MCS 100 HW3: Ranking NCAA Division I Men's Basketball Teams 2015-2016

ID: 00008

Introduction:

   In this report, we used two different Bradley-Terry models, regularized normal and regularized binomial, to rank NCAA Division I men's basketball teams in the 2015-2016 season. In order to train our models (and to rank teams), we set aside 80% of all games played between Division I teams. We then used the remaining 20% of games to test our model's ability to predict winners. Game results data used for our analysis can be found at Spreadsheet Sports.[1]

Rankings for Regularized Normal Bradley-Terry Model (betas):

Top 5 Teams	Bottom 5 Teams
1) West Virginia (20.33)	1) Central Connecticut State (-19.83)
2) Michigan State (20.22)	2) Florida A&M (-18.31)
3) Louisville (19.92)	3) Delaware State (-18.28)
4) Kansas (19.66)	4) Northern Arizona (-16.52)
5) Villanova (19.51)	5) Southern Utah (-16.38)

For reference, home-court advantage had a beta of 3.47.

Rankings for Regularized Binomial Bradley-Terry Model (betas):

| Top 5 Teams	Bottom 5 Teams
1) Villanova (2.902)	1) Central Connecticut State (-2.719)
2) Xavier (2.865)	2) Chicago State (-2.652)
3) Kansas (2.604)	3) Prairie View (-2.323)
4) Oklahoma (2.473)	4) Texas-San Antonio (-2.314)
5) Virginia (2.353)	5) Southern Utah (-2.230)

For reference, home-court advantage had a beta of 0.65.

Predictive Power

   Our regularized normal Bradley-Terry model was able to predict approximately 77.44% of the games in the training set and approximately 71.55% of the games in the test set. Similarly, our regularized binomial Bradley-Terry model was able to predict approximately 79.55% of the games in the training set and approximately 71.73% of the games in the test set. Overall, the binomial model did only very slightly better than the normal model. Both models show substantial predictive power given that more than 70% of the games in the test set were predicted correctly.

---

[1] Direct link: https://www.dropbox.com/sh/pt08h91kszrdypj/n9QERQa20k

Visualization of Normal vs. Binomial Bradley-Terry Rankings
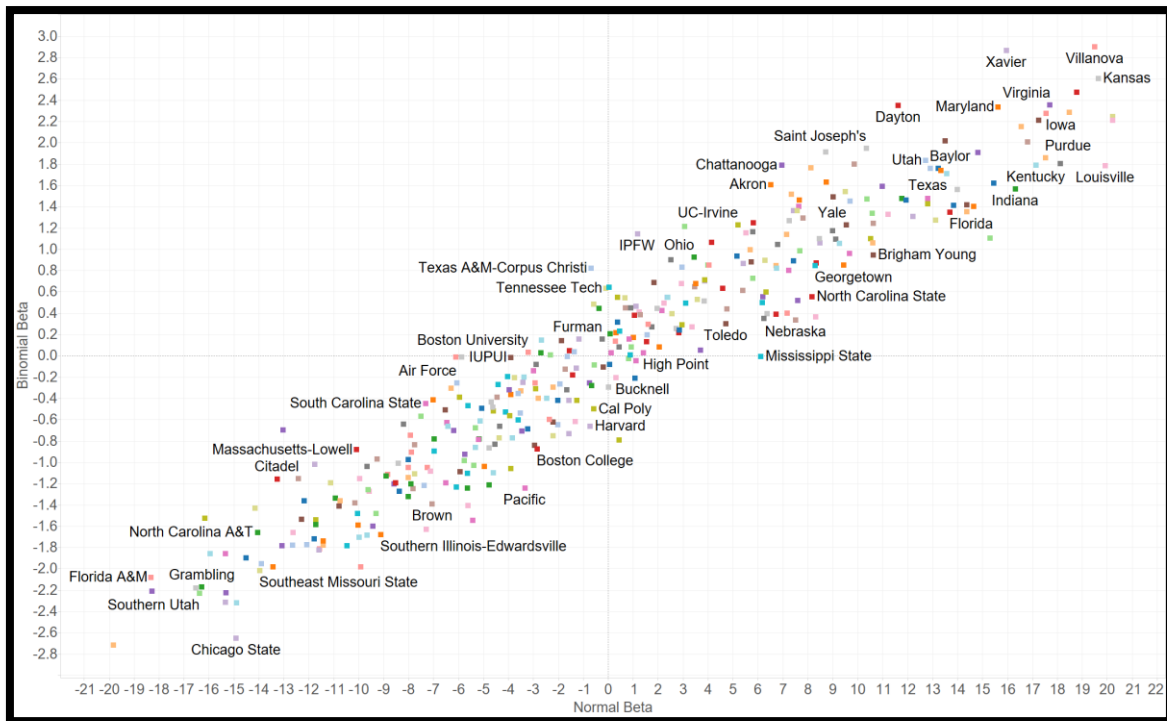
Discussion

In college basketball, there already exist traditional media rankings like the AP Top 25 and USA Today Coaches Poll. The question then is: how do our models compare to these traditional media rankings?

Looking at just the rankings prior to the start of the NCAA tournament, we see that the consensus top-5 teams in both the AP[2] and USA Today[3] Polls were Kansas, Michigan State, North Carolina, Virginia, and Oregon. Our two models only identified Kansas as a consensus top-5 team with the normal model identifying Michigan State and the binomial model identifying Virginia. North Carolina was ranked 7th by the normal model (beta of 18.49) and 8th by the binomial model (beta of 2.282) while Oregon was ranked 29th by the normal model (beta of 13.51) and 14th by the binomial model (beta of 2.02). Finally, none of the teams ranked in the top 5 by either of our models ended up outside of the top 25 in either poll (with the exception of Louisville in the USA Today Coaches Poll, which was most likely due to the university's self-imposed probation from postseason play).

While our binomial model was particularly perceptive in ranking Villanova (2016 NCAA Tournament Champions) as the #1 team, we believe many other factors could be used to generate more accurate rankings and matchup predictions. One factor to consider would be team traveling distance with the hypothesis that teams traveling farther distances will be more likely to perform below expectations. Another factor to consider would be team improvement as the season progresses. This could be quantified by weighting more recent games (February/March) more heavily than early-season games (November/December).

---

[2] http://espn.go.com/mens-college-basketball/rankings/_/year/2016/poll/1/week/1/seasontype/3
[3] http://espn.go.com/mens-college-basketball/rankings/_/year/2016/poll/2/week/1/seasontype/3