NBA Draft Prediction

Leveraging college basketball statistics to predict the NBA draft pick

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Introduction

Problem to Address

How to predict NBA draft selections using college basketball player statistics

Importance

Teams can develop more comprehensive strategies to acquire the best talent

Background

What: Selection of players to join the NBA
When: Annually every summer (June)
Who: Individuals 19 or older
How: Teams with worse records select first
Where: Changes year to year

Methods

Exploratory Analysis
Understand the Landscape

- Draft pick correlation with key statistics
- Key statistic distributions by lottery type

Classification
Predict the Lottery Selection

- LDA
- QDA
- Logistic
- Random Forest
- Adaptive Boosting
- Bagging
- Gradient Boosting

Regression
Predict the Draft Pick Order

- Linear
- Polynomial
- Random Forest
- Lasso
- Ridge

Dataset & Exploratory Analysis

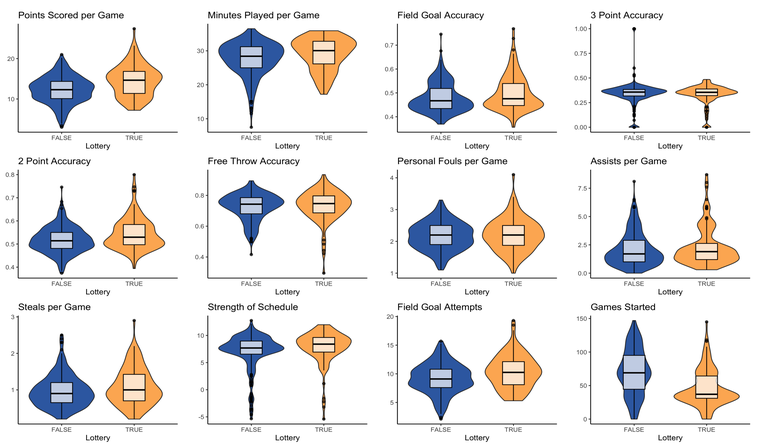
Pk	School	STL	BLK	TOV	PF	SOS	name	lottery
1	Kentucky	1.8	0.5	4	1.9	6.82	john wall	TRUE
2	Ohio State	1.6	0.7	3.5	2.7	7.86	evan turner	TRUE
3	Georgia Tech	0.9	2.1	2.5	2.6	9.02	derrick favors	TRUE
5	Kentucky	1	1.8	2.1	3.2	6.82	demarcus cousins	TRUE
7	Georgetown	1.5	1.5	2.9	2.5	9.26	greg monroe	TRUE
9	Butler	1.3	0.9	2	2.1	3.57	gordon hayward	TRUE
10	Fresno State	2	0.9	2.7	2.8	1.13	paul george	TRUE
11	Kansas	0.5	2.3	1.2	2.1	8.12	cole aldrich	TRUE
12	Kansas	1.5	0.5	1.9	1.8	8.25	xavier henry	TRUE
13	UNC	0.4	2.1	1.4	1.9	9.09	ed davis	TRUE
14	Kentucky	0.7	1.6	1.6	2.1	6.24	patrick patterson	TRUE
15	VCU	0.6	2.7	1.5	3.1	-0.69	larry sanders	FALSE
16	Nevada	0.9	0.8	2.1	2.2	1.98	luke babbitt	FALSE
18	Kentucky	1.4	0.3	3	2.2	6.82	eric bledsoe	FALSE
19	Texas	1.3	0.5	1.5	2.4	7.38	avery bradley	FALSE
21	Iowa State	0.5	1	2	2	7.34	craig brackins	FALSE

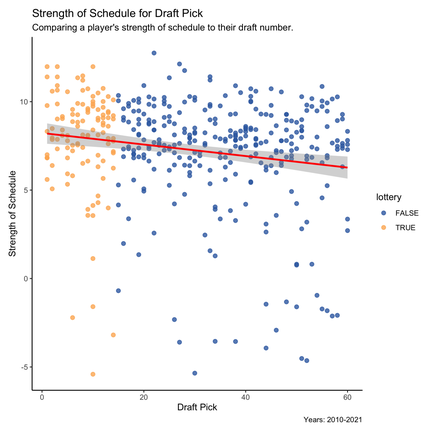
MODELING

- **Historical** college basketball statistics scraped from Basketball Reference
- Years: 2010-2021
- Dimensions: 415x29

