

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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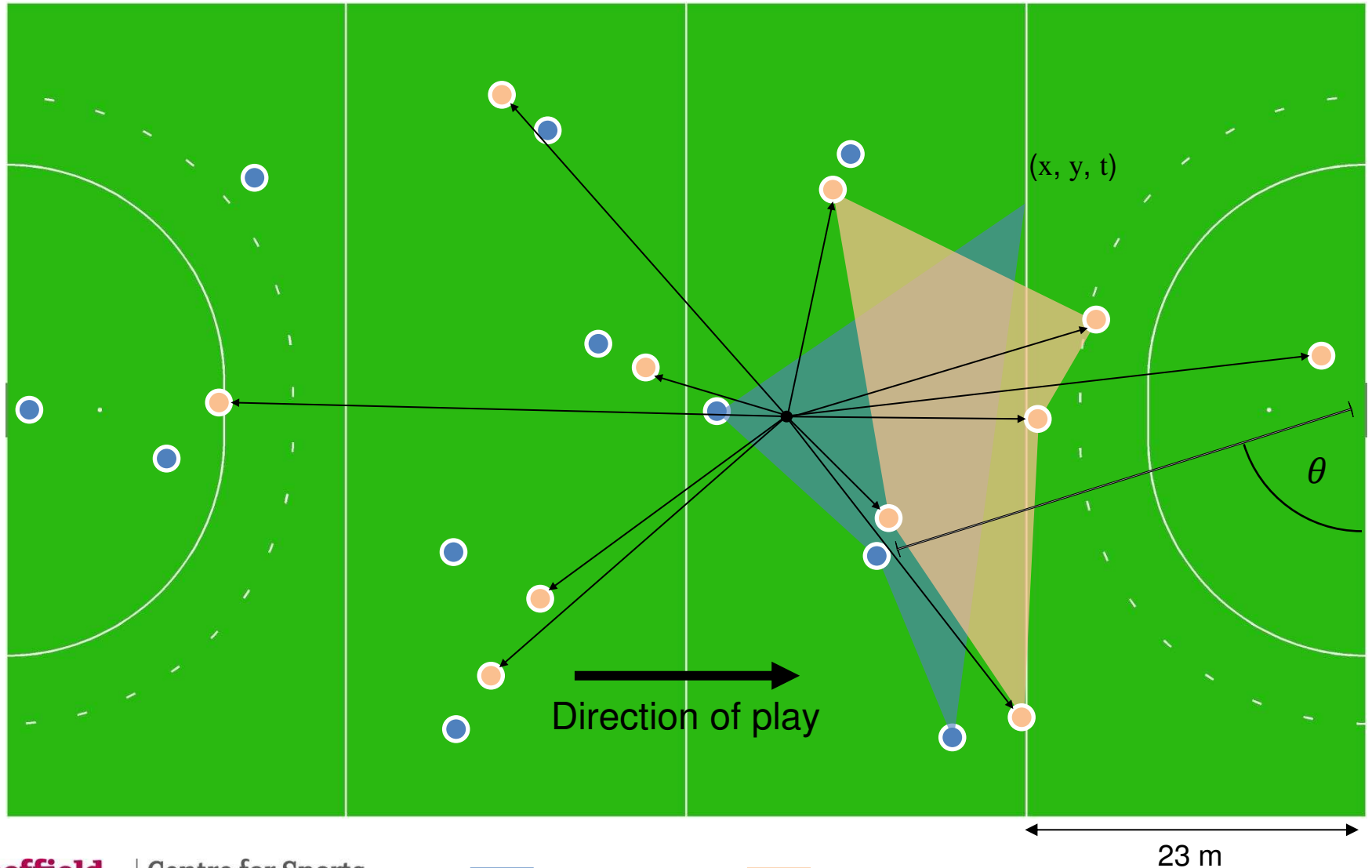
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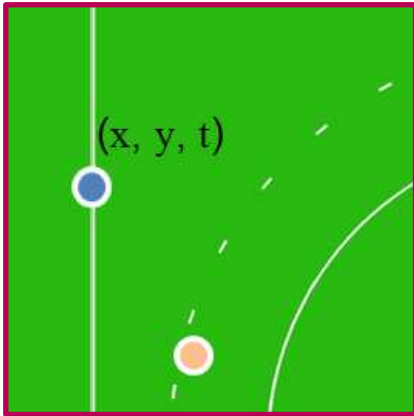


