

# Group S Final Report

Sarah Fatihi, Sophie Diop, James Street

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## Abstract

We want to study International Federation of Association Football (FIFA) Stats in comparison to their in game valuation. Our goal is to predict in game market value from the FIFA video game stats. We looked at correlations between FIFA video game predictors including pace, shooting, passing, dribbling, defense, and physicality and in-game transfer market value. We found that pace, shooting, passing, and physicality were significant quantitative predictors of transfer market value. The models accounted for a lot of the variability in transfer market value, although log transformations were used to make the data more linear.

## Background and Meaning

Originally, we attempted to try and analyse in-game statistics in relation to real world transfer prices, but found that due to the complexity of the transfer market (cyclical economics, club relationships, regulations) the in-game variables held very little significance. In the FIFA game however, a player's transfer market value holds immense significance for the gamer, reflecting their monetary worth in the in-game transfer market. This value is determined by the developers of the game, and are meant to reflect a players worth based on their skill level and statistics. Our project seeks to explore the relationship between FIFA video game stats and in-game transfer market value. Specifically, we aim to assess the accuracy of FIFA game stats in predicting in-game transfer market value and identify the best and worst predictors of a player's market worth. FIFA game stats, which use attributes such as pace, shooting, passing, dribbling, defense, and physicality, serve as key indicators of a player's ability and performance in the virtual realm of FIFA video games. However, how far these statistics influence their in-game value set by developers is unclear. To achieve our objective, we employed a multiple linear regression model to test the null hypothesis that there is no correlation between FIFA video game stats and transfer market value. By analyzing the relationship between these variables, we sought to determine the extent to which FIFA video game stats accurately predict a player's in-game market worth. This approach allowed us to assess how accurate FIFA video game stats are on predicting transfer market value and identify any significant predictors.

## Methods

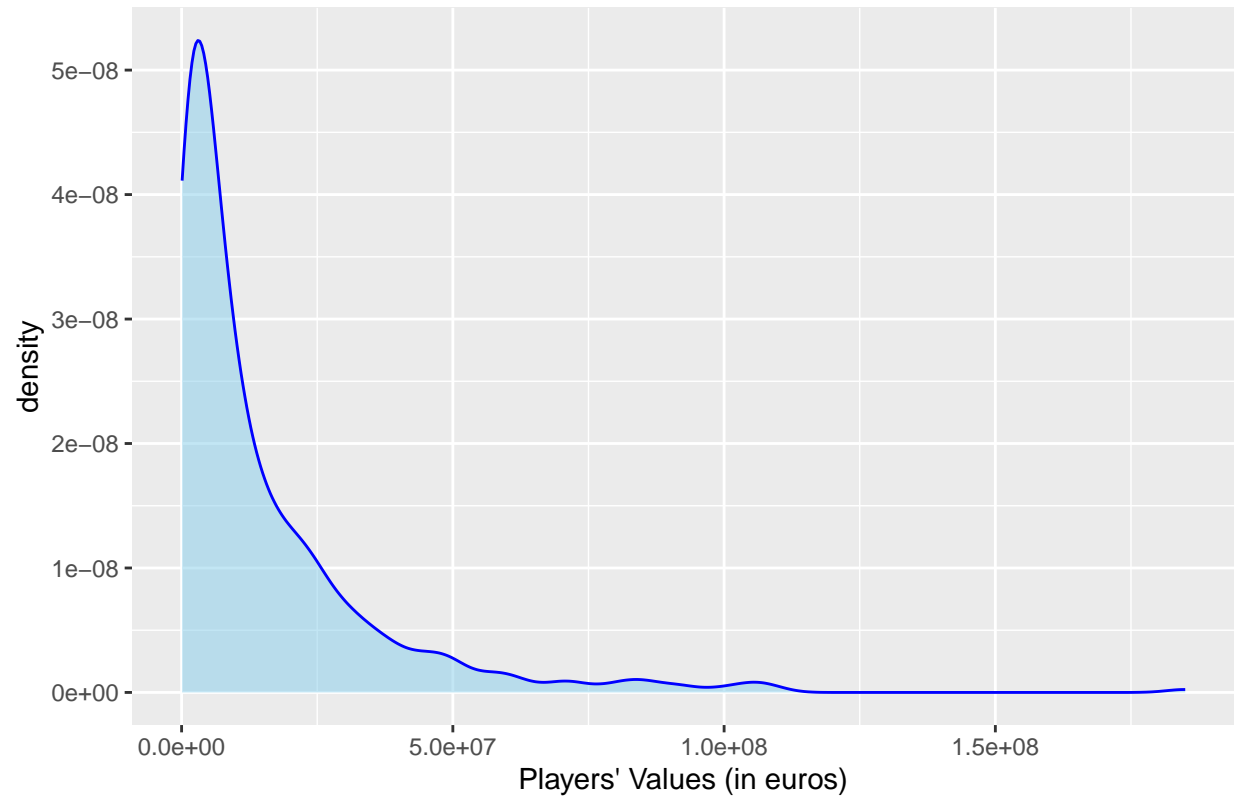
Data The FIFA Football Players dataset, <https://www.kaggle.com/datasets/rehandl23/fifa-24-player-stats-dataset>, is a comprehensive collection of information about football (soccer) players from around the world. This dataset offers a wealth of attributes related to each player, making it a valuable resource for various analyses and insights into the realm of football, both for gaming enthusiasts and real-world sports enthusiasts. The data is based on the game FIFA 24 which contains information on soccer players from over 19,000 fully licensed players, 700 teams, and 30 leagues in the year 2023-2024. We are planning on slimming down this data to only include players in the premier league. The Premier League is the top professional football (soccer) league in England. It consists of 20 teams, and it's widely regarded as one of the most competitive and popular football leagues in the world.