PROSPECT

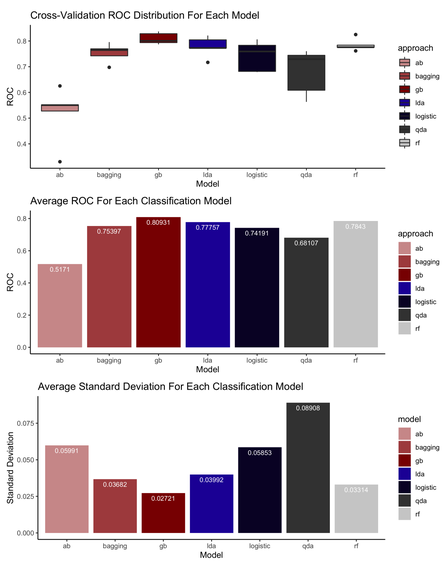
- **Current** college basketball statistics scraped from Basketball Reference
- Years: 2021-2022
- Dimensions: 76x26



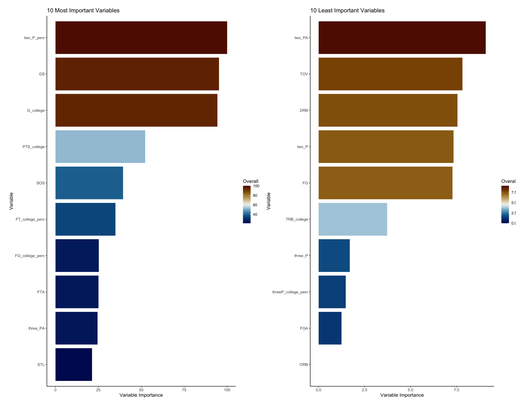


Results

Classification Model Comparison:



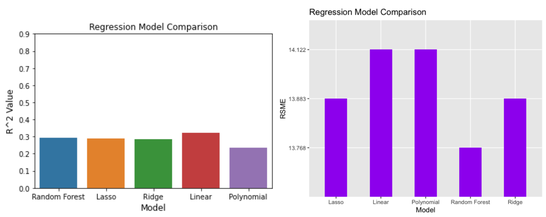
Classification Feature Importance:



Lottery Prediction:

Prospect	Lottery_Probability
keon-ellis	0.915393
chet-holmgren	0.863053
bryce-mcgowens	0.862580
nolan-hickman	0.852826
keegan-murray	0.837418
jaden-ivey	0.785196
kofi-cockburn	0.705536
jalen-duren	0.675730
jeremy-sochan	0.650321
paolo-banchero	0.641342
jabari-smith	0.638466
malaki-branham	0.532393
aj-griffin	0.516619
kennedy-chandler	0.504911

Regression Model Comparison:



Statistical Analysis

Regression

- Lottery, name, and school removed
- Missing values removed
- Regression models run with all variables
- Adjusted R2 and RMSE compared
- Optimal model selected
- Best subset selection to determine most significant variables
- Interaction terms added to improve accuracy

Classification

- Pick, name, and school removed
- Missing values removed
- Lottery converted to factor
- 5-fold cross validation because of data size
- Random grid search
- Optimal model determined via accuracy and sd comparison
- Features extracted
- Prospects predicted

Conclusions

1. Basketball statistics can accurately predict whether a player will be in the lottery
2. Games started, two point percentage, number of games are most important in lottery prediction
3. Basketball statistics cannot accurately predict draft pick order

Future Directions

1. Assess NBA performance post-draft
2. Collect additional demographic information
3. Evaluate prospect predictions to actuals
4. Segment analysis by position

Literature Cited

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