Introduction

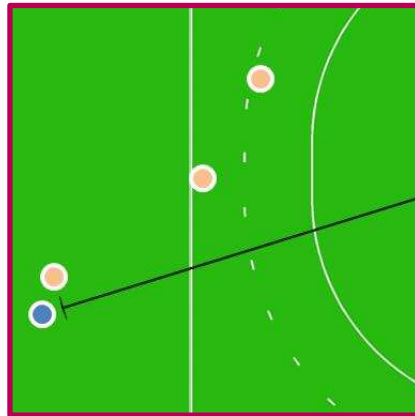


Introduction

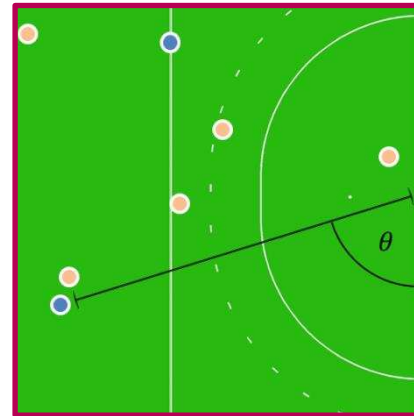
Positions



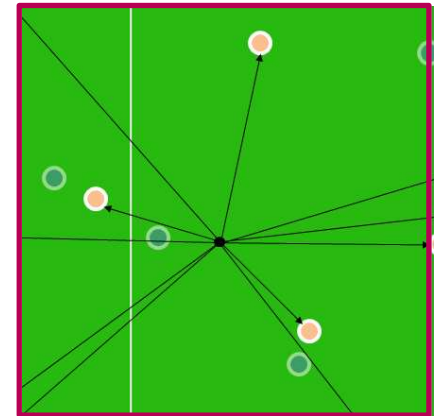
Distances



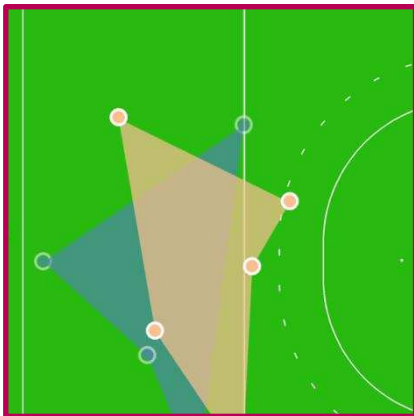
Angles



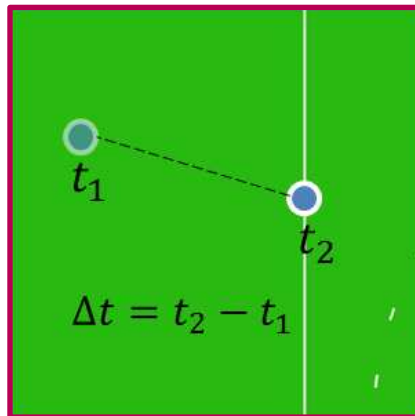
