design a classifier to fete the athlete’s athletic gesture (7). Urtasun use a balanced Gaussian process dynamic model to guide the tracing of three- dimensional natural movement in a monocular videotape sequence. The dynamic model is learned from minimum sports training data containing multiple modes (8). Sigel et al. In this paper, a Bayesian frame is proposed, which includes sequence significance sample and annealing atom filtering, and multiple.

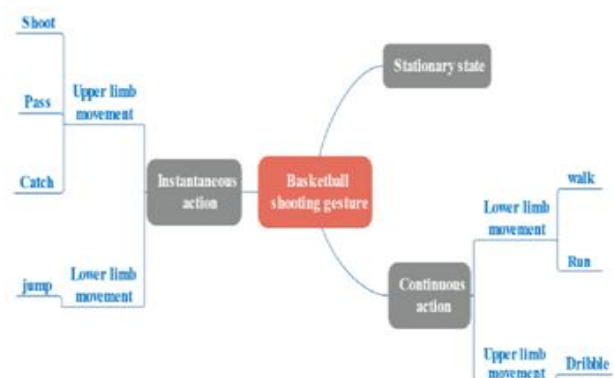


Figure 1: Classification structure of basketball shooting posture

1.1 Basketball Shooting

The process of basketball involves veritably complicated mortal movements. Before designing a basketball sport posture recognition algorithm, it’s necessary to establish a

basketball sport posture category. Scientific and sensible posture classification is the foundation for exact identification of basketball postures. In order to effectively recognize the posture of basketball, according to the physical state of the basketball player, the posture is first divided into a sport state and a stationary state. The sports state corresponds to the state of the athlete when he completes various basketball behaviors, at which time the athlete's branches are in movement. The fixed state that refers to the proper static of the athlete's processing, without any movement. The crucial point of basketball posture recognition is the recognition of various sport postures

1.2 Image original features

Max of the being learning- to find a basis visual recognition approaches use original image descriptors similar as overeater or SIFT, which substantially count on the computation of the original slant changes of videotape images or other natural images, or the original area image. The histogram is used for advancing statistics, and eventually a characteristic description with statistical plots for the entire image is formed.

Another origin of original image point is inspired by biology. The natural visual system is naturally predicated on original visual features. Wiesel and Hubel proposed the natural visual receptor, which is a processor of natural original visual features. Marr's visual proposition also believes that the processing of the nethermost level of the image should be attributed to the accession of original visual features of the image. Fundamentals of Mart's visual proposition include edges, corners, cases, lines, and terminal points. Thus, the traditional idea is to study the information rooted from crests, spots, and edges. At present, some exploration institutions want to prove that the use of these original features can also restore the information of the original videotape image.

II. MOTION TRACING BASED ON ENHANCED SGPLVM

In former studies, the Gaussian idle variable model and its variants have been extensively used to learn a priori acts from training data for 3D pose estimation and natural movement tracing. But max of the approaches are agonized by the following two difficulties,

- 1) A good initialized sheltered variable.
- 2) Large- scale observation data processing. Unfortunately, these two points will always live in natural movement tracing.

This paper proposes a approach predicated on random initialization of quiet variables to work these two problems.

The movement tracing approach predicated on the developed random Gaussian idle variable model has the following two advantages.

- 1) In the initialization phase of the remote variable, use the K- means algorithm to cluster the randomly generated remote variable, select the cluster center as the original reference point, and select the nearest neighbor point of the point as the element of the grade computation in the secret variable.
- 2) After opting the reference point, LPP (location Conserving protuberance) projects the original three-dimensional retired variable into N- dimension, and selects the nearest neighbor point of the reference point. The enhanced algorithm has made great enhancements in the selection of original points and computational complexity, making the following results more robust and accurate.

2.1 Human motion tracking

The main task of natural body movement tracing is to determine the natural body figure from the videotape image, and also detect the common points of the natural body, on this base, fete the natural body movement posture, and eventually reconstruct the three- dimensional natural body movement posture. Since the current videotape image is the projection of the natural outline in the three- dimensional scene on the two-dimensional image, a large measure of depth information is lost, and during the movement of the natural body, the nature-occlusion of the natural branches frequently occurs, and the videotape image is deep, which makes It's delicate to recover natural movement posture from unmarked monocular videotape. Still, because natural movement tracking grounded on monocular videotape has possible operations and profitable value in various aspects similar as medical treatment, sports training, animation produce, and intelligent monitoring systems, it has attracted the attention of numerous scholars. So far, videotape- based natural movement tracing approaches are substantially divided into the following two categories. The first is a learning- grounded natural movement tracing approach. This approach first excerpts accurate image features from the training videotape image and target videotape image databases, also learns the mapping between the image features of the training videotape image database and the stir captive data, and eventually uses the natural features directly on the target videotape image to recover the three- dimensional station. Similar as Urtasun et al. It's to use a balanced Gaussian process dynamic model to guide the tracing of three-dimensional natural movement in a monocular videotape sequence. The dynamic model is learned from smaller sports training data containing multiple modes.

