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Predicting NBA Veterans' Value for the 2021-2022 Season

1. Introduction

1.1 Concept

The goal of this project is to help front offices evaluate veterans when adding to their roster to bolster championship contention. Veteran assets are incredibly important to help add pedigree to young rosters and turn teams into contenders. At the same time, veterans are vastly different based on the accolades they have acquired throughout their career and how much they impact winning. Thus, this project isn't simply just predicting the values of veterans but also classifying veteran NBA players as high level bench players, starters, stars, or superstars. The model will apply a variety of player evaluation metrics per season dating back to 1996, when advanced stats started to really be used to evaluate players performance. The model will then predict player drop offs or improvements for the 2021-2022 season using a veteran value metric.

1.2 Use Cases

The findings of this prediction aren't perfect. While statistics can definitely paint a story of how impactful a player is to his specific team, it is hard to evaluate all players on the same basis given the differences in roster construction. In addition, this model doesn't take into account the new rule changes that hinder the free throw rates for certain players and the ability to have more impact on the defensive end. With that said, this model definitely points out some useful results in terms of player classification and veteran value predictions that could be used by teams during mid-season trades which occur around the all-star break. A player predicted to improve significantly from the previous season could be a great pick up for a team this year or even next year in free agency. In addition, this model could help fantasy enthusiasts key in on sleeper pickups who may be projected to play well this season.

2. Data

2.1 Data Sources

The majority of the data used to train the model comes from a Kaggle Data set of player stats dating back from the 1950-2017. While the data has a lot of basic counting stats, a majority of advanced stats are left off because most advanced stats weren't calculated until the late 1990s. Along with player stats and

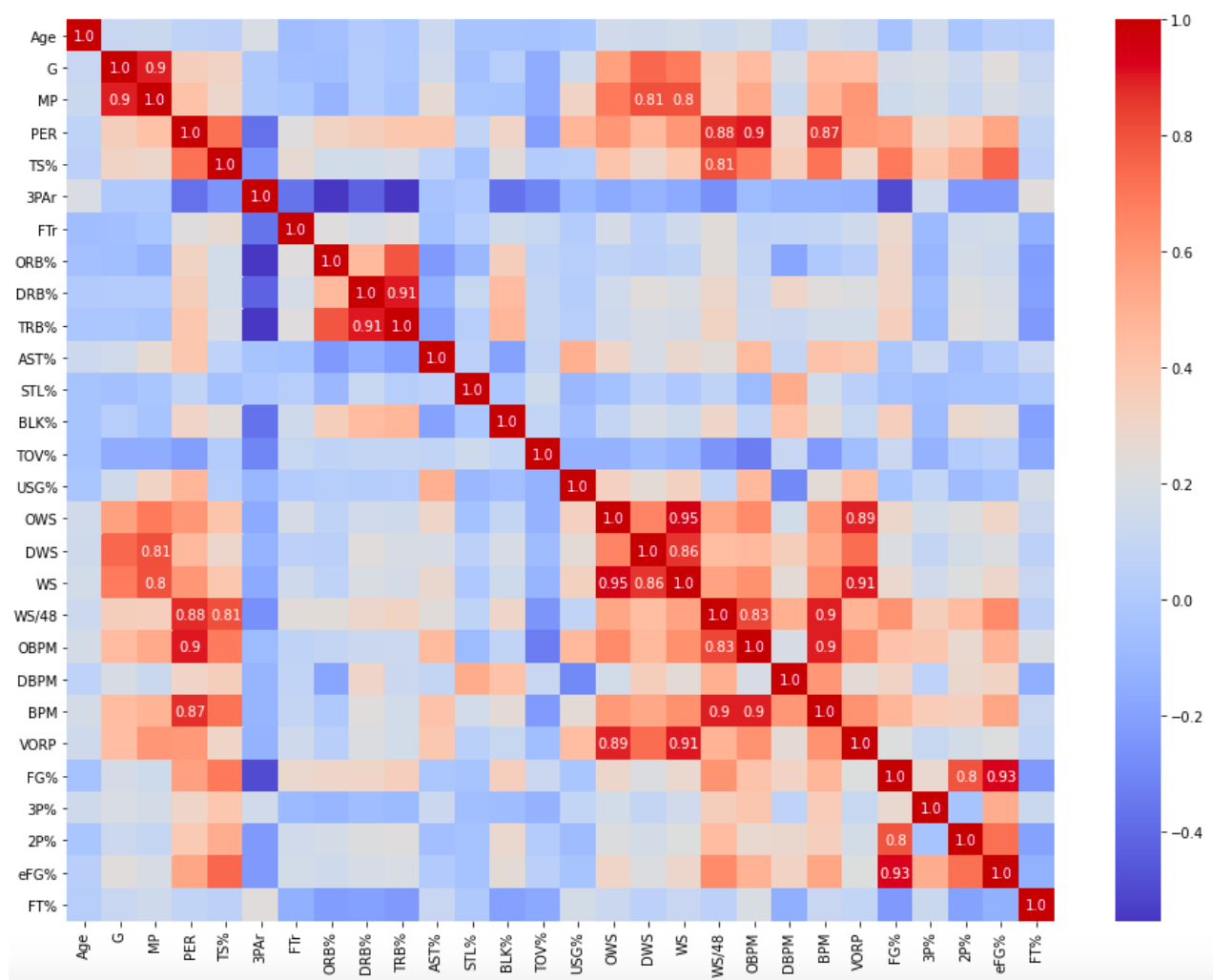
advanced player stats, I also separately scraped Team Net Rating Data (TmNetRtg) and Roster Continuity. Both of these statistics are important in evaluating players because while this is an individual evaluation, basketball is a team sport and thus context needs to be added to player performance. The advanced statistics and team statistics were taken from basketball reference and the official NBA website. The completed csv data can be found in the github link provided under model_data.csv.