Spread



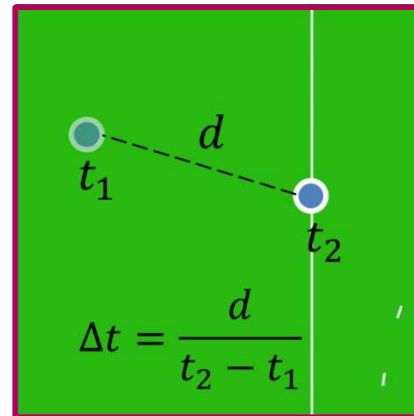
Area



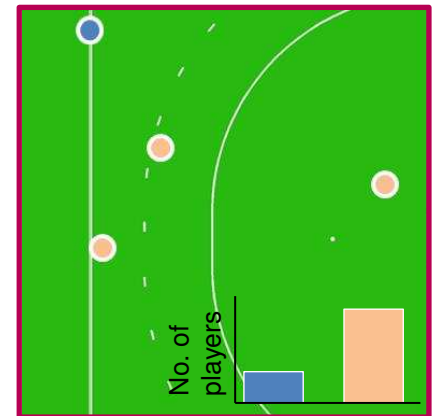
Duration



Speed



Context



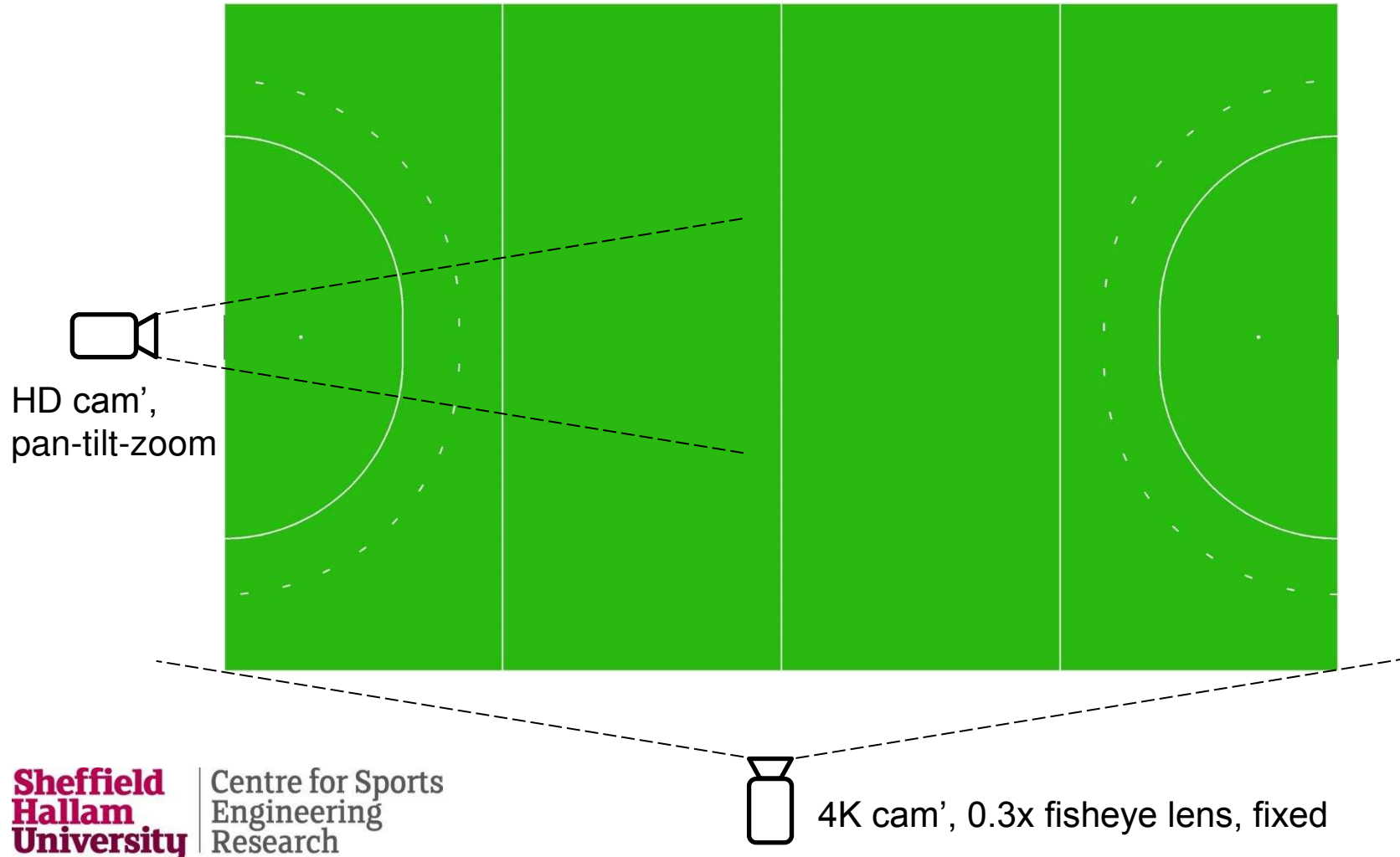
Introduction

Question:

What combinations of spatio-temporal metrics distinguish play outcomes?