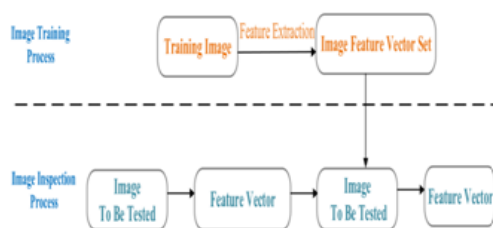


Figure 2: Learning based human motion tracking framework

IV. RESULTS AND DISCUSSION

Real- Time Analysis of Basketball Sports Data. Real-time refers to the capability to cut and deal with a matter in a timely and correct manner, and there's a length of time to deal with a matter, and the shorter the time is taken to deal with it, the better the real- time is, and the longer the time is taken to deal with it, the worse the real-time is. We want to be suitable to reuse the basketball scoring event in real- time, and we want to be suitable to reuse it in as short time as possible. An image with a frame rate of not lower than 25 fps is called a real- time image and can meet the system's real- time conditions. To authenticate the velocity of the algorithm in this paper, the time of running the algorithm is recorded, and the average value is taken as the time of running the algorithm 20 times continuously, and the results From the data in Figure 4, the average time of the algorithm handling is calculated as $20.2 \text{ ms} < 30 \text{ ms}$, which satisfies the real- time conditions of basketball sports. In the process of real- time analysis of basketball sports data, the players sharing in the trial were grouped ahead and after the trial for 20 twinkles of full- court games, recorded games, and the statistics of specialized and desirable frequency indicators after the game that the indicators after the trial are advanced than those before the trial, therefore indicating using the results of the real- time analysis for the civilization of players' shooting ways at each position and perfecting the introductory cooperation of players and other aspects. The results of the real-time analysis have a significant effect on the development of players' shooting ways at each position and the enhancement of players' introductory collaboration, similar as rationality, standardization, and inflexibility.

III. CASE ANALYSIS OF BASKETBALL SHOT BASED ON GRAPHIC FEATURE EXTRACTION

Action analysis through factual basketball pop images is an effective approach to study the characteristics and things of basketball action. The test data can be used to break down the relevancy of basketball players' shooting rate and individual movements, work principles and other aspects. Since the 21st century, there have been a large number of literature reports on the examination of basketball shooting, basically in Europe, the United States and Japan. The below describes the theoretical base of basketball shooting action examination predicated on image point origin and machine learning. This section analyzes and verifies the practicability and effectiveness of the approach by breaking down factual case tests.

V. CONCLUSION

This paper basically studies the gesture recognition of basketball shot. Natural movement tracing and posture recovery have numerous important operations in the field of machine vision. still, due to the essential variability of natural posture, the dimensionality of the observation data space is too large, the expression of natural videotape image features is complex, and the influence of different experimental surroundings, etc., performing in natural movement tracing is still an open critical need in the field of machine vision answered problem. In view of the below problems, this study starts from the action principle of basketball shots, and originally elaborates the background, reasons and current status of the research. After evolving the proposition of image point recognition and Gaussian remote variables, the accurate recognition of basketball shots movements is realized. Practical case analysis and vibration impact assessment.

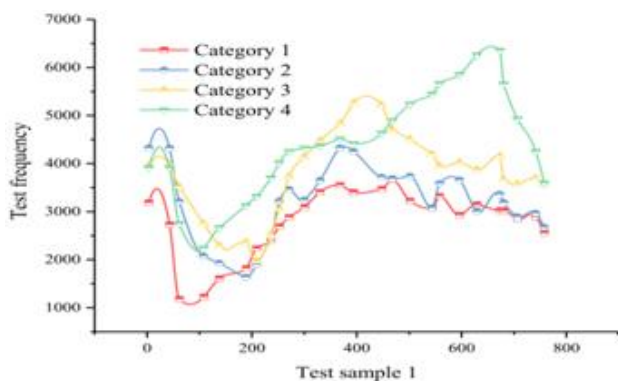


Figure 3: Test Sample 1

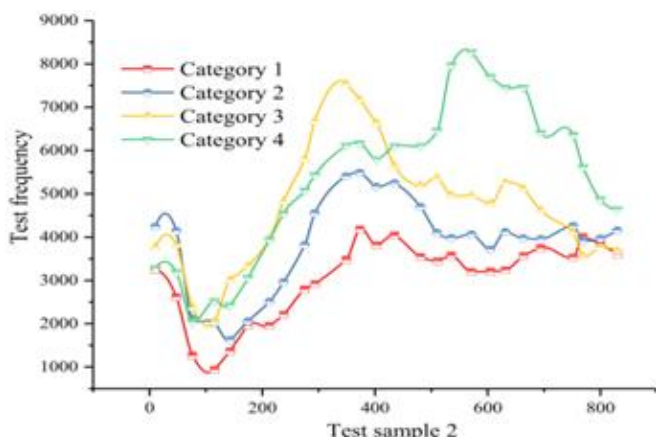


Figure 4: Test Sample 2

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