Variables: We have both categorical and quantitative variables as our explanatory variables. These are purchasing club (categorical), in-game Passing (quantitative), in-game Shooting (quantitative), in-game Dribbling (quantitative), in-game Defending (quantitative), in-game Physicality (quantitative), in-game Pace (quantitative). All of our quantitative in-game stats are on a scale of 0-100 determined by the people working at FIFA. Below is a list of the explanatory variables we intend on using: Club - This predictor is the club that the soccer player plays on. The premiere league contains 20 different clubs. These include, Aresenal, Aston Villa, Bournemouth, Brentford, Brighton, Burnley, Chelsea, Crystal Palace, Everton, Fulham, Liverpool, Luton Town, Man. City, Manchester Utd, Newcastle, Nottingham, Sheffield Utd, Tottenham, West Ham, and Wolves. Short Passing - This is a measure at how good the soccer player is at passing in real time performance on a scale of 0-100 determined by the people working at FIFA. Shooting - This is a measure at how good the soccer player's shot is in real time performance on a scale of 0-100 determined by the people working at FIFA. Dribbling - This is a measure at how good the soccer player is at dribbling in real time performance on a scale of 0-100 determined by the people working at FIFA. Defending - This is a measure at how good the soccer player is at Defending in real time performance on a scale of 0-100 determined by the people working at FIFA. Physicality - This is a measure at how physical the soccer player is in real time performance on a scale of 0-100 determined by the people working at FIFA. Pace - This is a measure at how fast the soccer player is in real time performance on a scale of 0-100 determined by the people working at FIFA.