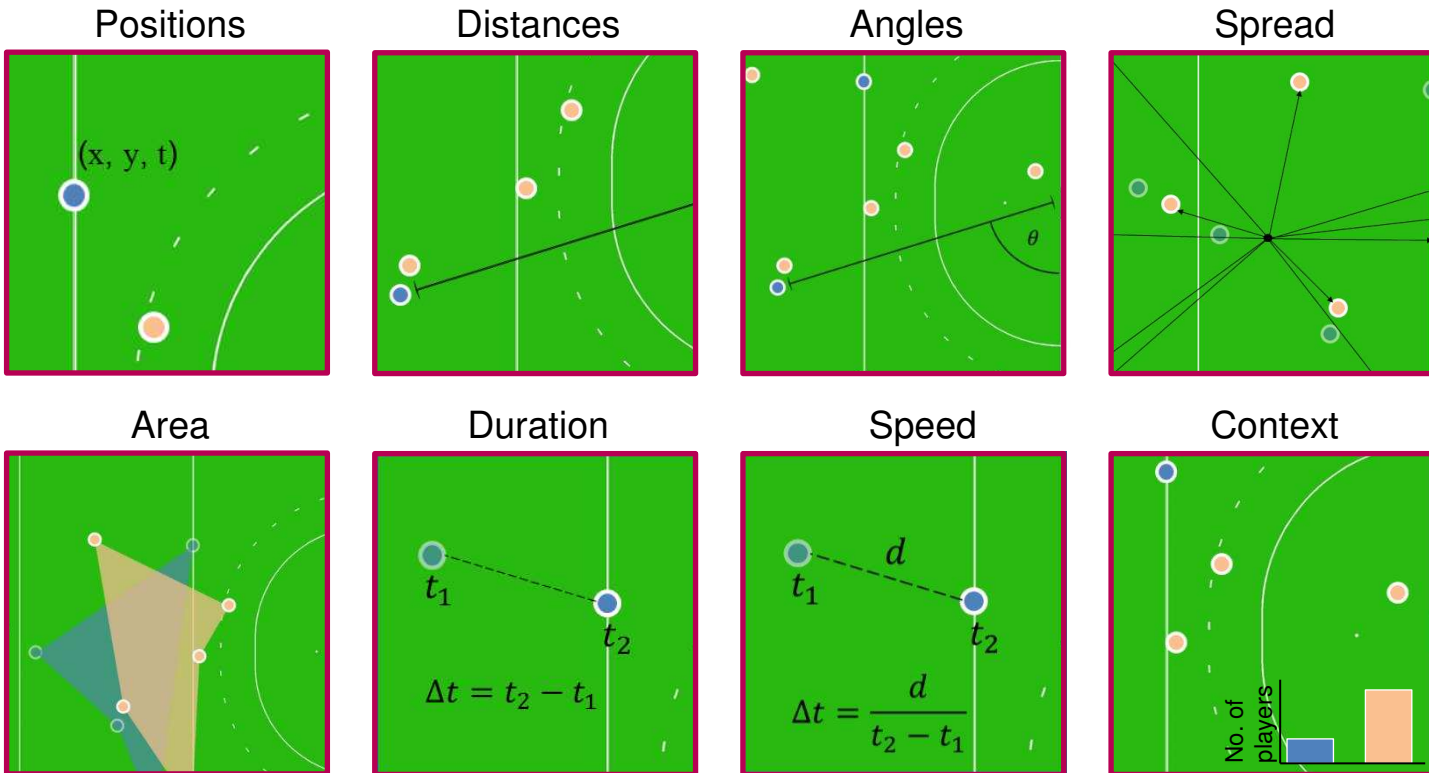
Method

Data collection



Method

Data processing



Method

