Body Part Categorization Based Tracking with Correction by Temporal Positions for Volleyball Spike Height Analysis

Proposals

P1: Skin Pixel Filter Based Link Field Detection

P2: Body Part Categorization Based Observation Model

P3: Occlusion Detection and Discard Based Observation Model

P4: Temporal Positions Based Tracking Result Correction

Application

- Attack Evaluation
- Player Evaluation
- Strategy Analysis

Problems

- High Similarity Between Hands
- Deformation
- Occlusion

Observation by Image Similarity

Observation by Categorization

Conventional

Observation by Image Similarity

Proposed

Observation by Categorization

Solved by transferring tracking into categorization

Experiment result

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Success Rate</th>
<th>Average Error of Spike Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Framework</td>
<td>34.69% (68/196)</td>
<td>16.39cm</td>
</tr>
<tr>
<td>P1</td>
<td>45.41% (89/196)</td>
<td>14.16cm</td>
</tr>
<tr>
<td>P1+P2</td>
<td>75.51% (148/196)</td>
<td>11.73cm</td>
</tr>
<tr>
<td>P1+P2+P3</td>
<td>84.18% (165/196)</td>
<td>8.47cm</td>
</tr>
<tr>
<td>P1+P2+P3+P4</td>
<td>93.37% (183/196)</td>
<td>5.96cm</td>
</tr>
</tbody>
</table>

Conclusion

By 4 proposals, the success rate increases to 93.37%, and the average height error is 5.96cm.