2.2 Data Cleaning

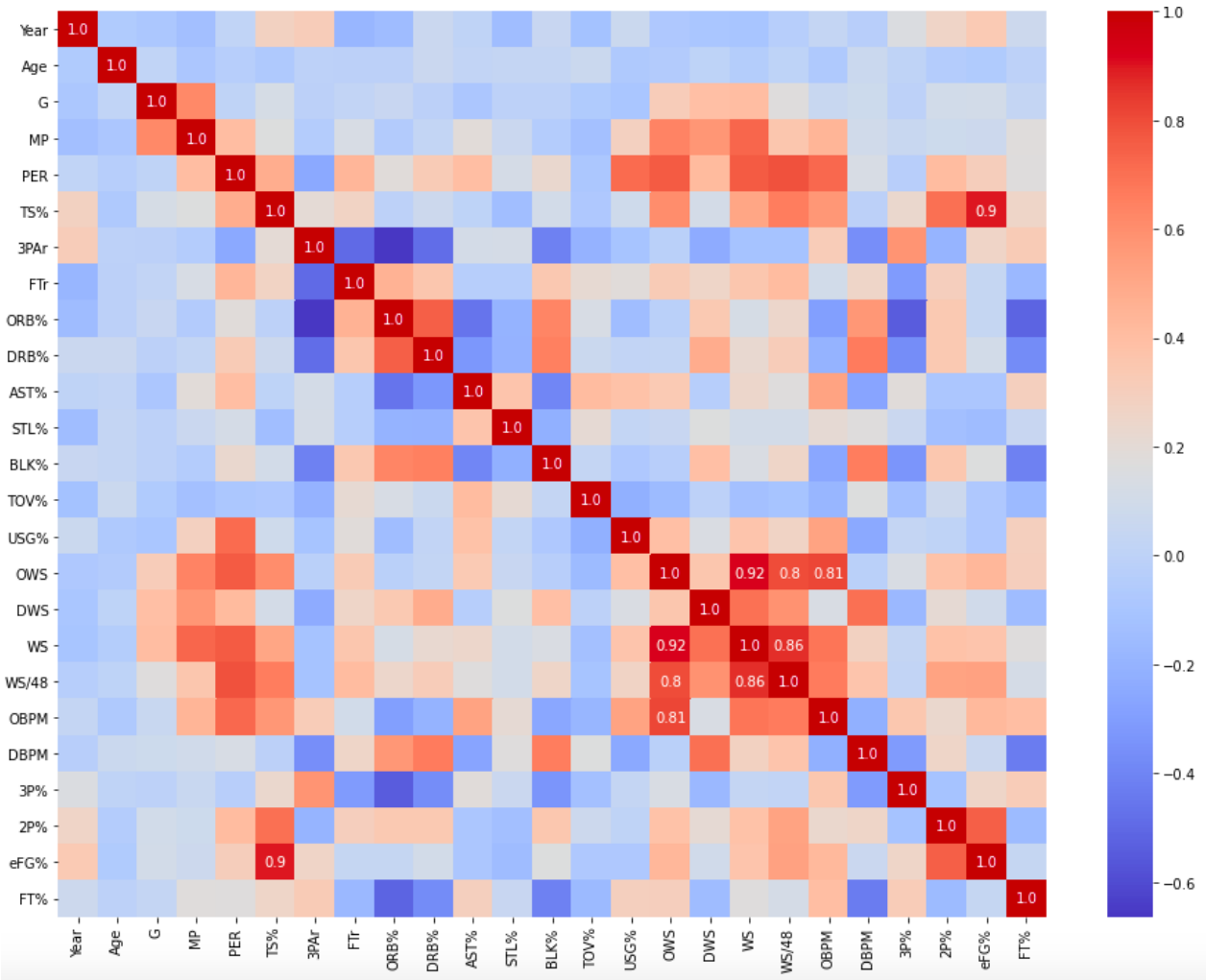
There was a lot of data cleaning involved. Since TmNetRtg data is only tracked from the 1996-1997 season onwards, I discarded the previous data before that season. I also had to apply constraints for injury riddled seasons, NBA lockout seasons, and obviously veteran players. I defined veteran players as players over the age of 30, with thresholds for minimum games and minutes played in a season. In order to match TmNetRtg with players I had to manipulate players traded in a certain season to not include the 'TOT' which adds the stats for the two teams a player played for in one season. Rather, I chose the team the player played the most games on in that season.

2.3 Individual Feature Selection

In the original dataset player portfolios encompassed many different counting stats including FT, FG%, AST, RBD, etc. The issue with counting stats is that they do not provide context to player performance. The best player on a below 0.500 team can put up crazy stats at low efficiencies which translates to less wins. For that reason, advanced stats are a better measurement of player impact as it looks at the rate of scoring, assisting, rebounding, rather than simply counting totals. After deciding the baseline features, I used a heatmap to evaluate correlation between the feature options. Highly correlated features can skew the performance of a model and thus we want a set of features that encompasses both offensive and defensive impact. Below is the original set of feature options before choices were made.



