

# Capstone Project 1: NBA\_Salary\_Prediction

## Statistical Data Analysis Report

To analyze my variables, I, first, looked at the scatter plot shown below, to see if positions of players affect their points, salary and minutes they play. I mainly focused on two main positions.

I found these results:

1- There is a statistically significant difference between minutes of PG and C players.

2- There is a statistically significant difference between points of PG and C players.

3- Salaries of center players ARE NOT significantly different than point guard players.

4- Correlations:

'Point' :0.61, 'Asist':0.52, 'Rebound': 0.48, 'Defensive Rebound' : 0.52, 'Free Throw': 0.58, 'FG'(Field Goal Made): 0.59, 'Minutes':0.58, and 'Game Started': 0.53, 'Steal': 0.51, 'Turnover': 0.57

- **C = Centers** who are usually the tallest players in the team and defending rim from short range shots and collecting the rebounds.
- **PG = Point-guard** who are the brains of the team sets the game, holds the ball mostly and directs other players.

Some information about plots that will be shown below:

	salary	Point	Assist	Rebound
Position				
C	8.284385e+06	9.374648	1.446479	6.319718
PF	7.762332e+06	8.860870	1.476812	4.586957
PG	8.833254e+06	11.453030	4.328788	3.157576
SF	9.108709e+06	10.518367	2.040816	3.942857
SG	6.543541e+06	10.253659	2.085366	2.770732

### Summary statistics for positions

If you look at the statistics, we can easily see the difference in Assists, which shows that PG players are able to assist more (directing the game as said before) and stay in the game longer than center players.

And also, they are earning slightly more than Center players. PG players are also scoring leaders as seen in the table.

T-tests were performed to prove these observations.

**H0 = Null Hypothesis => Center players are staying in the game as long as point guard players.**

**H01 = Null Hypothesis => Center players are scoring per game as much as point guard players.**

**HA = Alternative Hypothesis => There is significant difference between minutes of Center players and minutes of PG players.**

**HA1 = Alternative Hypothesis => There is significant difference between points of Center players and points of PG players.**

**p-value is 0.002 and t-value is 3.2143507802050766 for minutes**

Since p-value is 0.002 less than 0.05 for minutes, we reject the null hypothesis, and there is a statistically significant difference between minutes of PG and C players.

**p-value is 0.038 and t-value is 2.102429387246607 for point**

Since p-value is 0.038 less than 0.05, we reject the null hypothesis, and there is a statistically significant difference between points of PG and C players.

Another T-test was performed to see if they are actually earning different amounts;

**H0 = Null Hypothesis => Salaries of center players are not significantly different than salaries of point guard players.**

