MIT Sloan Sports Analytics Conference

MIT Sloan Sports Analytics Conference

MIT Sloan Sports Analytics Conference

Sloan 2014

Panels

•10,000 Hours vs. The Sports Gene

•Adidas: Wearable Tech Revolutionizing Sports Analytics

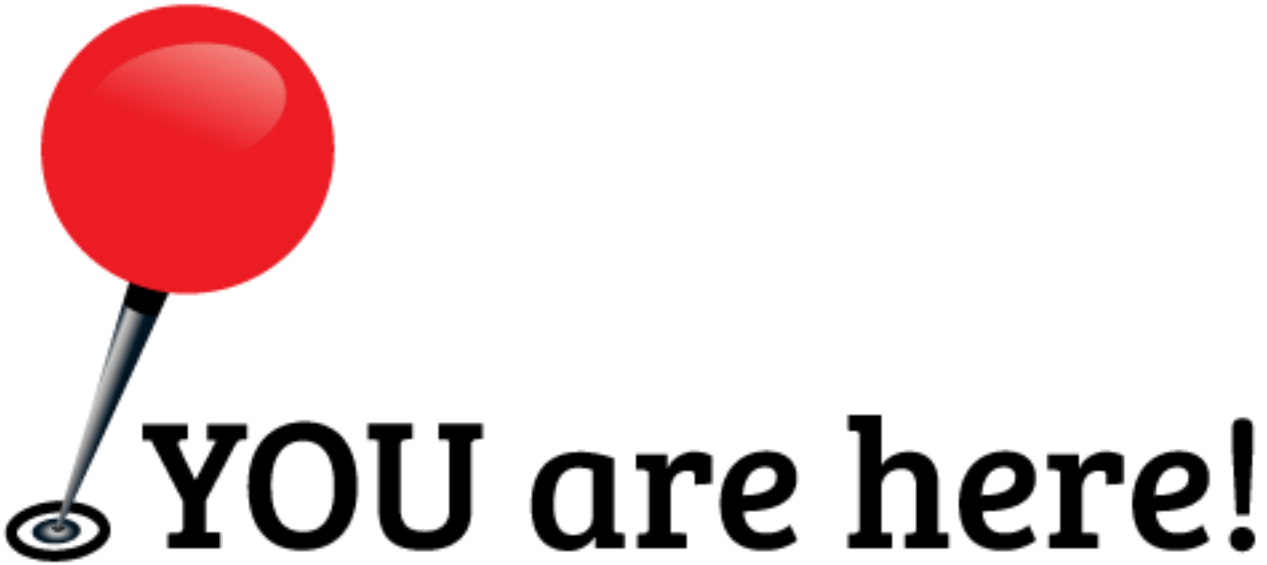
•Analytics in Sports Business: Putting the Money in Moneyball

Talks

•Automatically Recognizing On-Ball Screens

•Win at Home and Draw Away: Automatic Formation Analysis Highlighting the Differences in Home and Away Team Behaviors

III. Finding YOUR Place



Returning to Pythagoras

Bill James created the Pythagorean win expectation formula for full-length baseball games.

$$\text{winning\%} = \frac{(\text{pts scored})^2}{(\text{pts scored})^2 + (\text{pts allowed})^2}$$

*Jason W. Rosenfeld, Jake I. Fisher, Daniel Adler, and Carl Morris (2010) "Predicting Overtime with the Pythagorean Formula," *Journal of Quantitative Analysis in Sports*: Vol. 6 : Iss. 2, Article 1.

Finding your x

- **Question:** How does a team's strength predict the winner in overtime games?
- **Plan:** Use historical data to find the overtime exponents for the NBA, NFL, and MLB.

$$\text{winning}\% = \frac{(\text{pts scored})^x}{(\text{pts scored})^x + (\text{pts allowed})^x}$$

Pythagorean OT

- **Tool:** Logistic regression
- **Result:** Exponent are as follows (full-length exponents in parentheses):
    - NBA - 9.2 (14.1)
    - NFL - 1.1 (2.6), and
    - MLB - 0.9 (1.9)

What to expect?

- Impact of strength on win probability decreases least in NBA overtime and most in NFL overtime.
- NBA overtime games are most likely to be won by the team that would win a full-length game.
- NFL overtime games are most random relative to full length games.

