Spatio-temporal metrics that distinguish outcomes of field hockey plays

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Spatio-temporal metrics that distinguish outcomes of field hockey plays

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Introduction
Introduction

Positions

Areas

Distances

Angles

Speed

Context

\[(x, y, t)\]

\[\Delta t = t_2 - t_1\]

\[\Delta t = \frac{d}{t_2 - t_1}\]
Introduction

Question:
What combinations of spatio-temporal metrics distinguish play outcomes?
Method

Data collection

HD cam’, pan-tilt-zoom

4K cam’, 0.3x fisheye lens, fixed
Method

Data processing

- **Positions**: (x, y, t)
- **Distances**: \( \Delta t = t_2 - t_1 \)
- **Angles**: \( \Delta t = \frac{d}{t_2 - t_1} \)
- **Spread**
- **Area**
- **Duration**
- **Speed**
- **Context**

No. of players

[Images of diagrams showing various calculations and data processing steps related to positions, distances, angles, and spread.]
Method

Problem:

• Many metrics \( n_{metrics} = 3,641 \)
• Few observations \( n_{observations} = 660 \)

\[ I\text{-score} = \sum n_j^2 (\bar{Y}_j - \bar{Y})^2 \]

Backward Dropping Algorithm (Wang et al. 2012)
Method

I-score

1500

2578

65

1111
## Results

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<tr>
<th>Rank</th>
<th>Metric Combination</th>
<th>I-score</th>
</tr>
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<td>[23,26]</td>
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<td>[3,21]</td>
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<td>2643.416</td>
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</tbody>
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Discussion

Direction of play

(x, y, t)
Discussion

Direction of play

(x, y, t)

(x, y, t)
Conclusion

Problem:
• Too many metrics.
• Too few observations.

Solution:
• Ask someone who knows – genetic analysts.
• Backward Dropping Algorithm

Results
• Metrics associated with outcomes.
• Metric combinations associated with outcomes.
Spatio-temporal metrics that distinguish outcomes of field hockey plays

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