

A METHOD FOR GAME ANALYSIS BASED ON THE DOMINANT REGION

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Introduction

In game analysis of football, the location and size of "space" and their time variations are essential information. However, there is little way to obtain such features of "space" quantitatively. We propose a novel method for computing them from a video sequence using "dominant region" [1], and for evaluating the superiority of each team.

Methods

First of all, player's positions and velocities are estimated from a video sequence, and then, the dominant region for each player or each team is computed. Because the dominant region of a player is a region where the player can arrive at earlier than any other players, we extract every dominant region with a size larger than a threshold as a "space". Furthermore, we compute "time occupancy rate" for representing superiority or inferiority of each team. The time occupancy rate is obtained as an image by calculating the mode of the team dominant regions at each point of the pitch for a specified time period of a game.

Results & Discussion

Using the proposed method, we tried to extract the superior or inferior regions for each team from a video sequence in the FIFA World Cup games. As a result, we extracted successfully two significant spaces which were starting points to goals from the time occupancy rate for 45 minutes in a game including two goal scenes. Those results are shown by circles in the left side of Fig.1. In the figure, the dark gray area means the region having more than 50% of the time occupancy rate, and the left and right figures are the loser and winner sides, respectively. From this result, it is known that there is little space around the penalty area of the winner side, while large spaces are clearly observed in the loser side. In the experiments using other video sequences, the effectiveness of the time occupancy rate was also confirmed.

Conclusion

A novel method for game analysis based on the dominant region was proposed. In the experiments with several video sequences, it was shown that the superiority or inferiority of each team could be estimated.

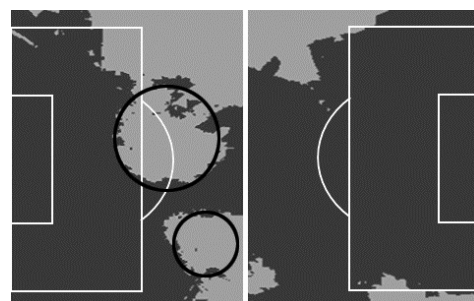


Fig 1. Comparison in space of both teams.

References

1. Taki, T. et al. (2000). *4th Asian Conf. on Computer Vision (ACCV2000)*: 693-698.