Performance Analysis in Australian Rules Football: Moving from the Subjective to the Objective

Sam Robertson

SPRINZ AUT Sport Performance Analysis

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Overview

01 Why Analytics in AFL?

02 Key Challenges in AFL

03 Developing a Successful Analytics Organisation

04 The Future of Sports Analytics in AFL
Why Analytics in AFL?
WHODUNNIT?
Overcoming Human Limitation

Improving individual, departmental and organisational decision-making
Overcoming human limitation

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<th>Citation</th>
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</table>

In only 8 out of 136 (6%) did experts outperform model.

In Sport, we still have a long way to go...
Why the resistance?

1. Perceived loss of control from users
2. Inconsistent use by staff
3. Total organisational integration?
4. Lack of awareness
5. Lack of publicised success stories
4TH 00:03  SYDNEY SWANS 67  WESTERN BULLDOGS 88
Peter Judd: Robots in the coaches box as AFL clubs adopt machine intelligence

THERE'S a robot in the Western Bulldogs coaches box.

Not so much a Transformer, more a faceless machine intelligence that sucks in data and spits out insights only a PhD student could love.

This robot, let's call it Ruff, helped the Western Bulldogs win the AFL premiership.

ANTICIPATE and recommend the next best move, always playing the percentages, like Brad Pitt in Moneyball.
Overcoming Human Limitation
Improving individual, departmental and organisational decision-making

Increased Data Generation
Establish infrastructure & Reducing staff burden
17th Hole - Tee Shots Since 2003

4,363 Rounds Played
Holes-In-One: 0
Increased data generation

- Wearable technologies
- Vision
- User-derived
Overcoming Human Limitation
Improving individual, departmental and organisational decision-making

Increased Data Generation
Establish infrastructure & Reducing staff burden

Answer Complex Problems
High impact questions in sport: Injury, list management, automation
‘We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology.’

Carl Sagan, *Why We Need to Understand Science*, 1990
Answer complex problems

Sports Analytics

- Engineering
- Maths & Stats
- Visualisation
- Computer Science
- Machine Learning
- Software Development
- Sport Science
- Physics

Graph:

- 2014: $125m
- 2025: $4.5bn

$0, $1,000,000,000, $2,000,000,000, $3,000,000,000, $4,000,000,000, $5,000,000,000

News article:

Universities Need To Focus On Training Students In Sports Analytics
Overcoming Human Limitation
Improving individual, departmental and organisational decision-making

Increased Data Generation
Establish infrastructure & Reducing staff burden

Answer Complex Problems
High impact questions in sport: Injury, list management, automation

Inform Decision-Making
Increase evidence base and refine processes
Current challenges in AFL
Current challenges in AFL

- Outcome prediction
- Athlete decision-making
- Automated movement classification
- Scouting and list management
- Sports Challenges
- Integrity
- Business intelligence
Current challenges in AFL

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Basketball and Ice Hockey

The Bill James Lead Calculator

Points ahead: 23
Time left: 17 min 10 sec

Does the leading team have the ball?
- Yes
- No

Safe?

On the way. The lead is 41% safe

Assess risk
Evaluate coaching
Player evaluation

Real-time data access for in-game prediction

**WHAT TO DO ON 4TH-AND-8 ON OPP. 36**
Tied with 11:45 remaining in the 1st quarter

- **ATTEMPT FIELD GOAL**
- **PUNT**

Cardinals should PUNT

- **GO FOR IT**
- 61% chance of making field goal

34% chance of converting 4th down

http://nyt4thdownbot.com/
Fan engagement via social media
Current challenges in AFL

- Athlete decision-making
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Outcome prediction
The importance of context
Interaction of contextual variables

**Individual**
- Skill level
- Physiology
- Current fatigue levels

**Skill**
- Skilled behaviour (event)
- Coaching instruction
- Game plan

**Task**
- Time prior to execution
- Pressure
- Target density

**Environment**
- Field location
- Wind
- Noise

Athlete decision making
Predicting ball movement
Identifying preferred ball movement

• Individual skill
• Prior events
• Consider context (i.e., pressure)
• Risk vs Reward
Defining ‘Pressure’
Defining ‘Pressure’

BIC = 449

BIC = 589
Player coupling - by time
Player coupling - within team
Player coupling - between team
Current challenges in sport

- Outcome prediction
- Athlete decision-making
- Automated movement classification
- Scouting and list management
- Sports Challenges
- Integrity
- Business intelligence
Kick volume in an AFL pre-season
Wearable sensors - laboratory

Wearable sensors - laboratory

Wearable sensors - laboratory

[Bar chart showing accuracy (%) for different movements: CMJ, COD, Jog, Run & Jump, Sprint, Stationary, Tackle, Walk. The chart compares accuracy at 0.5 s, 1.0 s, and 1.5 s intervals.]
Current challenges in sport

- Outcome prediction
- Athlete decision-making
- Automated movement classification
- Integrity
- Business intelligence
- Scouting and list management
Non-intervention does not mean that nothing happens. It means that something else happens.
Player performance forecasting

Scouting & list management

Forwards

Midfielders

Defenders
Player performance forecasting

Scouting & list management
Current challenges in sport

- Outcome prediction
- Athlete decision-making
- Scouting and list management
- Automated movement classification
- Sports Challenges
- Integrity
- Business intelligence
Detecting match fixing
Men’s 100 m: 1967 to 2017
Summary

01. Skepticism is not the same as negativity

02. Keep an open mind...but no so open that your brain falls out

03. Extraordinary claims require...some evidence at all

04. Be comfortable with uncertainty
Performance Analysis in Australian Rules Football: Moving from the Subjective to the Objective

Thank you

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