Highly correlated features are marked in red with values representing how correlated the features are. Features with a correlation above 0.85 are significant. DRB% (Defensive Rebound %) is highly correlated with TRB% so it makes more sense to include DRB% and ORB% separately and dismiss total stats as we want to evaluate offensive and defensive impact independently. Since we have OWS and DWS it doesn't make sense to include WS as that is just a net total of two other features, same goes for BPM. VORP is a highly offensive focused statistic on player creation and scoring per 100 possessions, which is why it is highly correlated with OWS. FG% is highly correlated with eFG% and since we have 2P% and 3P% we don't need FG%. After dropping these stats we are left with an updated heat map shown below.



The main concerns left are evaluating WS against OWS and WS/48. Win Shares represent how much a player impacts winning on a team based on a variety of individual stats as compared to team evaluation. While these features are highly correlated, Win Shares will be used in our veteran value metric and it is still important to have WS/48 and OWS as both will be factored into the model, so it doesn't make sense to drop any of these features. The final issue is evaluating TS% (True Shooting %) and eFG% (Effective Field Goal %).

True shooting factors in free throw attempts and makes, so it is a more reliable stat in determining efficiency as a scorer. If you are mixing in a lot of free throw attempts that will boost your overall TS%. eFG% is mostly about how much you shoot and it applies a weight on threes. If a player is a high volume shooter who makes a lot of threes as much as two pointers, his eFG% will be high. For the

purpose of evaluating veterans, high volume shooting isn't as much of a concern as efficient scorers, because veterans typically receive less shot attempts than they would in their "prime" years. Thus, eFG% is dropped from the feature choices.

2.4 Team Feature Selection

Basketball is a team sport so it is important to factor team performance in evaluating how much a player's effectiveness is. There are two main metrics that are prioritized in this veteran value model. The first is Team Net Rating. A team's net rating is based on the difference in a team's ability to score minus the team's ability to prevent the other team to score per 100 possessions. This metric is typically used to rank the most effective teams and there is a very high correlation with team net ratings and team standings. In addition, roster continuity is taken into account. Roster Continuity represents the percentage of the team that was on the team in the previous season. This is another important feature because a team that has low continuity typically struggles compared to teams that have built team chemistry over time. There are obvious outliers such as the 2010-2011 Miami Heat, but unless a team has two of the top 15 best players in the NBA then typically wins come at a higher difficulty.

3. Exploratory Data Analysis

3.1 Forming Veteran Value Metric

The purpose of the target veteran value metric is to evaluate how much a player will improve or decline from their previous season. Thus two different factors are involved in the veteran value. First is the change in a player's win shares from the current season and the next season. The next factor is a change in the team net rating from the current season and the next season. While win shares take into account a player's ability to impact winning, team net rating accounts for how good the team is in general. A piece-wise combination of these two metrics is used to add context and weigh improvement on good and bad teams respectively. The implementation of this metric is shown below.

```

z = zip(change_ws, change_rtg)
targets = []
target_class = []
class_var = []
#tgt represents decline
for t in z:
    d_ws = t[0]
    d_rtg = t[1]

    RTG_UP = d_rtg > 0
    RTG_DOWN = d_rtg < 0
    WS_UP = d_ws >= 0

    if RTG_UP:
        vv = d_rtg * d_ws
    else:
        if WS_UP:
            vv = -1*d_ws*d_rtg

        else:
            # vv = np.nan
            vv = d_rtg / d_ws

    targets.append(vv)
    target_class.append(0 if vv >= 0 else 1)

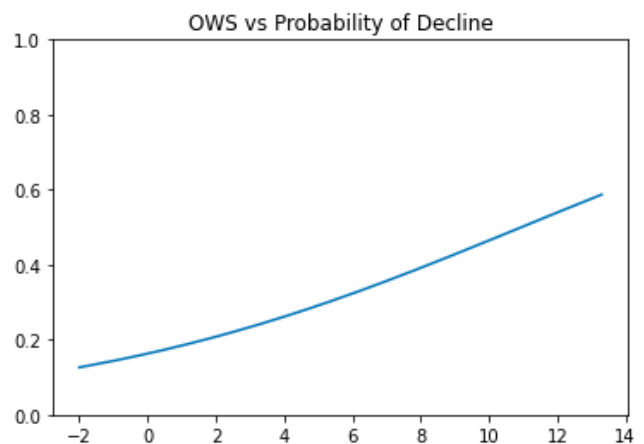
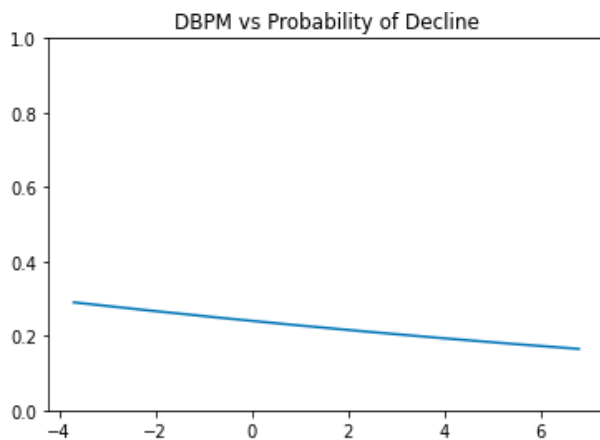
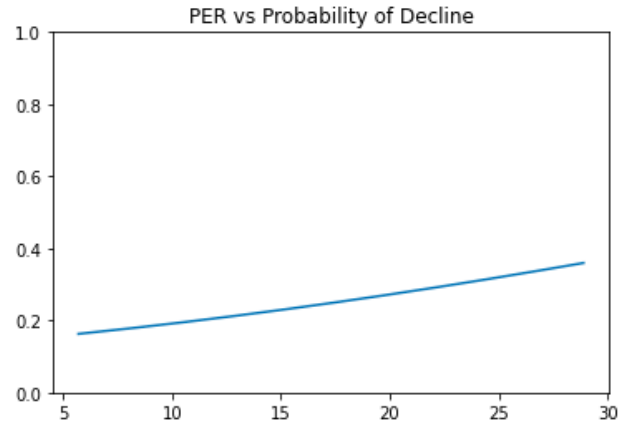
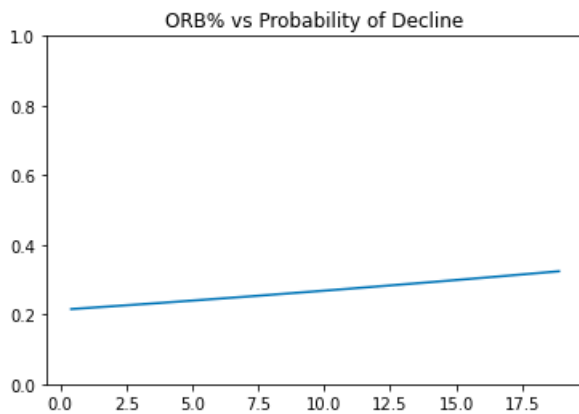
df['Veteran Value'] = targets
df['VV Class'] = target_class