Chance in OT

If a team has a 75% chance of winning a full-length game, its chances of winning an overtime game are

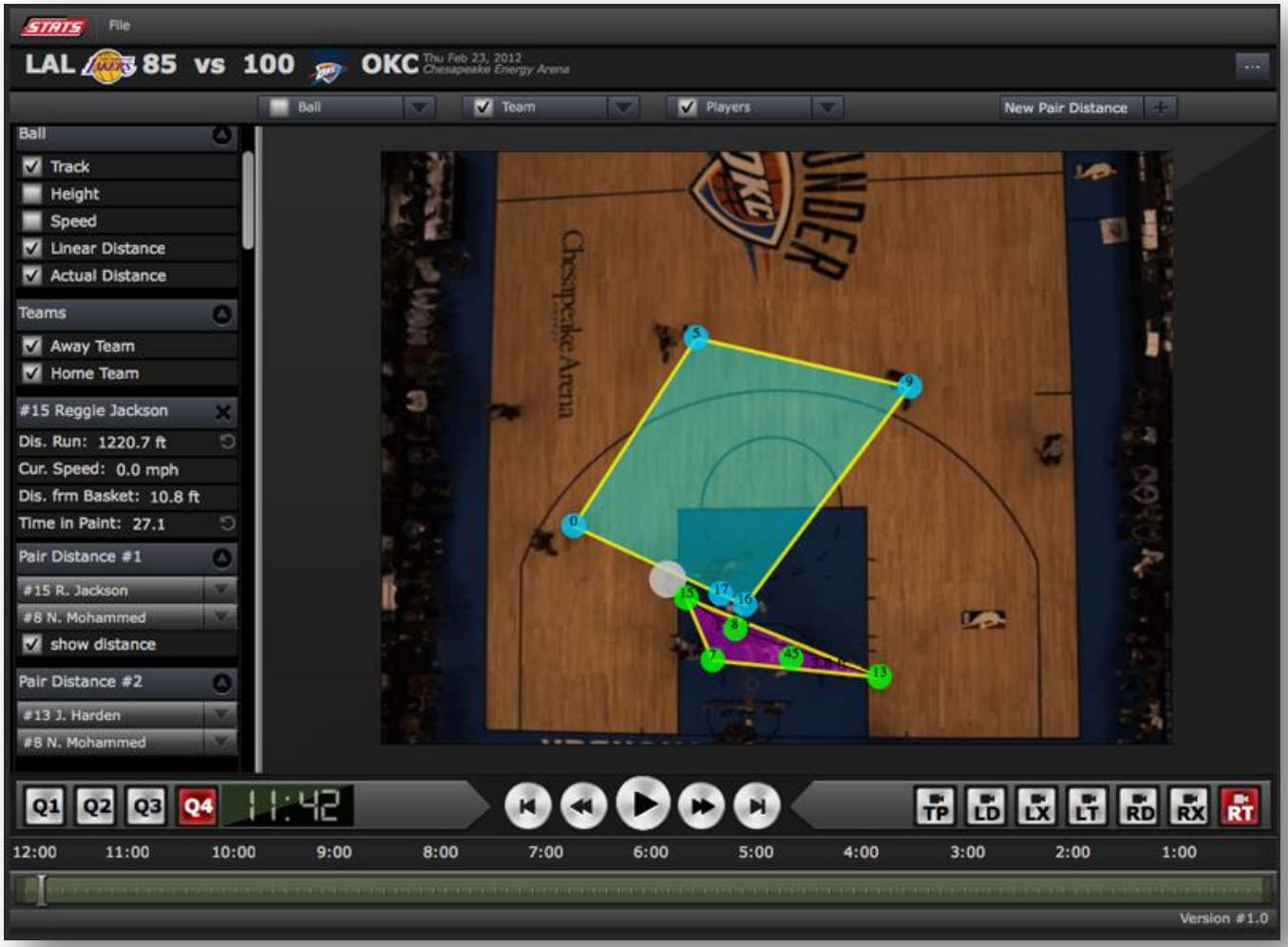
- NBA – 67%
- MLB – 63%,
- NFL – 62%

The odds of research

- This paper makes strides at understanding how team strength affects overtime outcomes.
- Pythagorean formulas reinterpreted as odds ratio formulas, leading to use of logistic regression methods to estimate log(odds) based on data for individual games.

