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HW9: Predicting Win Totals in Big Ten Women's Basketball for the 2020 Season

Analytics in sports has always been easiest in games where there are discrete plays or actions. As time moved on from the early days of baseball analytics- shaping the game as it went- people began to create new robust ways to inject data science into continuous games like basketball.

Specifically, four factor analysis can be used to predict a team's success rate for any given season. Our 'four factors' in this instance are used for a team and its opponent, including effective field goal percentage- a statistic designed to measure the weight of shot attempts and reward teams for attempting to score more points with three point shots, turnover percentage rates, offensive rebound rates, and rebound rates. Examining this through the lens of Big Ten women's basketball, we can predict win totals for the 2020-21 season regressing our four factors against win totals in previous seasons. The model appears sound, with an R-Squared value of 0.876 and coefficient values that pass eye-test sanity checks. Training our model on nine seasons of games, we predicted our 2020 season win totals as the following:

	SEASON	TEAM	P1	P2	P3	P4	Predicted Wins
131	2020-21	Maryland	0.093	-0.053	0.092	0.013	30.749147
137	2020-21	Rutgers	0.086	-0.083	0.034	-0.052	28.514199
132	2020-21	Indiana	0.070	-0.052	0.035	0.032	27.936092
138	2020-21	Ohio St.	0.049	-0.043	-0.004	0.012	23.612006
135	2020-21	Michigan	0.054	0.023	0.132	0.035	23.154931
134	2020-21	Northwestern	-0.029	-0.116	-0.016	-0.008	21.230485
136	2020-21	Michigan St.	0.022	-0.039	0.058	-0.020	21.163690
133	2020-21	Iowa	0.084	0.028	-0.048	0.013	20.171201
139	2020-21	Nebraska	0.042	0.049	-0.029	0.003	14.841444
140	2020-21	Penn St.	-0.025	0.006	-0.010	-0.010	12.142726
142	2020-21	Purdue	-0.026	0.043	0.003	0.010	10.261336
141	2020-21	Minnesota	-0.063	0.027	-0.002	0.026	8.682434
143	2020-21	Illinois	-0.048	0.035	-0.025	-0.018	7.134959
144	2020-21	Wisconsin	-0.038	0.068	-0.037	-0.016	5.240471

Compared to our actual win total order:

	SEASON	TEAM	P1	P2	P3	P4	WIN
131	2020-21	Maryland	0.093	-0.053	0.092	0.013	26
132	2020-21	Indiana	0.070	-0.052	0.035	0.032	21
133	2020-21	Iowa	0.084	0.028	-0.048	0.013	20
134	2020-21	Northwestern	-0.029	-0.116	-0.016	-0.008	16
135	2020-21	Michigan	0.054	0.023	0.132	0.035	16
136	2020-21	Michigan St.	0.022	-0.039	0.058	-0.020	15
137	2020-21	Rutgers	0.086	-0.083	0.034	-0.052	14
138	2020-21	Ohio St.	0.049	-0.043	-0.004	0.012	13
139	2020-21	Nebraska	0.042	0.049	-0.029	0.003	13
140	2020-21	Penn St.	-0.025	0.006	-0.010	-0.010	9
141	2020-21	Minnesota	-0.063	0.027	-0.002	0.026	8
142	2020-21	Purdue	-0.026	0.043	0.003	0.010	7
143	2020-21	Illinois	-0.048	0.035	-0.025	-0.018	5
144	2020-21	Wisconsin	-0.038	0.068	-0.037	-0.016	5

We can see that without much hyperparameter tuning to our model, there are some pretty notable deviations from our four factor analysis from the real 2020-21 season totals, with the bottom end of the tables being the most similar comparatively.

Work Cited

Stats, H. H. (n.d.). *The #1 source for women's basketball insight used by coaches, broadcasters,*

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