

Archetypal Ballers and Ternary Plots

A look at the 2018 WNBA season

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Archetypal Analysis (Eugster and Leisch 2009)

- Goal:
 - ▶ Dimensionality reduction
 - ▶ Reduce a dataset with 17 box score metrics to three archetypes
 - ▶ Represent players' skills in terms of the archetypes
- Inputs:
 - ▶ Player box scores for the 2018 WNBA season
 - ▶ About 160 players
- Outputs:
 - ▶ Archetype table
 - ▶ Player table

The Three Archetypes

- Weighted box score metrics
- Each archetype represents a skill set
 - ▶ Floor Spacing (Shea 2014, chap. 5):
 - skills for a backcourt player (Guard)
 - dominated by three-point shots
 - ▶ Rim Protection (Shea 2014, chap. 6):
 - skills for a frontcourt player (Center, Forward)
 - dominated by rebounds
 - ▶ Bench: the “bad” archetype - players with low overall skills

The Player Table

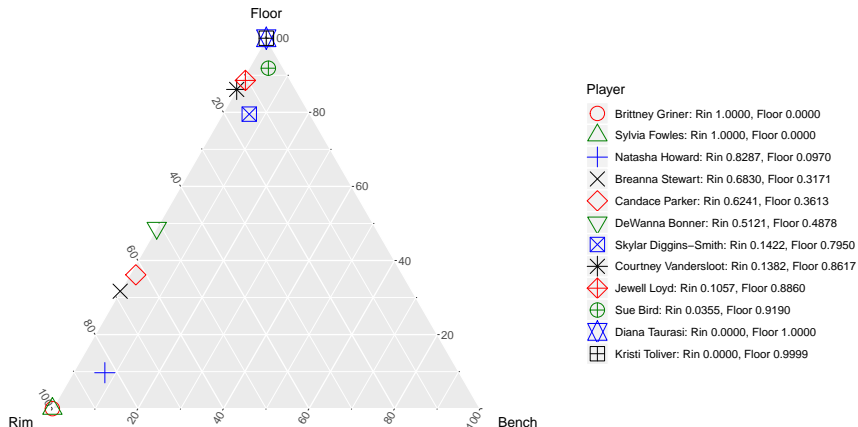
- For each player, the percentage of a player's skill in each archetype
- $\text{Floor} + \text{Rim} + \text{Bench} = 1$
- $\text{Rim} + \text{Floor} = 1 - \text{Bench}$ represents overall skill
- The archetypal player is the one with the largest value for the archetype

Ternary plots (Hamilton and Ferry 2018)

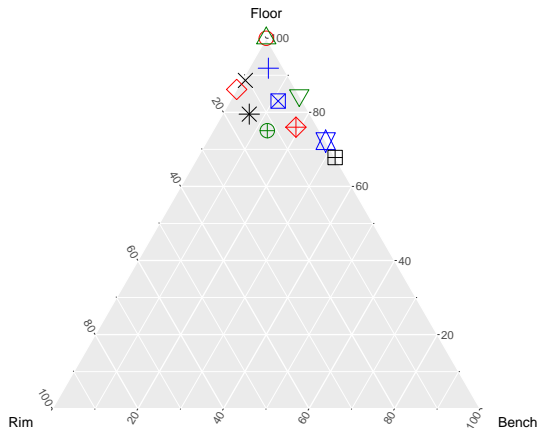
- Rim, Floor and Bench sum to 1.0
- So we can plot them on a ternary plot
 - ▶ equilateral triangle with the corners labeled Rim, Floor and Bench
 - ▶ The poor players cluster near “Bench”
 - ▶ The good rebounders cluster near “Rim”
 - ▶ The good three-point shooters cluster near “Floor”
 - ▶ And the all-stars are near the Rim - Floor line

Who are the archetypal floor spacers and rim protectors in the WNBA?

2018 WNBA Top Twelve Overall - The All-Stars



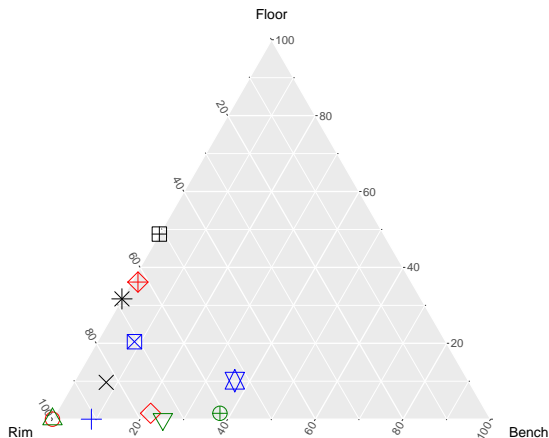
2018 WNBA Top Twelve Floor Spacers



Player

- Diana Taurasi: Rin 0.0000, Floor 1.0000
- Kristi Toliver: Rin 0.0000, Floor 0.9999
- Sue Bird: Rin 0.0355, Floor 0.9190
- Jewell Loyd: Rin 0.1057, Floor 0.8860
- Courtney Vandersloot: Rin 0.1382, Floor 0.8617
- Renee Montgomery: Rin 0.0000, Floor 0.8456
- Chelsea Gray: Rin 0.0569, Floor 0.8303
- Skylar Diggins-Smith: Rin 0.1422, Floor 0.7950
- Jasmine Thomas: Rin 0.0506, Floor 0.7598
- Maya Moore: Rin 0.1223, Floor 0.7503
- Alex Bentley: Rin 0.0000, Floor 0.7221
- Briann January: Rin 0.0000, Floor 0.6779

2018 WNBA Top Twelve Rim Protectors



Player

- Brittney Griner: Rin 1.0000, Floor 0.0000
- △ Sylvia Fowles: Rin 1.0000, Floor 0.0000
- + Liz Cambage: Rin 0.9111, Floor 0.0000
- × Natasha Howard: Rin 0.8287, Floor 0.0970
- ◇ Jessica Breland: Rin 0.7681, Floor 0.0156
- ▽ A'ja Wilson: Rin 0.7480, Floor 0.0000
- ⊠ Elena Delle Donne: Rin 0.7107, Floor 0.2041
- * Breanna Stewart: Rin 0.6830, Floor 0.3171
- ⊞ Candace Parker: Rin 0.6241, Floor 0.3613
- ⊕ Elizabeth Williams: Rin 0.6100, Floor 0.0155
- ⊠ LaToya Sanders: Rin 0.5331, Floor 0.1014
- ⊠ DeWanna Bonner: Rin 0.5121, Floor 0.4878

References

Eugster, Manuel J. A., and Friedrich Leisch. 2009. "From Spider-Man to Hero – Archetypal Analysis in R." *Journal of Statistical Software* 30 (8): 1–23. <http://www.jstatsoft.org/v30/i08/>.

Hamilton, Nicholas E., and Michael Ferry. 2018. "ggtern: Ternary Diagrams Using ggplot2." *Journal of Statistical Software, Code Snippets* 87 (3): 1–17. <https://doi.org/10.18637/jss.v087.c03>.

Shea, S. M. 2014. *Basketball Analytics: Spatial Tracking*. CreateSpace Independent Publishing Platform.