```

The function first checks if there has been a positive change in team net rating, meaning that a team has improved in the next year. If that is the case the veteran value is simply the change in win shares multiplied by the change in rating. This can be a high positive or high negative value. The reason for this is if a player is improving his win shares on a good team he is impacting winning, but if his win shares dropped while his team got better that means the player is not actually hindering his team's ability to win. If the team net rating declines in the next season the function checks if a player's win shares has increased in the next year. If so, a weight of -1 is added to the same veteran value formula. This is to highlight that a player has been able to improve his win shares even though his team is worse than the prior year. Thus, it is important to ensure that a positive veteran value is applied to said player. Finally if a player's win shares dropped and his team got worse the veteran value is the change in team net rating divided by the change in win shares. This is quite typical to see in players, and thus we want the value to be a low positive value because it is expected for players to perform worse on teams that have gotten worse from the prior year.

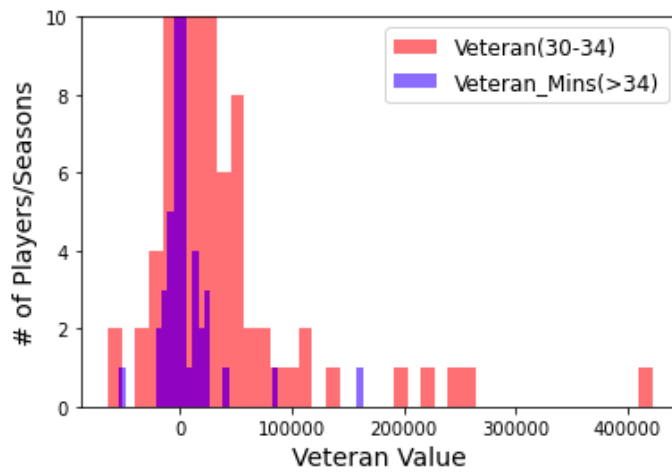
3.2 Feature Importance with Logistic Regression

A simple logistic regression model is performed on each of the features to see how much it impacts a player's chance of declining in the following season. A decline is simply viewed as a veteran value score of below 0. Some of the key results are shown below. Both Offensive Win Shares and PER have a significant impact in predicting a decline in a veteran. This makes sense as win shares is a major part of the veteran value metric and PER encapsulates a lot of basic offensive tracking stats of a player which is highlighted as separate features of this model. A positive defensive box plus-minus translates to a lower probability of decline in a player, which is interesting because higher offensive performance is more likely to result in decline compared to defensive stats.



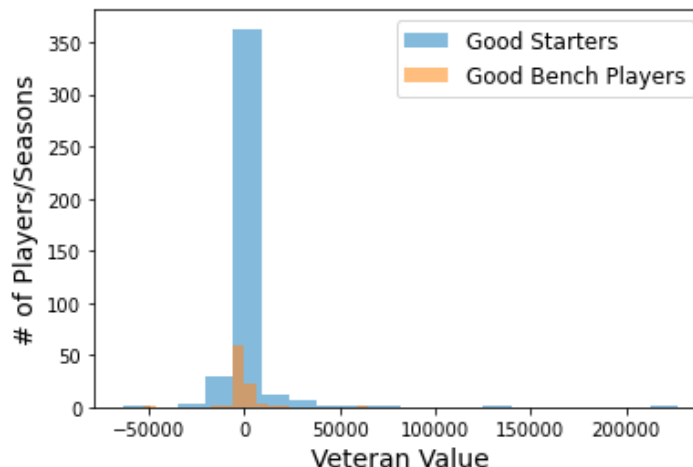
3.3 Veterans vs Old Veterans

There are a few hypotheses worth taking a look at. The first is the distribution of the veteran value amongst older veterans aged 35 and older. It is important to see the distribution of these veteran players based on a difference in age and in turn mileage on the body. The data shows that older veterans are less likely to have steep declines or improvements as they are typically well past their prime and their roles are much more defined and limited. Very few teams are asking a lot out of a 35+ year old, unless your name is LeBron James or Chris Paul.



