Team Formation and Abrupt Pose Features Based Qualitative Action Recognition for Volleyball Game Analysis

Background

- Assist player training
- Player evaluation system

Applications:

- Ball motion state feature
- Abrupt pose feature

Proposals

- Step 1: Basic Action Discrimination
  - Basic Actions
    - F1: Maximum velocity among players
    - V1
    - V2
    - V3
    - V4
    - Maximum!
  - F2: Extreme Distance
    - To the net
    - To target player

- Step 2: Qualitative action Discrimination
  - Qualitative Receive Discrimination
    - Return ball quality
    - Motion quality

Experiment Result

<table>
<thead>
<tr>
<th>Spike</th>
<th>Block</th>
<th>Receive</th>
<th>Toss</th>
</tr>
</thead>
<tbody>
<tr>
<td>accuracy</td>
<td>recall</td>
<td>precision</td>
<td>accuracy</td>
</tr>
<tr>
<td>98.41%</td>
<td>92.41%</td>
<td>100%</td>
<td>96.49%</td>
</tr>
</tbody>
</table>

Qualitative Receive Discrimination

<table>
<thead>
<tr>
<th>Quality++</th>
<th>Quality+</th>
<th>Quality-</th>
<th>Quality--</th>
</tr>
</thead>
<tbody>
<tr>
<td>accuracy</td>
<td>recall</td>
<td>precision</td>
<td>accuracy</td>
</tr>
<tr>
<td>94.41%</td>
<td>96.24%</td>
<td>88.50%</td>
<td>92.73%</td>
</tr>
</tbody>
</table>

Conclusion

This work achieved accuracy averagely 97.26% for basic action discrimination and 91.76% for qualitative receive discrimination.