

Simulation of Tennis Serve Behavior Based on Video Image Processing Technology

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SUBJECT AREAS

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Tennis serve, Sparse representation, Best hitting point, Support vector machine, Particle swarm algorithm, Tennis serve model

Abstract

Video-based human motion analysis is an important research direction in the field of computer vision. It detects moving objects from video sequences, extracts key parts of the human body, and obtains useful information for human movements. Further analysis and identification. In this paper, the joints of the teeing arm are first color-coded. The tennis teeing video is collected by a high-speed camera. The coordinates of the tacking points in each frame are used instead of the knuckles to study the trajectory of the teeing arm. In the process of video processing, after constructing a dictionary for a series of noise maps, the sparse representation idea was used to reconstruct an interference-free service diagram, and a mixture of Gaussian background modeling was used to extract the foreground of the motion. After obtaining the motion foreground, the marker points are extracted through the color features, and binarization operations are performed on the marker points. Next, the outline of the marker points is searched, the outline is surrounded by the minimum circle, and the returned circle center coordinates are used as the joint point coordinates. Taking the trajectory of the shoulder marking point as a research object, a tennis serving model based on an improved support vector machine was established.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed.

However, the manuscript can be downloaded and accessed as a PDF.

Figures

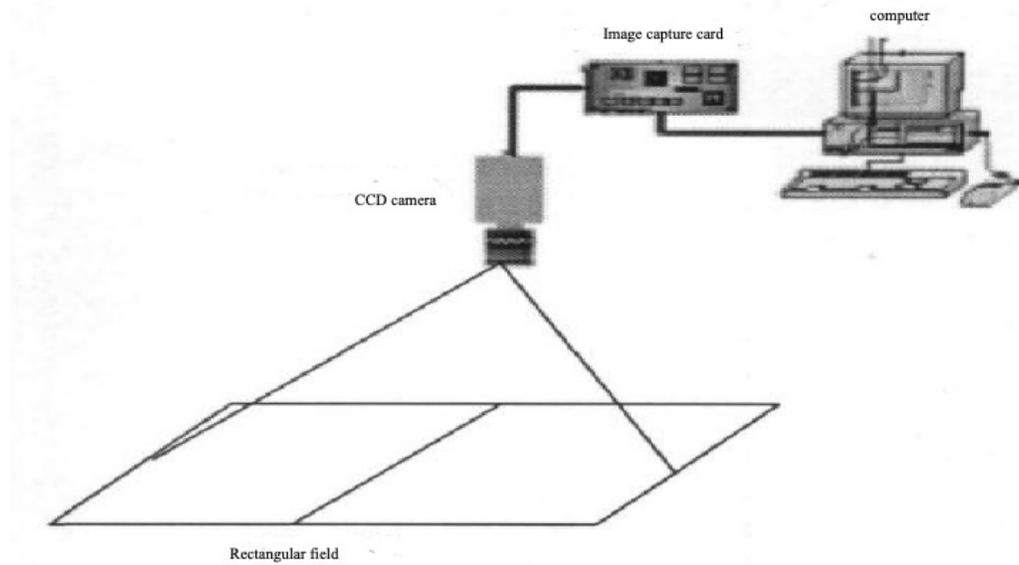


Figure 1

Video technology analysis process

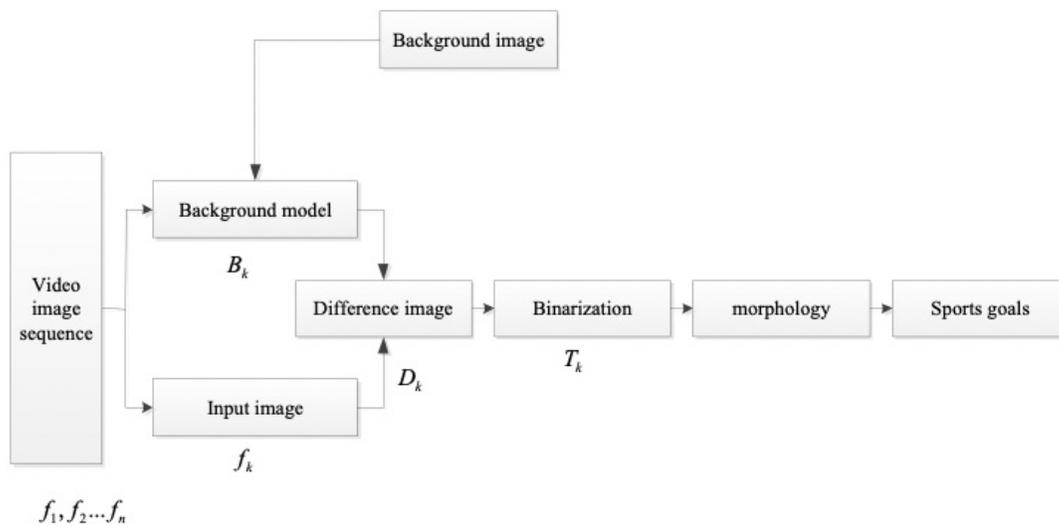


Figure 2

Background Difference Method Schematic

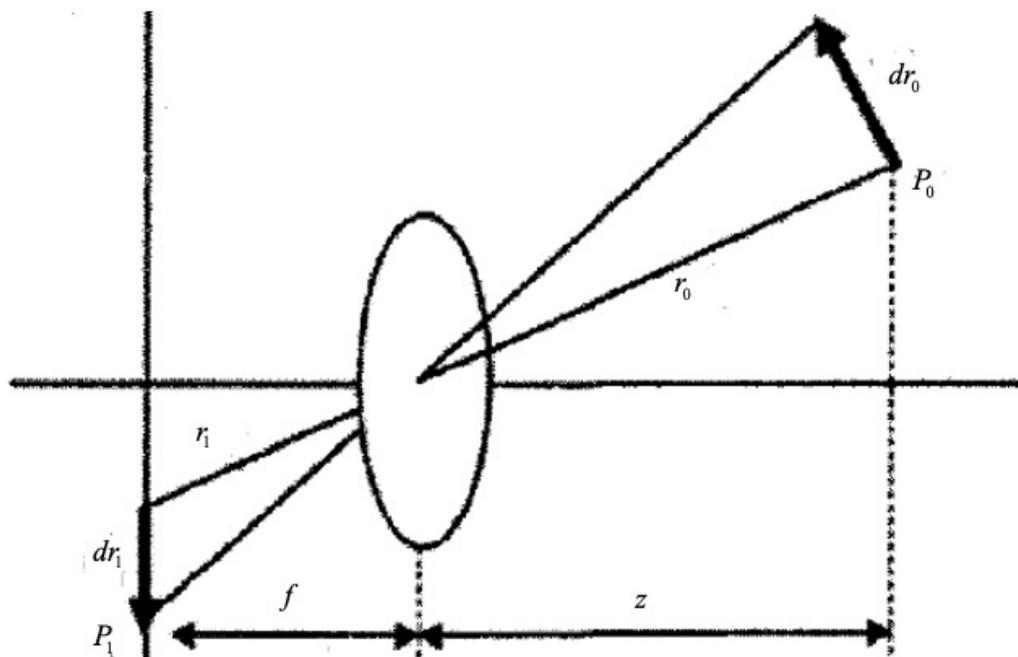


Figure 3

Projection

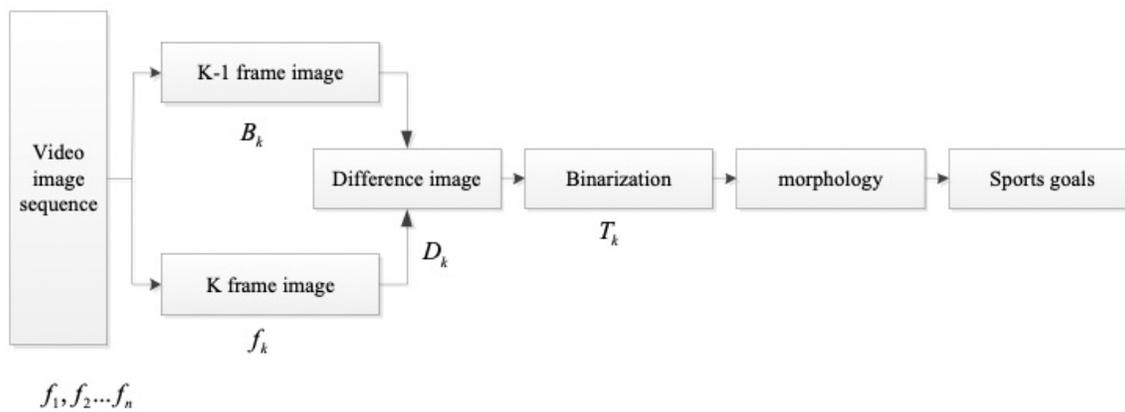


Figure 4

Schematic diagram of the difference between frames

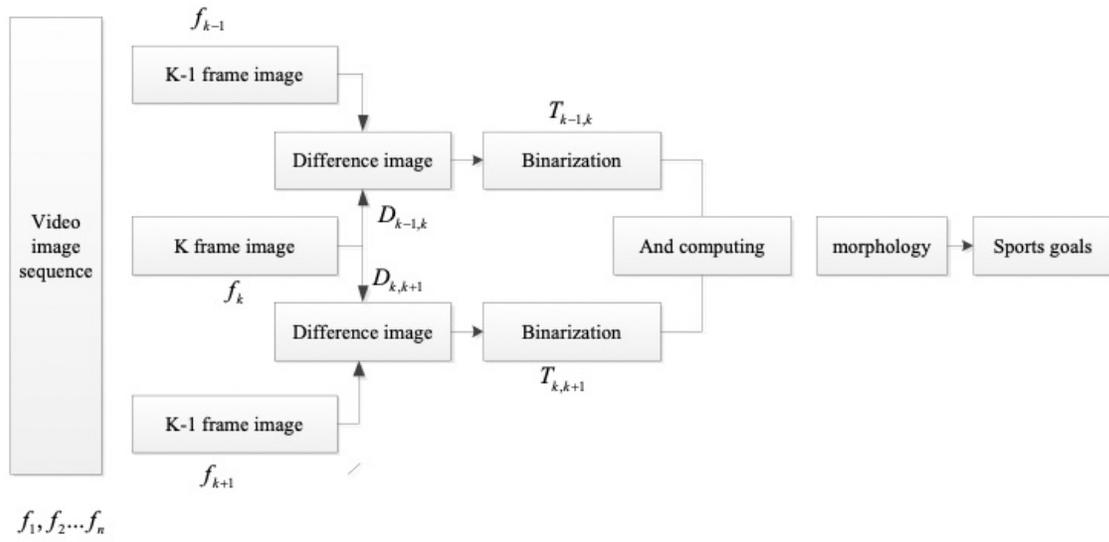


Figure 5

Three-frame difference method schematic