

Development of an Automated Tracking System for Analysis of Human Movement

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ABSTRACT

To understand the mechanisms underlying a successful team, one must first understand the circumstances leading to successful performance outcomes (i.e., point/goal scoring events). However, tracking player performance in team sports is difficult as games involve quick, agile movements, with many unpredictable changes in direction and frequent collisions between players. Manual tracking can be a subjective and an often laborious process which has arguably discouraged researchers from conducting more detailed analyses of the multiple players' interactions within games.

The current challenge is to obtain appropriate video sequences that can robustly identify and label people over time, in an indoor environment containing multiple interacting players. Therefore the aim of this investigation is to develop an automated, motion detection system capable of tracking the global movements of two basketball teams and the ball on an indoor court.

A basketball playing court was recorded using one static overhead camera and player movements were identified by automated motion detection software. This software provided the x , y coordinates of each individual player and the ball, and players were assigned to one of two teams using colour recognition of team uniforms. Individual player coordinates were then tracked over time and used to provide spatio-temporal trajectories (maps) of player movements and event frequencies. The analysis of these variables can be used to compare playing sequences (i.e. throw in to scoring opportunity; or turnover to scoring opportunity) to determine if common movement patterns exist in team behaviour.