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## Does height affect the performance in specific positions in Basketball

### Introduction:

As the title states, we have focused on shedding light whether height affects the performance of Basketball players in specific positions.

We have focused on 5 positions, and the **assumptions** around their height requirements (which we want to verify):

**\*\* Shooting Guard:** A player in that position would specialize in shooting. Usually players in this position are 'short' (the average height is 198.7, therefore we define 'short' as a height below 198.7).

**\*\* Power Forward:** Is usually found next to the basket, and shoots from underneath it. A player in that position would specialize in taking rebounds and shooting from underneath the basket. Usually players in this position are considered tall.

**\*\* Small Forward:** The most diverse role. A player in this position usually needs to be good in shooting from long and short distances.

**\*\* Center:** Located within 'colored zone' of the field, which is the area of the penalty line. On defense, should specialize in blocking (protecting the ring), on attack should specialize in shooting from underneath the ring. In both cases (attack/defense) he should specialize as well in rebounds. Is usually found as the tallest player in the field.

**\*\* Point Guard:** Usually specializes in shooting and assists.

### General description of our steps:

We have cleaned rows containing no information regarding height, and erased columns containing no information to minimize our data, and more subtle arrangements of the data.

As we are interested in 5 specific Positions, we've created for each position a Dataframe of all the players in that position, on which we were experimenting.

We continued by analyzing each table separately. We've calculated the correlation between each feature versus the height of the player.

We chose the 12 highest correlated features of a player with height, and made a graph showing the sorted list of features and their correlation with the height.

We then drew a regression lines of every chosen feature vs height, which we can learn from the regressions line slope about the height impact on the various features regarding the player's efficiency.

Further more we made a multi-regression model to examine again which features from the chosen 12 features of each role, are most influenced by the player's height.

### **Our findings (per position):**

#### Shooting Guard:

We can see in our plot (File name: SG1.png) that the #1 the most correlated feature is the Free Throw rate. We can see in the plot within SG2.png that the linear regression is revealing a negative influence of height over Free Throw rate.

On the other hand, we can see a 'minor' positive influence on the TRB% feature (Total Rebounds).

#### Power Forward:

We can see that the highest correlation is reflected in the assists%, eFG (effective field goals), 2P% (two points precentage) and Free Goals precentage. We can see a very high correlation of the Assists feature.

We can notice in the plot PF2.jpg that the AST% correlation is positive, meaning the higher you get the more likely you are to make assists. Same goes for effective free goals, 2Points (goals), and also the total rebounds is positively affected by the height of the player.

#### Small Forward:

We can see in our plot (File name: SF1.png) that the highest correlation is between height and Assist%, eFG%(effective field goal precentage), 2P% (2 points field goals precentage ) and FG%(Field goals, not including penalties).

In SF2.JPG that the assists are influenced positively by the height – the taller you are, the more likely toy are to have assists. We could as well notice that there's no negative influence of height on any of the top 12 features which are shown in our plot.

#### Center:

The plot (File name: C1.png) reveals that the top 5 highest correlations are PER (Player effeciency rating), eFG% (effective free goal precentage), 2P% (2 points precentage), FG% (free goal precentage) and AST% (assists precentage).

We can notice that the only **negative** correlation is with FT%, that means the higher you get, the less likely you are to be performing free throws. We can see on all of the other top features that the impact is a positive one.

#### Point Guard:

Top 5 correlations are AST%, eFG%, 2P%, FG%, and STL%.

We can notice for the first time that ball STEAL is within the top correlation.

We can see that height has a (minor) negative influence on the ability to steal balls, meaning that the shorter you get the more likely you are to be able to successfully steal the ball.

## **Conclusions:**

### **Achilles heels – ideas for improvements:**

1. We didn't have information in the MP (minutes played) column. Therefore, we couldn't normalize our information for in order to be exact