3.4 Player Classification

Another important factor to consider is how much a player's role impacts their veteran value classification. A superstar is asked to do a lot more than a typical starter or bench player. Even a superstar player who is predicted to have a significant decline is miles better than a bench player expected to have a big improvement. Classifying players as such will help add context to different sets of players when it comes time to analyze the results of the model. The graph below shows that starters have a larger distribution of veteran values than bench players. Once again having a larger role as a starter creates larger discrepancies in performance between consecutive seasons.



Given the above results, there clearly is a need to classify players. A heuristic is applied to the players to classify them as a superstar (3), a star (2), a starter (1), and a bench player (0). The metrics utilized include Win Shares per 48 minutes, minutes played per game, and usage rate. Both superstars and stars should have a WS/48 of at least 0.15 and play at least 30 minute per game. These values were estimated based on historic player data that was measured and evaluated. The main difference between a superstar and a star is that the usage rate should be higher for a superstar compared to a star, but the output should be similar. A starter should have a lower amount of win shares while at least playing 25 minutes per game. The classification values were applied to each player and added as a feature called 'Player Level'.

```
temp = []
for index, row in df.iterrows():
    if row['WS/48'] >= 0.15 and row['MP'] / row['G'] > 30 and row['USG%'] > 30:
        temp.append(3)
    elif row['WS/48'] >= 0.15 and row['MP'] / row['G'] > 30 and row['USG%'] > 20:
        temp.append(2)
    elif row['WS/48'] >= 0.1 and row['MP'] / row['G'] > 25:
        temp.append(1)
    else:
        temp.append(0)
df['Player Level'] = temp
```

4. Model Choice and Tuning

4.1 Preprocessing

Before choosing a model it is important to apply some basic principles to improve model performance. Removing outliers is the first step to improving predictions. The lower and upper bound veteran value is set to (-30000,30000). About 44 data points were removed from the original total of 821 data points, resulting in a final set of 777 players to train the model on. Models typically perform better when classification models are used. Thus, the veteran value metric needs to be transformed into a different class to convert the regression to a classification problem. After testing different class sizes, I decided to use 5 classes split equally based on percentile thresholds. The 5 classifications range from values of [0,4], where 0 represents a significant drop off from the previous year, 1 is a smaller drop off, 2 is essentially the same level from previous years, 3 a slight improvement, and 4 is a significantly large improvement from last year.

4.2 Model Selection

Six models were tested to see which had the best performance. The models used are Logistic Regression Classifier, KNN Classifier, Random Forest Classifier, AdaBoost Classifier, Neural Network, and a Voting Classifier. Initially, cross-validation is used using 10 folds to see which model performs the best. The reason to apply a large number of folds on each model is to test if there is high variability in the performance and gather more metrics to evaluate the models better. Using 10 folds means that the data will be split into 10 parts and is tested 10 times with each part representing the test data set in each separate model. After performing cross validation on every model, the Random Forest Classifier performed the best. The models were then trained on the data set using a 90-10 split of training to validation. We found that this split gave the best performance in terms of area under the curve. The higher the AUC, the better the performance of the model is at distinguishing between positive and negative classes.

4.3 Model Performance

Model	Accuracy
Logistic Regression Classifier	0.64047
KNN Classifier	0.65872
Random Forest Classifier	0.66831
AdaBoost Classifier	0.66995
Neural Network	0.56319
Voting Classifier	0.67941

The voting classifier performed the best. The voting classifier trains on the other five models and predicts the veteran value class based on their highest probability of chosen class as the output. This model uses a soft voting which means the output class is the prediction based on the average of probability given to that class. This model is trained on the set of players ranging from the 1997 to 2020 NBA season and predicts the VV class for the 2021-2022 NBA veteran class.

Note: The model doesn't consider players who turn 30 during the 2021-2022 season.

5. Results

5.1 Superstars

Veteran Players Classified as Superstars: Damian Lillard, Kevin Durant, LeBron James, Stephen Curry

It is important to note that this model is mainly useful in evaluating role players who can be easily traded for during offseason or midseason trade periods. However, it can be interesting to see how star and superstar players will be projected to perform as compared to their last year output.

Score Meanings: 4 (Significant Improvement), 3 (Strong Improvement), 2 (Stays the Same), 1 (Slight Decline), 0 (Significant Decline)

