Scene-Based Event Detection for Baseball Videos

連振昌,江秋龍,李建興
Computer Science & Information Engineering
Computer Science and Informatics
cclien@chu.edu.tw

Abstract

A lot of research has lately been focusing on scene analysis in sport videos. By extracting the semantics of successive frames or segmented shots, various kinds of video scenes may be identified. However, general baseball events, e.g., strikeout and ground outs, are hard to be detected because a general baseball event is composed of a series of video scenes and each scene is further composed of several video shots. Hence, the detection of general baseball events has to be developed in terms of scenes to facilitate the retrieval of the required video clips. To do this, the baseball video is firstly segmented into many video shots. Then, various visual features including the image-based features, object-based features, and global motion are extracted to analyze the semantics for each video shot. Each video shot is then classified into the predefined semantic scenes according to its semantics. Finally, the hidden Markov model (HMM) is applied to detect the general baseball events by regarding the classified scenes as observation symbols. The accuracy analysis for the scene classification and event detection are illustrated with large amount of video data consisting of several hours of video frames. Experimental results show that the proposed system detects the four kinds of general baseball events with reasonable accuracy.

Keyword：Video shot, Semantic scene, Baseball event, Hidden Markov model