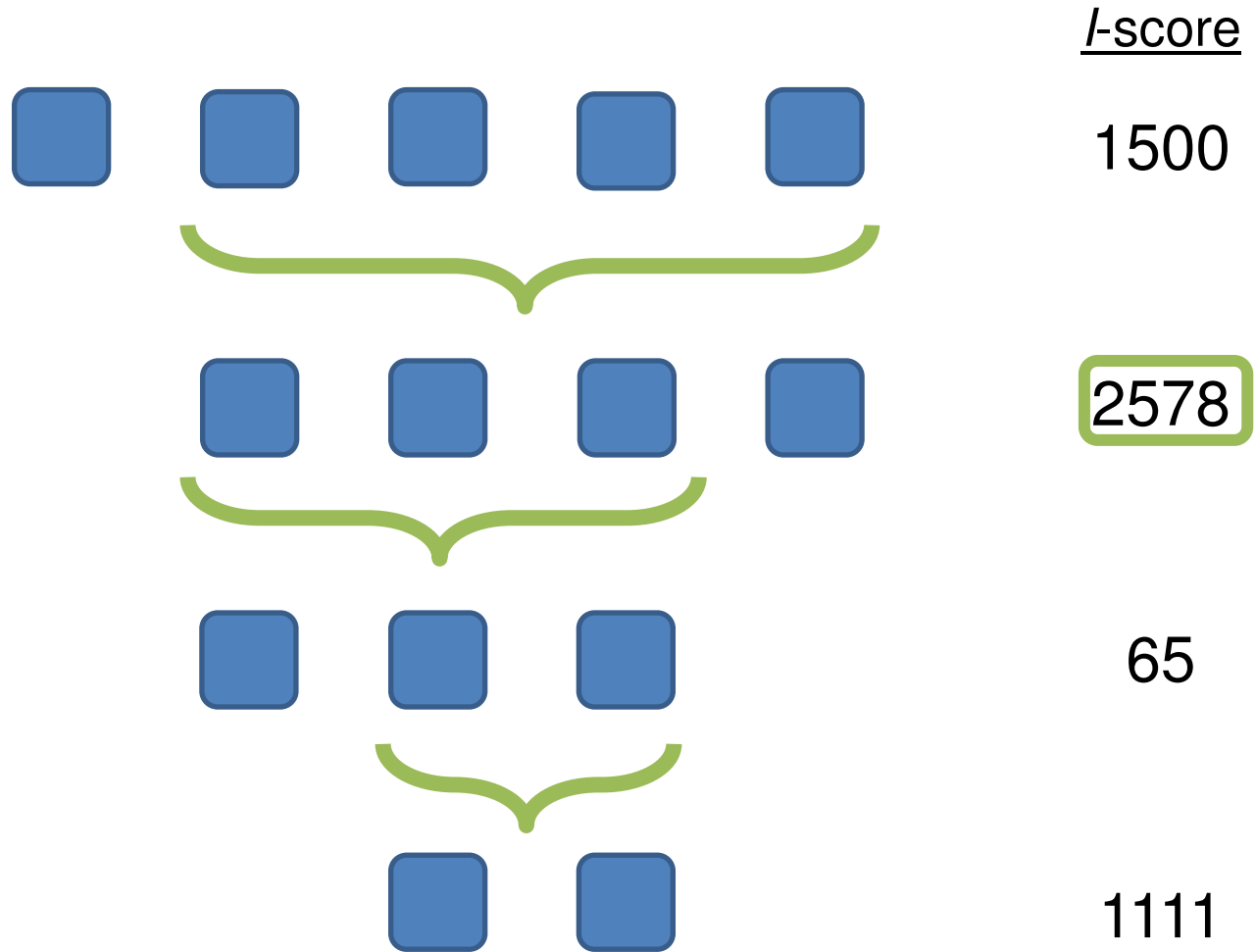
Problem:

- 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)