Damian Lillard

Veteran Value Score: 0

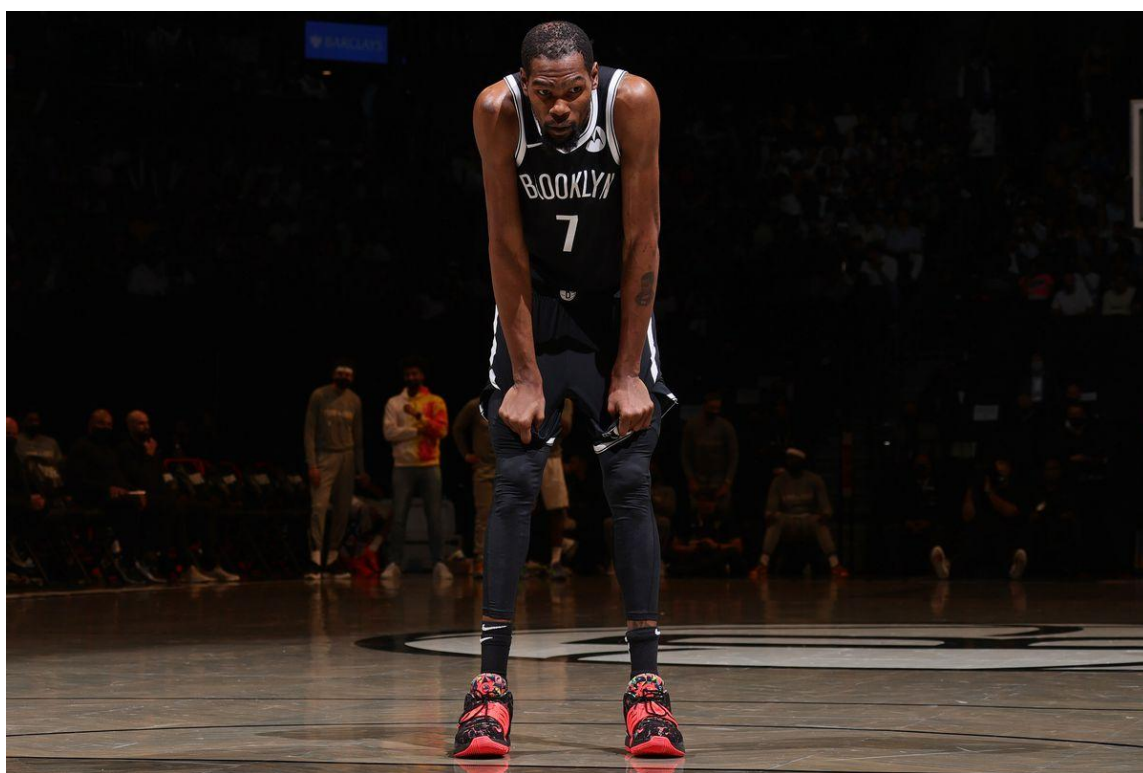


Damian Lillard is projected to have a significant drop off from his performance last season. Damian had a huge season last year averaging 28.8 PPG on 55.4 eFG% and adding 7.5 AST per game. Who can forget Lillard's carry job in Game

5 against the Nuggets. Lillard's projection may be due to a lack of star power around his team. In the first 10 games of the season, Lillard has been struggling shooting 24% from 3 and only averaging 18.5 PPG. So far the model is predicting Lillard's drop off correctly. With a new coach, a robust offensive scheme, and a lack of defensive firepower, Lillard has a tough task of carrying this same squad to higher heights. But as of right now, it isn't looking great for the Trailblazers.

Kevin Durant

Veteran Value Score: 4



Kevin Durant is projected to have a significant improvement from his performance last year. While KD arguably had the greatest comeback from a major achilles injury in NBA history, it is not hard to believe he can reach higher ceilings in his scoring and efficiency. One factor that might affect his projection is his lack of games played last year. He only played 35 games but still had strong averages of 26.9 PPG on 60.8 eFG%. 11 games into the 2021-2022 season, Kevin Durant is averaging 29.5 PPG on 61.5 eFG% and is the league leader in scoring right now. So far the projection is holding up, as a healthy James Harden is alleviating some of the workload from Kevin Durant and

allowing him to be the scoring machine he is without having to take on the offensive creation load. The model has not taken into account Kyrie Irving's absence from the team, but given the lack of game time all three players have seen at the same time, this shouldn't be a huge issue.

Lebron James

Veteran Value Score: 2



Any avid basketball fan can notice that Lebron hasn't been the same player in the past two years. His IQ is unmatched, his passing abilities are still stellar, and he can bully almost any player who is guarding him. Yet, his body has started to deteriorate and father time is unmatched. Lebron still put up high super efficient stats, but only played 45 games which ultimately caused the Lakers to fall in the first round. Lebron has picked up where he left off with early season averages of 25 PPG, 7 AST, 5.5 RBD, on 53.7 eFG%. This is quite similar to his stats last year, but once again Lebron has been sitting out with a core injury he sustained in the past two years. A veteran value class of 2, means that Lebron will essentially stay at the same level as last year. I think this is a fair estimate of

Lebron, until the playoff comes around and maybe he will take it up a notch like he usually does.

Stephen Curry

Veteran Value Score: 1



The baby faced assassin had a historic season last year putting up a career high 32 PPG on 60.5 eFG%. His MVP-Caliber season helped him finish 2nd in the race as the GSW finished just outside the playoff bracket. Steph Curry was putting up unimaginable numbers in the months of April and May, while getting double and triple teamed at times. Curry is predicted to have a slight dropoff in terms of his output. Statistically, Curry had a top 15 season of all time last year, so it makes sense that he is predicted to have a small drop off. For superstar players these predictions need context to put in perspective what a slight dropoff for a player of Steph's caliber really means. Currently he is putting up 27 PPG on 56 eFG% while picking up a career high 6.6 RBD and 6.6 AST per game as well. These numbers also follow a slight dropoff from his season last year. Look for Stephen to continue to put up these gaudy statistics while leading the Warriors to a high seed in the Western Conference.

5.2 All Stars

Veteran Players Classified as All-Stars: Jimmy Butler, DeMar DeRozan, James Harden, Jrue Holiday

Jimmy Butler

Veteran Value Score: 3



Jimmy Butler has always been an underdog in his eyes. As a low round pick back in 2011, Butler has worked hard to become a star and his in your face attitude has been the key to his success and building the culture around Miami. The Heat struggled with injuries last year losing in the first round to the Milwaukee Bucks. This year, the Heat added Kyle Lowry and have a healthy Bam, Herro, and Robinson to go along with their star leader, Butler. Butler is predicted to have an improved season compared to last year. He is currently putting up career highs in points at 25.3 PPG on 54.6 eFG%. He is grabbing 6 RBD and dishing out 5.5 AST as well. Look for Butler to keep this pace as the season continues, which will keep him on track for a bounce back year.

