

عنوان مقاله:

Analysis of Broadcast Soccer Video, Trajectory-Based Ball Detection, and Tracking

محل انتشار:

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خلاصه مقاله:

The soccer imaging and broadcasting companies try to improve the audience's satisfaction by substituting manual analysis methods of soccer videos with automatic ones, to provide more statistical real-time information about the current match. One of the most important issues in automatic analysis of soccer videos is the detection of the ball and its trajectory, which is a more challenging task compared to other object tracking problems. The difficulties emanate from the small size of the ball in long shots, ball deformation over frames, presence of more than one ball on the field or billboards, as well as merging the ball with the lines of the field, and occluding with players. In this paper, we propose a framework for detecting a ball and its trajectory. In the proposed method, after playfield detection and shot filtering, ball candidates are detected in the initial frames using morphology operators and object filtering. Then, candidate trajectories are extracted, scored, and ranked; and the trajectory with the best rank is selected. Later, the Kalman filter and block matching methods are used for detecting the ball and predicting its next positions in the next remaining frames. The proposed algorithm has been evaluated on 1125 video frames of the match between Esteghlal and Persepolis played at Azadi Stadium of the Islamic Republic of Iran in 2017. The results of experiments show 95.8%, 98.8%, and 96.9% for the accuracy, precision, and recall criteria respectively

کلمات کلیدی:

soccer video, Kalman filtering, Homography transformation, block matching, image processing, video processing, ball tracking

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