IV. Where we're going

SportVU


STATS
File
LAL 85 vs 100 OKC
Thu Feb 23, 2012
Chesapeake Energy Arena
Ball
Team
Players
New Pair Distance
Track
Height
Speed
Linear Distance
Actual Distance
Teams
Away Team
Home Team
#15 Reggie Jackson
Dis. Run: 1220.7 ft
Cur. Speed: 0.0 mph
Dis. frm Basket: 10.8 ft
Time in Paint: 27.1
Pair Distance #1
#15 R. Jackson
#8 N. Mohammed
show distance
Pair Distance #2
#13 J. Harden
#8 N. Mohammed
Chesapeake Arena
Q1
Q2
Q3
Q4
11:42
TP
LD
LX
LT
RD
RX
RT
12:00
11:00
10:00
9:00
8:00
7:00
6:00
5:00
4:00
3:00
2:00
1:00
Version #1.0

VU of the NBA

NBA analytics movement includes placing six cameras in rafters at all 30 team arenas

Courtesy of NBAE/Getty Images/Courtesy of NBAE/Getty Images - SportVU cameras in every NBA arena will provide new information for teams' statistical analysis.

Wildcat VU

DAVIDSON

Giving // Library // The Arts // Directory

Search Davidson

ALUMNI PARENTS & FAMILIES BUSINESS & COMMUNITY INSIDE DAVIDSC

ABOUT | ACADEMICS | ADMISSION & FINANCIAL AID | STUDENT LIFE | ATHLETICS | OFFICES & DEPARTMENTS

NEWS | NEWS STORIES | INTERNSHIPS PUT STUDENTS AT CONTROLS OF NBA'S NEW ANALYSIS SYSTEM

NEWS

NEWS STORIES

NEWS ARCHIVES

IN THE NEWS

SHARE

NEWS

INTERNSHIPS PUT STUDENTS AT CONTROLS OF NBA'S NEW ANALYSIS SYSTEM

October 28, 2013 by Bill Giduz

There'll be a half-dozen high-tech "eyes in the skies" watching every National Basketball Association (NBA) game during the coming season. And in Charlotte's Bobcats' Time Warner Cable Arena, there will also be two Davidson students in the arena to monitor this cutting-edge sports technology.

The "eyes" are new, high-speed SportVU cameras that will provide teams with gigabytes of data that coaches and management can use with proprietary software to analyze the game to a far greater degree than ever before. The cameras, which have been in use by some teams for the past three seasons, will be in every NBA arena this year.

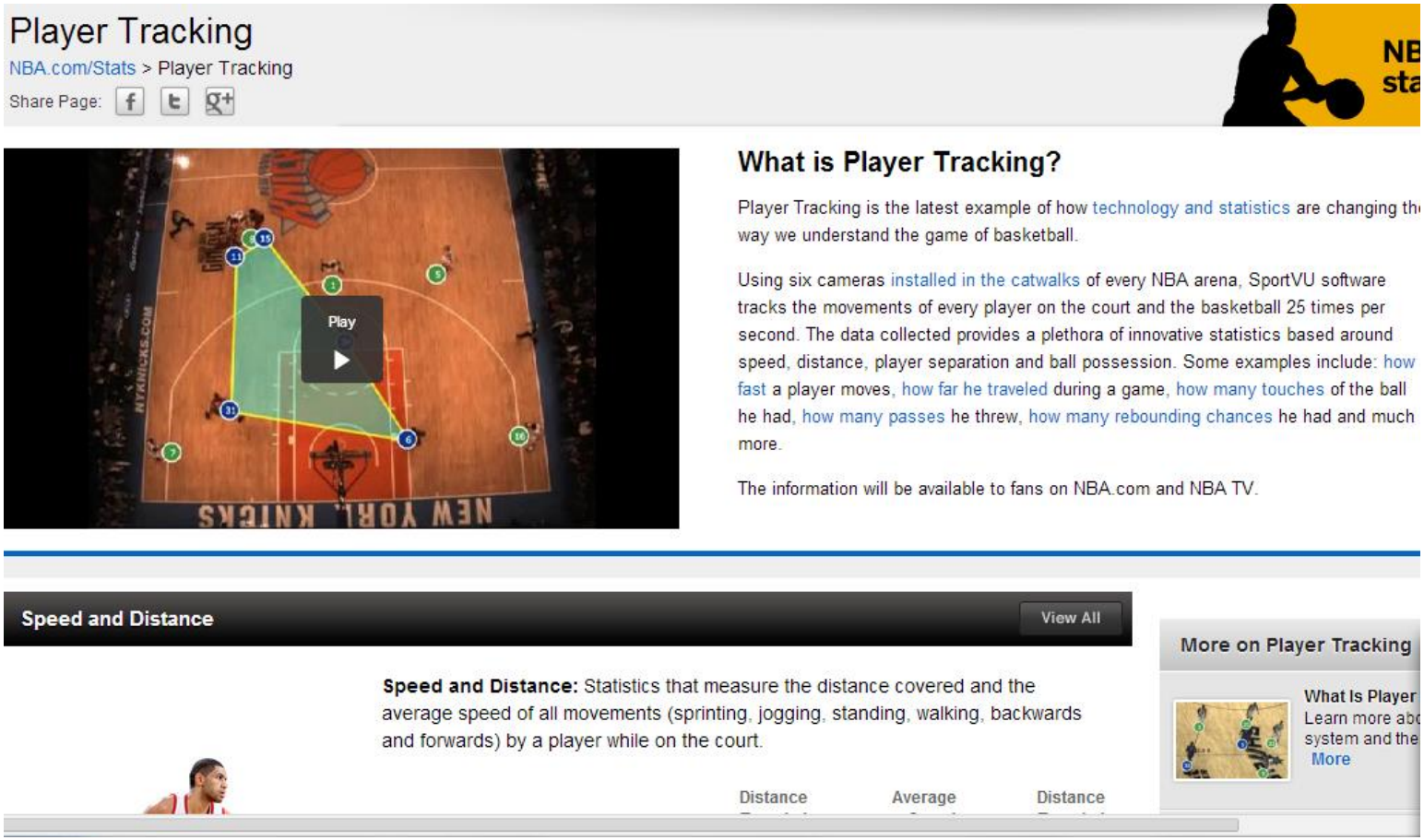
Mounted on the overhead catwalks, each camera shoots 25 frames per second. Accompanying