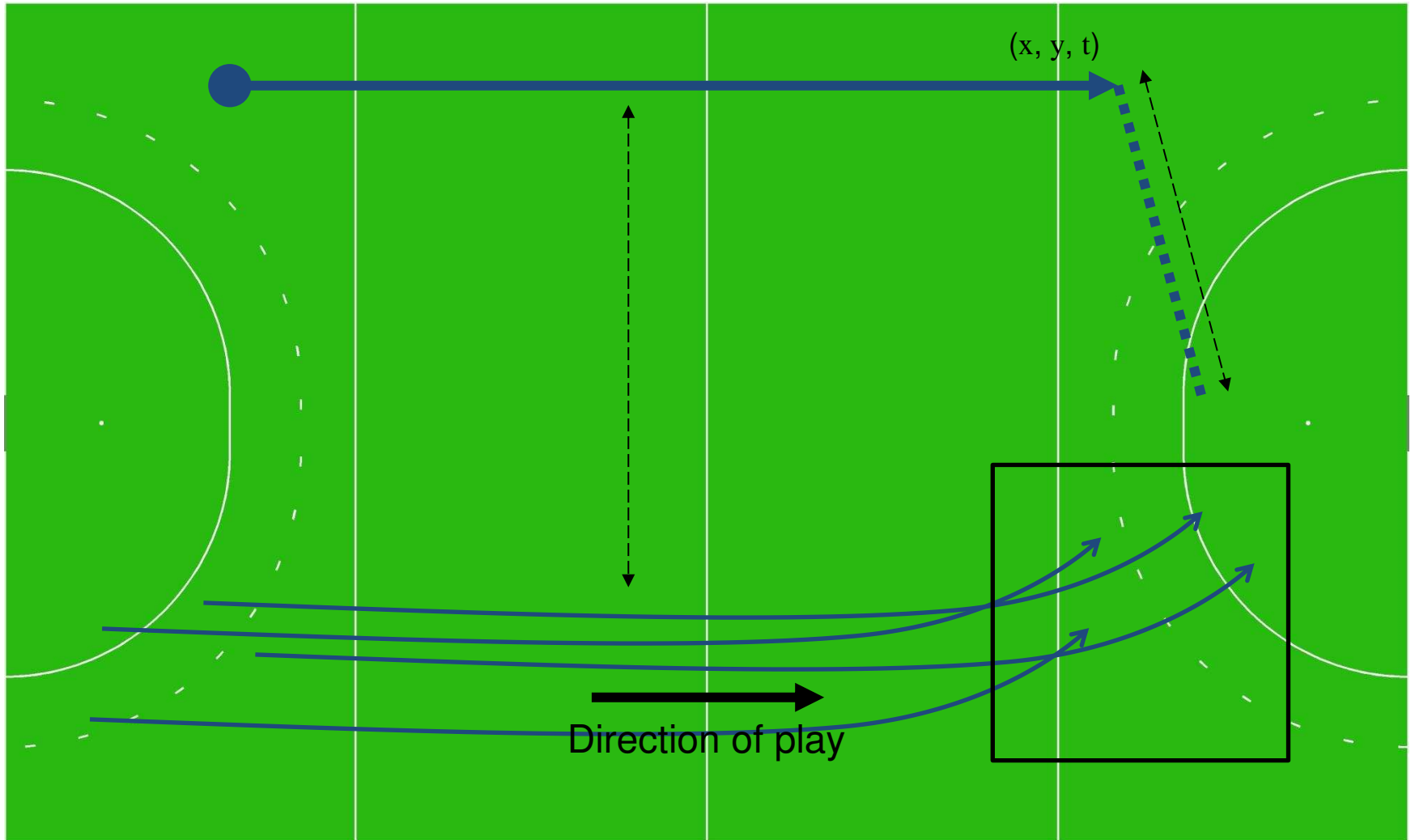
Method



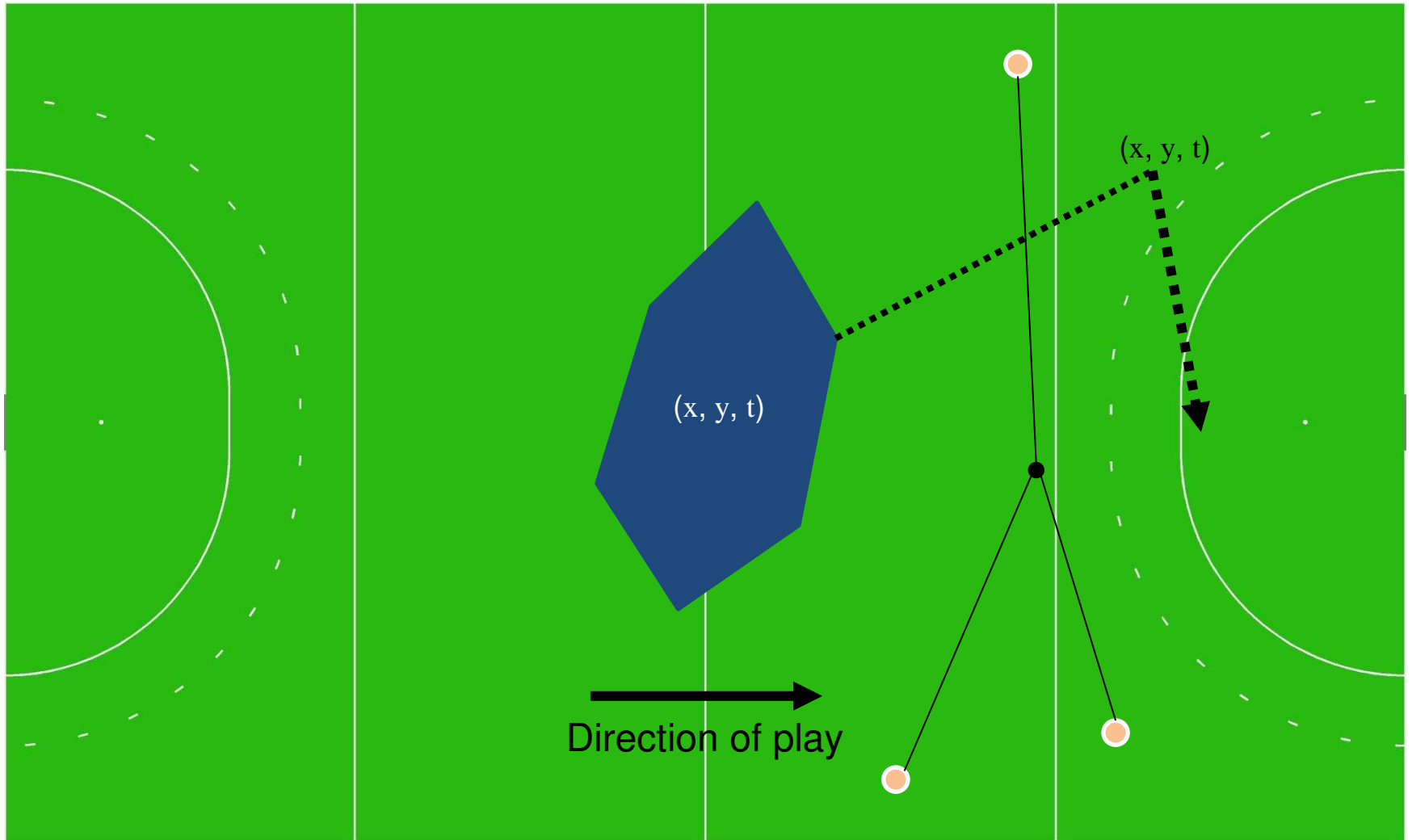
Results

Rank	Metric Combination	<i>I</i> -score
1	[23,26]	2702.772
2	[3,11]	2702.772
3	[4,5,7,8,31]	2681.984
4	[4,7,8,31]	2681.984
5	[5,7,8,31]	2681.984
6	[3,21]	2677.408
7	[4,5,8,31]	2646.662
8	[4,8,31]	2646.662
9	[5,8,31]	2646.662
10	[4,5,7,31]	2643.416

Discussion



Discussion



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.

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