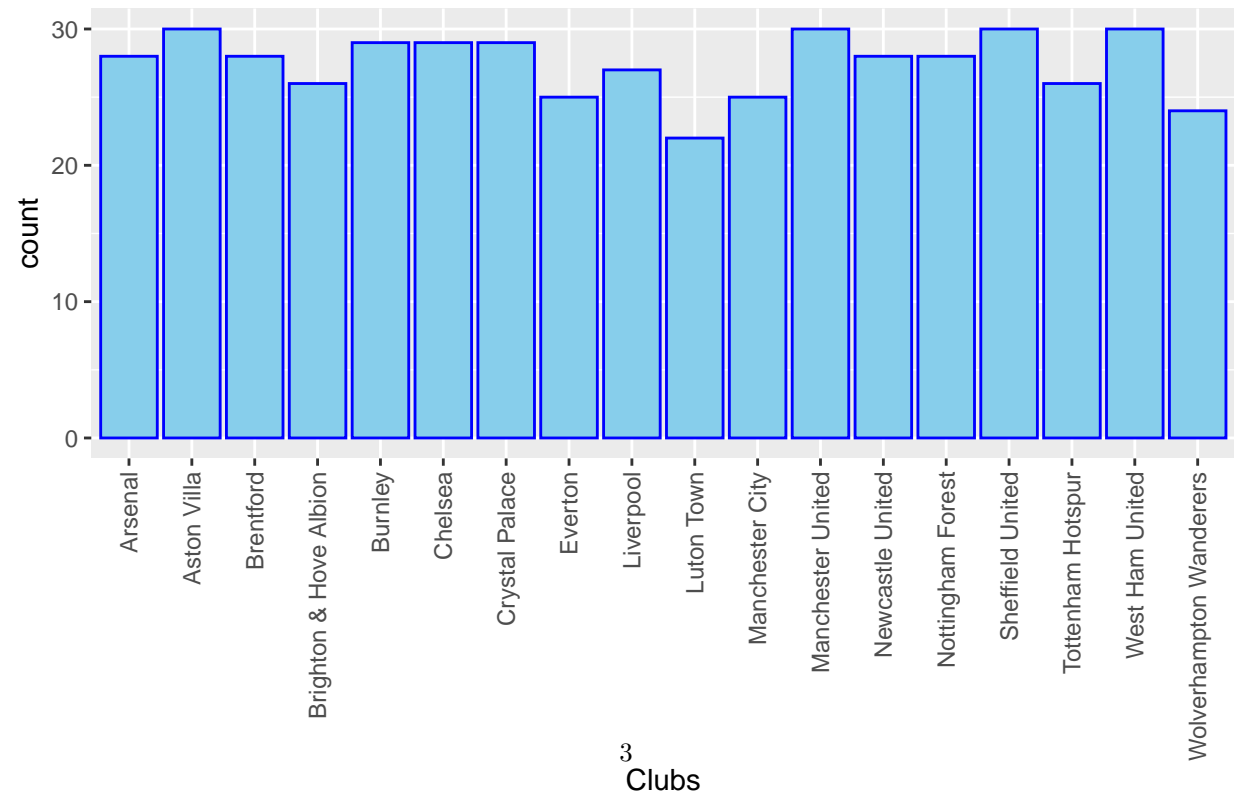
Results

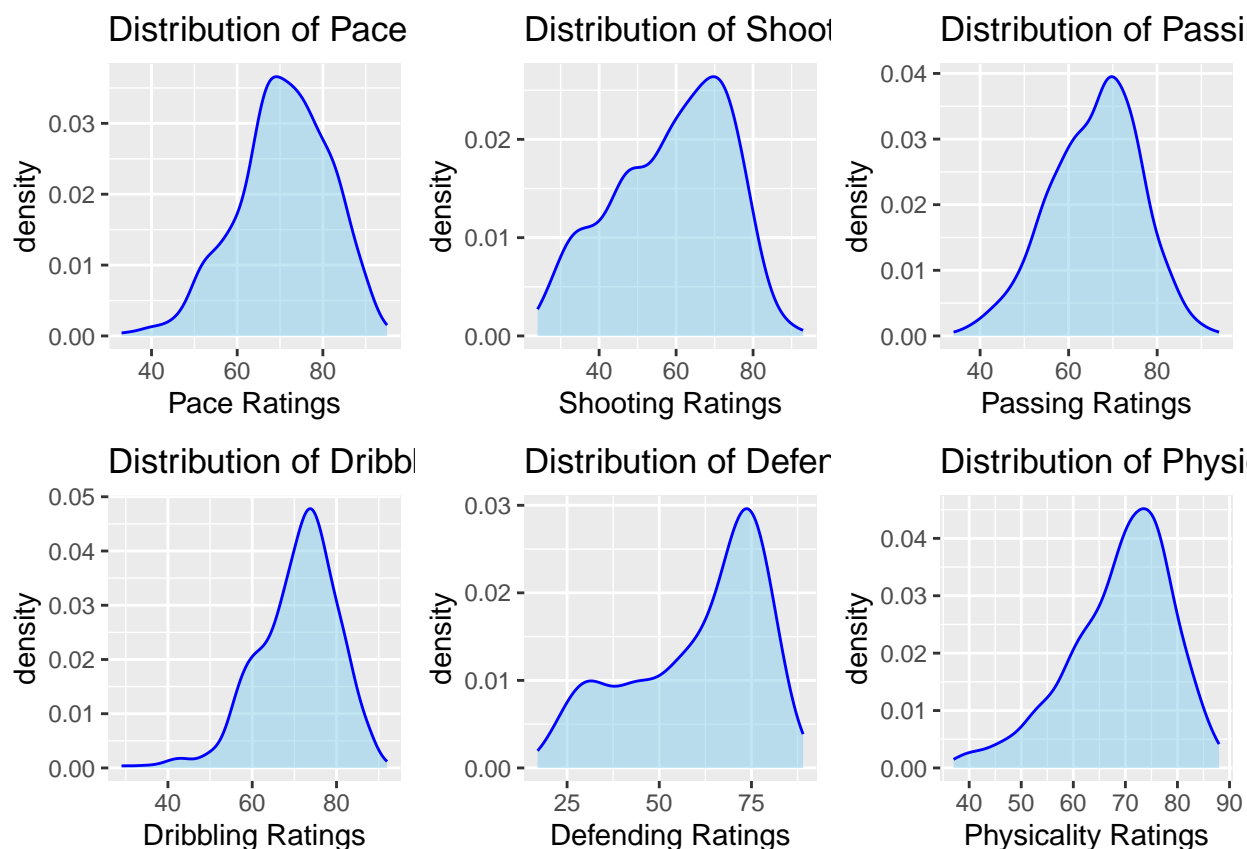
Univariate Descriptive Stats and Figures

Distribution of Value (in Euros)



Distribution of Clubs





For our univariate analysis we ran histograms to see the distribution of each non-continuous quantitative predictor variable

**Pace:** The ratings of players' pace is normalally distributed, so we use the mean of 70.75 as a measure of center, and the standard deviation of 10.73 as a measure of spread.

**Shooting:** The ratings of players' shooting is normalally distributed, so we use the mean of 58.7206 as a measure of center, and the standard deviation of 14.87 as a measure of spread.

**Passing:** The ratings of players' passing is normalally distributed, so we use the mean of 65.92 as a measure of center, and the standard deviation of 10.16 as a measure of spread.

**Dribbling:** The ratings of players' dribbling is normalally distributed, so we use the mean of 70.77 as a measure of center, and the standard deviation of 9.42 as a measure of spread.

**Defending:** The ratings of players' defending is left-skewed with a potential second peak, so we use the median of 66 as a measure of center, and the IQR of 29 (first quartile = 46, third quartile = 75) as a measure of spread.

**Physicality:** The ratings of players' physicality is normalally distributed, so we use the mean of 69 as a measure of center, and the standard deviation of 9.89 as a measure of spread.