Operating the Cameras

“It is essentially calibrating the cameras to remote to the laptops and overseeing the system that tags players and referees throughout the game. It's interesting in that we can almost use it as a form of instant replay (seeing if there was a missed call, how an injury happened, etc.)… Players who wear bright color shoes, tape their wrists, have headbands, are always easier to tag because they stick out.”

- Camera operator

NBA.Com/Stats



Speed and Distance, Touches/Possession, Passing, Defensive Impact, Rebounding Opportunities, Drives, Catch and Shoot, Pull Up, Shooting Efficiency

Top 10 Rim Protectors in the NBA 2013-14*

Rk	Player	GP	MIN/gm	STL/gm	BLK/gm	Total BLK	Opp FGM at Rim/gm	Opp FGA at Rim/gm	Opp FGP at Rim
1	Bismack Biyombo (CHA)	76	14	0.1	1.1	86	1.8	4.5	38.8%
2	Roy Hibbert (IND)	81	29.9	0.4	2.2	182	4.1	9.8	41.4%
3	Robin Lopez (POR)	82	31.9	0.3	1.7	139	4.4	10.3	42.5%
4	Serge Ibaka (OKC)	81	33.2	0.5	2.7	219	4.2	9.5	43.9%
5	Tiago Splitter (SAS)	59	21.7	0.5	0.5	31	2.3	5.3	44.1%
6	Ian Mahinmi (IND)	77	16.3	0.5	0.9	72	2.3	5.2	44.5%
7	Andrew Bogut (GSW)	66	26.6	0.7	1.8	118	3.4	7.6	45.0%
8	Taj Gibson (CHI)	82	28.8	0.5	1.4	112	2.4	5.2	45.7%
9	Kyle O'Quinn (ORL)	69	17.3	0.6	1.3	88	2.0	4.3	46.2%
10	John Henson (MIL)	69	26.7	0.6	1.7	115	3.2	6.9	46.3%

*NBA.com/Stats

Rim Protection is defined as the defender being within five feet of the basket and within five feet of the offensive player attempting the shot.

Filters: Opp FGA at rim/gm > 4 and GP > 50.

V. Why you should care

Relevance to *you*

- Academics: research papers
- Sports fans: understanding of the game
- Media: doing the job well
- …
- *Careers*?

VI. What I look for as I hire

Skills

- Programming
- Statistical Analysis
- Problem-solving
- Big-picture thinking
- Basketball knowledge
- *Thinking like a statistician*

Ideas? Collaboration?

- Ideas to make the Bobcats better?
- Interest in an internship or collaborating?
- E-mail me: JRosenfeld@hornets.com