Demar Derozan

Veteran Value Score: 3



It is quite obvious that Demar is enjoying his new Bulls team, as they are sitting 2nd in the eastern conference. The past couple seasons have been tough for Derozan as he has struggled to put up all-star numbers on a struggling Spurs franchise looking for an identity post Kawhi Leonard. Demar has gone back to putting up all-star caliber numbers, averaging 26.9 PPG to go along with 6 RBD per game. While Demar had to carry the offensive creation on the Spurs, he can focus on scoring while on the Bulls and allow Lonzo to run the offensive schemes. Look for Derozan to keep his scoring at a high and continue to be the Bulls go-to scorer in the clutch along with Lavine. The model projects Demar to have a strong improvement this season and in terms of offensive output Demar is proving why he is still a star in this league.

James Harden

Veteran Value Score: 4



It might come as a surprise that James Harden isn't in the list of superstars. However, Harden's injuries and lack of consistency with his Nets teammates hindered his output on the court. His WS/48 did not meet the superstar threshold along with his usage rate. Most casual fans and analysts alike can agree that Harden at his best is clearly a superstar player in this league. The model projects Harden to have a significantly better season this year. When Harden got into the groove of the Nets offense he was single-handedly carrying his team to wins, with KD and Kyrie out. Look for Harden to continue this in the 2021-2022 season. As of right now though, Harden is struggling to improve as the new rules that allow more defensive contact has limited his free throw rate. In addition, the switch to the Wilson ball is affecting his accuracy on his shots. These are two factors that the model doesn't take into consideration, which may affect Harden's Veteran Value score.

Jrue Holiday

Veteran Value Score: 2



Jrue Holiday is one of the most underrated two way players in the league today. In many casual fans' eyes, Jrue is not a star. However, the player classification heuristic views Holiday as a star player and I have no reason to disagree. Jrue finally got his chance to shine under the bright lights as he helped lead the Bucks to the championship while playing some incremental on ball defense on Booker and Paul. The model projects Jrue to essentially play at the same level this upcoming season. So far Holiday has not been playing up to his abilities. With scoring lows of 12 PPG and 0.8 STL per game, look for Holiday to pick it up as he gets back into basketball shape and can stay consistently healthy for the next set of games.

5.3 Starters

High level Veteran starting-caliber players are incredibly important assets to look at as a franchise. These set of players along with the bench-classified veterans are the most useful trade pieces to bolster a teams roster. While the model doesn't take salaries into account, teams should look to grab players projected as a 4 or 3 while being undervalued in their contracts. I will highlight only a few key players in the projections and provide current salaries for all the players.

Veteran Value Score: 4

Kyle Lowry

Contract: 3 years, 90 Million

Kyle Lowry has found a new home with the Miami Heat. His presence has already made a difference as the Heat are currently sitting 2nd in the Eastern Conference. Lowry has filled the Heat's void as the natural playmaker and offensive creator for the team. His spacing at the 1 spot is going to be an important factor come playoff time. While Lowry's counting stats might drop this year due to Heat's strong depth, his impact on team winning will definitely improve which is why the model projects Lowry to have a strong improvement this season.

Nikola Vucevic

Contract: 4 years, 100 Million

Kemba Walker

Contract: 2 years, 17.9 Million

Kemba Walker has done a great job so far this season, taking over the starting point guard role for the New York Knicks. While Kemba's stats have fallen, he is filling the void as a spacer and shot creator that the Knicks needed deeply in the playoffs last year. Kemba will be splitting time with Derrick Rose so while his stats may drop this season, his skill set will mesh well with the Knicks and allow them to win more games this season. Let's see how this projection holds up, as health has been a big issue with Kemba the past few years.

Veteran Value Score: 3

Mike Conley

Contract: 3 years, 72.5 Million

Veteran Value Score: 2

Nicolas Batum

Contract: 2 Years, 6.5 Million

Paul George**Contract: 4 years, 190 Million**

Paul George is another surprise in terms of being classified as a starter rather than a star. George got a lot of flack for his struggles in the playoffs. However, George ended the year strong as he helped lead the Clippers to beat the Jazz with an injured Kawhi Leonard, and had a strong showing against the Suns. George is putting up all star numbers this year winning Western Conference Player of the Week in the first week of November. The question still remains can George consistently put up the same numbers in the playoffs. As of right now, George is considered a high level starter, but in my opinion this projection seems a bit off. Let's see if George can continue to lead his team to the playoffs and get another all-star or all-nba selection for the 2021-2022 season.

Draymond Green**Contract: 4 years, 99.67 Million****Danny Green****Contract: 2 years, 20 Million**

Veteran Value Score: 1

Joe Ingles**Contract: 1 years, 14 Million****Marcus Morris****Contract: 4 years, 64 Million****Brook Lopez****Contract: 4 years, 52 Million****Bojan Bogdanovic****Contract: 4 years, 73 Million****Seth Curry****Contract: 4 years, 32 Million**

Veteran Value Score: 0

Jeff Green

Contract: 2 years, 10 Million

Mason Plumlee

Contract: 3 years, 24.6 Million

5.4 Bench Players

High level bench players are great assets to pick up during mid season trades. Teams can look for older veterans who can add playoff pedigree or another 3 and D threat to help bolster a roster. Some of these bench players may come as a surprise, but once again a players actual role and what the statistics show as an impact of that role may differ at times. Here are the classified bench players and their respective Veteran Value scores along with contracts. Players who are missing did not play enough games for the model to accurately predict their projections for the 2021-2022 season.