## Bivarait Analysis

```
a <- ggplot(players, aes(x = pace, y = value_eur)) +  
  geom_point()
```

```

b <- ggplot(players, aes(x = shooting, y = value_eur)) +
  geom_point()

c <- ggplot(players, aes(x = passing, y = value_eur)) +
  geom_point()

d <- ggplot(players, aes(x = dribbling, y = value_eur)) +
  geom_point()

e <- ggplot(players, aes(x = defending, y = value_eur)) +
  geom_point()

f <- ggplot(players, aes(x = physic, y = value_eur)) +
  geom_point()

grid.arrange(a,b,c,d,e,f)

```

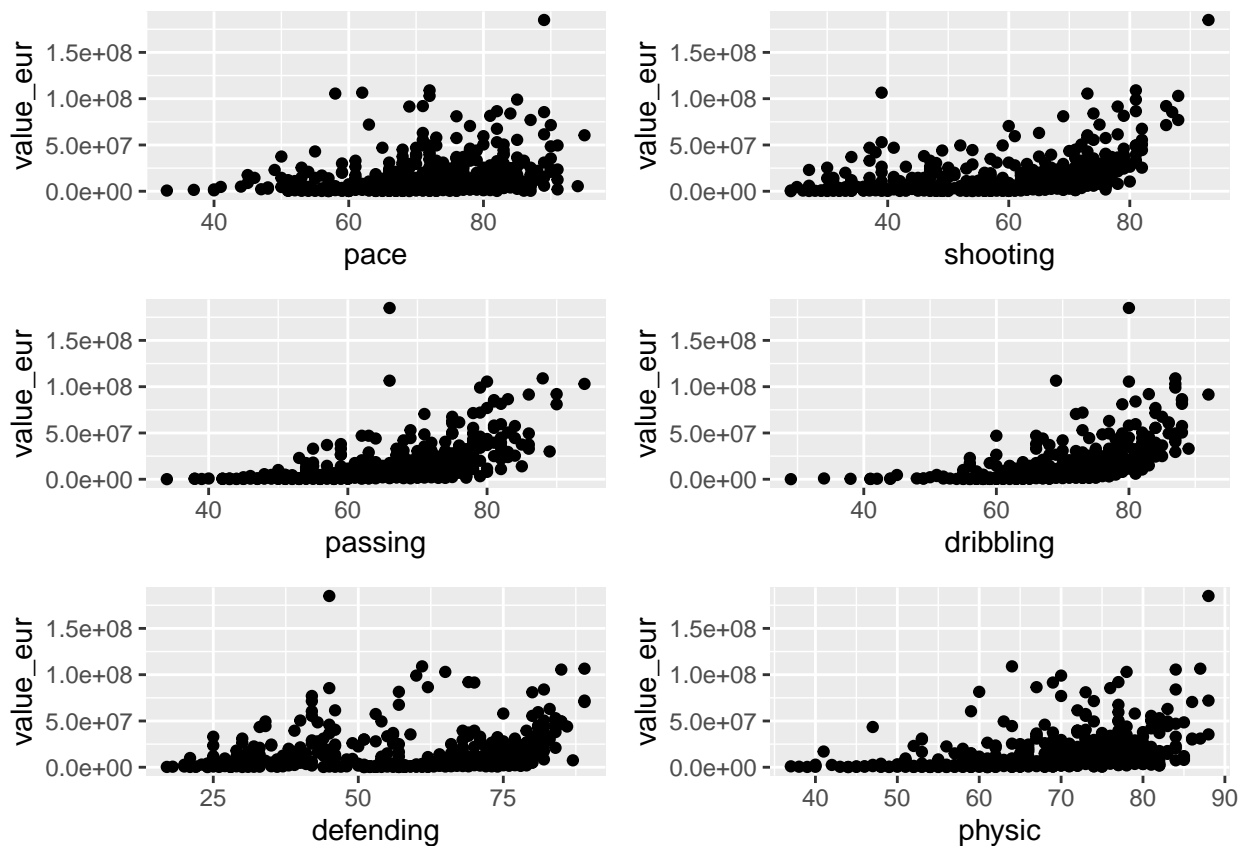
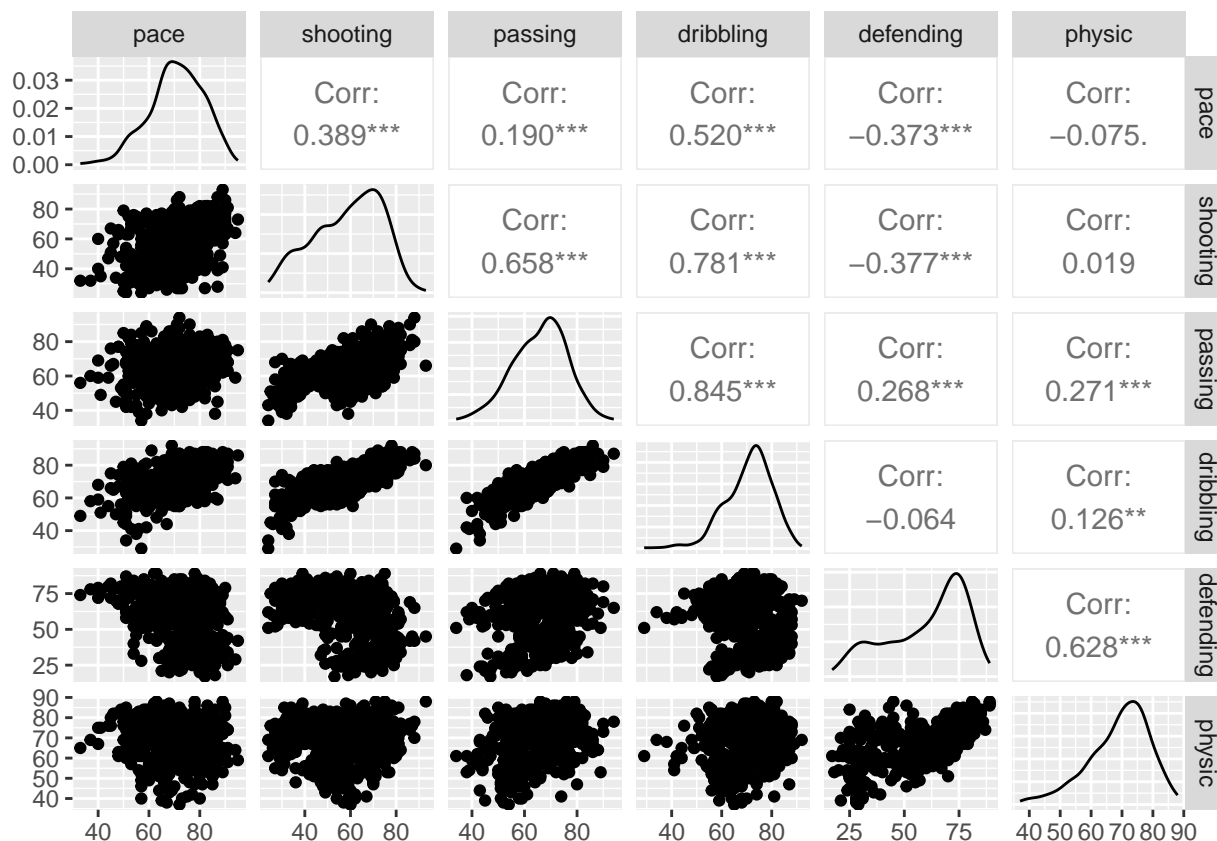


Figure 1 : To conduct bivariate analysis for the quantitative we made scatterplots of them as predictors of market value. We saw that there seems to be positive relationships between all the variables and transfer value. In other words, as a rating for a variable goes up, so does the transfer value. However, we can also see that none of these relationships seem to be linear and instead seem to be curved. This suggests that we need to do a transformation is needed to satisfy our linearity condition

```

players2 <- select(players, "pace", "shooting", "passing", "dribbling", "defending", "physic")
ggpairs(players2)

```



```
car::vif
```

```
## function (mod, ...)
## {
##   UseMethod("vif")
## }
## <bytecode: 0x12cab5320>
## <environment: namespace:car>
```

Figure 2 : This ggpairs model shows that some of our variables within our dataset are highly correlated with eachother. This is especially true for dribbling-passing, dribbling-shooting, passing-shooting and defending-physic. ## Interpreting the Model

## Conclusion