**HA = Alternative Hypothesis => There is significant difference between salaries of different positions.**

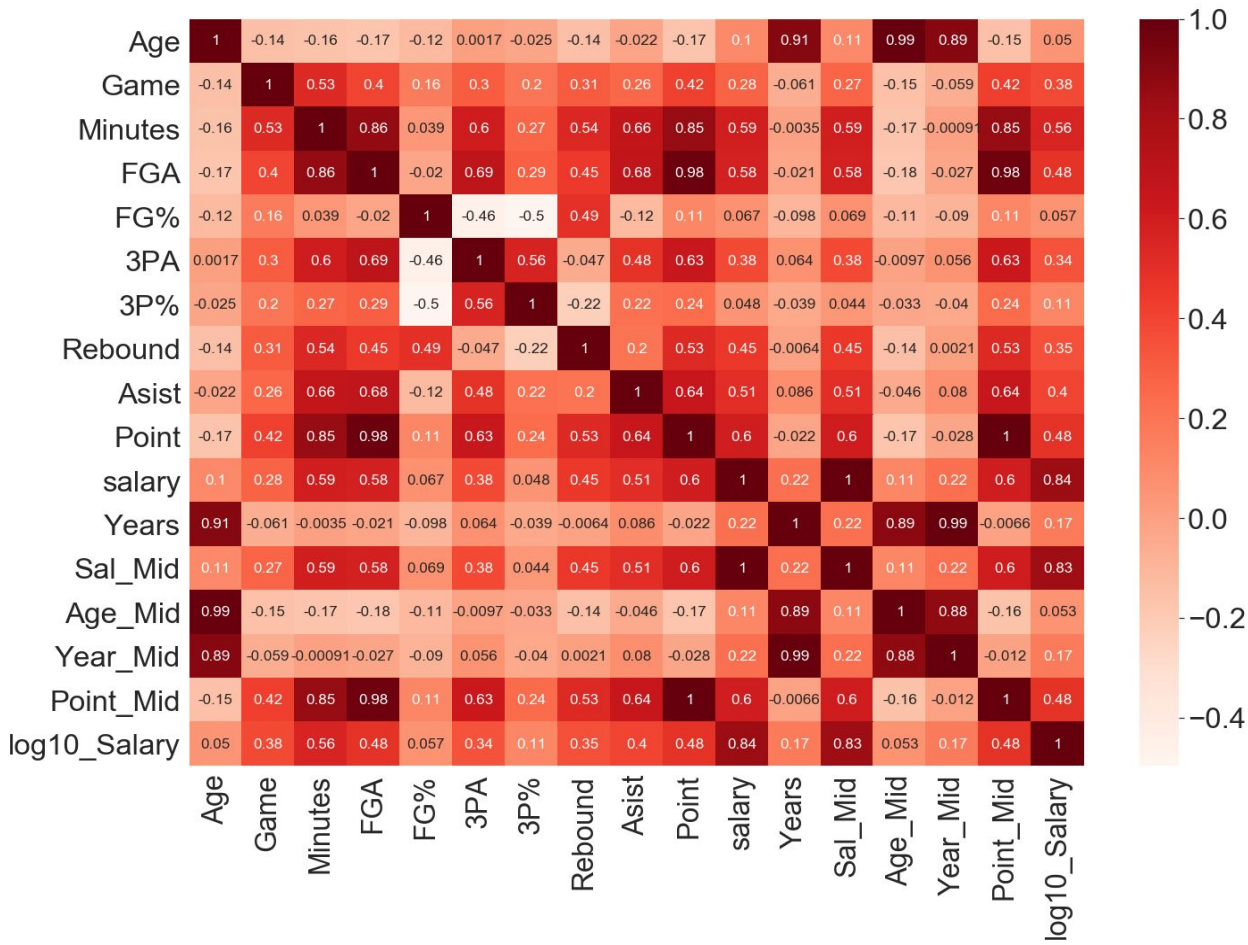
**p-value is 0.344 and t-value is 0.9515878705510601**

Since p-value is 0.344 more than 0.05, we failed to reject the null hypothesis, and salaries of center players ARE NOT significantly different than point guard players.

Seaborn heatmap is produced to see the correlations between dependent and independent variables.

**Dependent variable = salary**

**Independent variables = all other stats**



When we just take a look at the heat map and the correlations between salary(dependent variable) and other stats(independent variables), These independent variable are highly correlated with our dependent variable salary ->

'Point' :0.61, 'Asist':0.52, 'Rebound': 0.48, 'Defensive Rebound' : 0.52, 'Free Throw': 0.58, 'FG'(Field Goal Made): 0.59, 'Minutes':0.58, and 'Game Started': 0.53, 'Steal': 0.51, 'Turnover': 0.57

Pearson correlation coefficient between point and between salary is **0.599**

Pearson correlation coefficient between minutes and between salary is **0.595**

Pearson correlation coefficient between assist and between salary is **0.508**

Pearson correlation coefficient between field-goal and between salary is **0.581**

Pearson correlation coefficient between rebound and between salary is **0.450**

Pearson correlation coefficient between three-points and between salary is **0.378**

By looking at the heatmap we were able to see some correlations between independent variables;

When we just take a deeper look at the heat map and the correlations between independent variables, These independent variables are highly correlated with each other ->

'Point' : 'FGA' = **0.98**, The more shoot trials the more points.

'Point' : 'Asist' = **0.64**, The more assists to teammates the more shooting trials.

'Point' : 'Minutes' = **0.85**, The longer staying in the game the more chance to score.

There is also negative correlation between rebound and 3P%, we can easily say that Center players are not good at shooting 3 points.

'Rebound' : '3P%'(3 point percentage) = **-0.22**.