Veteran Value Score: 4

Will Barton

Contract: 2 years, 30 Million

JaMychal Green

Contract: 2 years, 17 Million

Paul Milsap

Contract: 1 year, 2.6 Million

Andre Iguodala

Contract: 1 year, 2.6 Million

Wayne Ellington

Contract: 1 year, 2.6 Million

Goran Dragic**Contract: 1 year, 19.4 Million****Danilo Gallinari****Contract: 3 years, 61.4 Million****Wesley Matthews****Contract: 1 year, 3.6 Million****Garrett Temple****Contract: 3 years, 15.5 Million****Rudy Gay****Contract: 2 years, 12.1 Million****Ricky Rubio****Contract: 3 years, 51 Million**

It is very possible that Ricky Rubio has his best season in his 11th year as an NBA player. He is averaging a career high 13.7 PPG while dishing out 6.8 AST and shooting a career high 42.9% from 3. His growth as a shooter can be tied to his performance in the olympics this past summer as he had a strong showing against the US national team dropping 38 points in a loss. Look for Rubio to lead this young Cavaliers team and possibly take the starting role from Sexton.

John Wall**Contract: 4 years, 171 Million****Kent Bazemore****Contract: 1 year, 2.4 Million****Markieff Morris****Contract: 1 year, 2.6 Million**

Veteran Value Score: 3

Eric Bledsoe

Contract: 4 years, 70 Million

Russell Westbrook

Contract: 4 years, 206.8 Million

It's hard to believe that a player classified as a bench player can make over 200 million dollars. Yet, Russell Westbrook has defied the odds and received a max contract. It may come as a surprise to see Westbrook as a bench player but even though he averaged a triple double last year, his ability to impact wins given his usage percentage did not meet the standards. Many will argue that Westbrook has the worst contract in the NBA along with John Wall. Their classifications speak for themselves. As of right now, Westbrook is struggling a lot with the Lakers. Look for Westbrook to improve his output later on in the season as he figures out the best way to help his team win. The best way may be for him to come off the bench, where he can truly lead the second unit and let LeBron play with another floor spacer. Only time will tell what the Lakers and Westbrook decide to do.

Veteran Value Score: 2

Robert Covington

Contract: 4 years, 46.8 Million

Thaddeus Young

Contract: 3 years, 43.6 Million

Veteran Value Score: 1

Carmelo Anthony

Contract: 1 year, 2.6 Million

Carmelo Anthony is not so silently having a great season so far in 2021. He is arguably one of the main reasons the Lakers have been able to win games as of late without the service of LeBron James and ailing Anthony Davis. It is hard to see Carmelo keep this hot streak going, but once again only time will tell. The model does project Carmelo to have a small decline in impact from his last year

in Portland, but it is entirely possible for Carmelo to defy any of these expectations and return to the top 10 scorer of all time that he is. One thing can be said for certain: Carmelo is outplaying his contract.

Reggie Jackson

Contract: 2 years, 22 Million

Reggie Jackson was once considered an overpaid borderline starter on the Detroit Pistons. As of right now, it can easily be said that Reggie Jackson is an established starting-caliber player in this league. He has revamped his career as a Clipper and picked up where he left off in the playoffs last year with averages of 17.6 PPG and 4.5 AST. Reggie's lack of efficiency holds him back and his score first mindset may hurt the Clippers who need a pace controller. Let's see if this model projection holds up.

Justin Holiday

Contract: 3 years, 18 Million

Patty Mills

Contract: 2 years, 16 Million

Veteran Value Score: 0

Dwight Howard

Contract: 1 year, 2.6 Million

DeAndre Jordan

Contract: 1 year, 2.6 Million

Robin Lopez

Contract: 1 year, 5 Million

6. Conclusion

6.1 Final Thoughts

I found this research incredibly interesting as I truly had to dive deep into the variety of metrics used to analyze players and teams alike. Developing the veteran value metric took time as there really isn't any similar metric or research done to evaluate a players performance on a holistic level. There is a lot of potential in sports analytics and how it can intersect the strategic decision making in the front office. General Managers such as Daryl Morey value statistical analysis to judge the efficiencies of a full team and what their output potential can be. While that is incredibly useful, I do think that a veteran projection can be used to grab low-cost players who are predicted to have improved seasons. There is a trend that I have noticed amongst teams, in that front offices rely on ex-all star and all-nba players in hopes that they have something left in the tank. There are some cases when this is true, but many times using name brand isn't an effective way to evaluate veteran assets in the NBA. Hopefully, models such as this one can continue to be used to support front office decision making.

6.1 Next Steps

There are plenty of ways that this project can be improved upon if given more data and qualitative factors are taken into consideration. There are a few factors that this model fails to capture. One is the rule changes and how that may affect the output of players. It is hard to project data on these rule changes, unless you estimate the change in free throw rate or defensive impact that will occur due to the leniency of contact from the rules. In addition, it might be valuable to look at value per dollar. It may be easy to simply divide the veteran value raw score by the single year contract value in 2021, but the veteran value score isn't perfect. The ability to stay healthy is only used as a constraint rather than a feature. It may be helpful to add an additional weight for injury prone players to their veteran value to control for availability.