Final-Project–3-.R

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```
# Load the RMySQL library for database operations
library(RMySQL)
```

```
## Loading required package: DBI
```

```
# Establish a connection to the MySQL database named 'Final'
mysqlconnection <- dbConnect(RMySQL::MySQL(),
                             dbname='Final',
                             host='localhost',
                             port=3306,
                             user='root',
                             password='cmsc2024')

# Prepare an SQL query to clean data, categorize players, and rank them based on average points
analysis_query <- "
WITH CleanedData AS (
    SELECT player_name,
           COALESCE(pts, 0) as pts,  # Replace NULL points with 0
           COALESCE(usg_pct, 0) as usg_pct  # Replace NULL usage percentage with 0
    FROM all_seasons
),
PlayerAveragePoints AS (
    SELECT player_name, AVG(pts) as avg_pts  # Calculate average points for each player
    FROM CleanedData
    GROUP BY player_name
),
PlayerCategories AS (
    SELECT player_name,
           avg_pts,
           CASE  # Categorize players based on their average points
               WHEN avg_pts > 24 THEN 'Superstar'
               WHEN avg_pts > 18 AND avg_pts <= 24 THEN 'Good Player'
               WHEN avg_pts > 8 AND avg_pts <= 18 THEN 'Role Player'
               ELSE 'Bench Player'
           END AS player_category
    FROM PlayerAveragePoints
),
PlayerRanks AS (
    SELECT pc.player_name,
           pc.avg_pts,
           cd.usg_pct,
           RANK() OVER(PARTITION BY pc.player_category ORDER BY pc.avg_pts DESC) as player_rank,  # Rank players within each category
           pc.player_category
    FROM PlayerCategories pc
    JOIN CleanedData cd ON pc.player_name = cd.player_name
)
SELECT player_name,
       avg_pts,
       usg_pct,
       player_rank,
       player_category,
       NTILE(4) OVER(ORDER BY avg_pts DESC) as performance_quartile  # Divide players into quartiles based on average points
FROM PlayerRanks
"
```

```
# Execute the SQL query and store the results in a dataframe
analysis_result <- dbSendQuery(mysqlconnection, analysis_query)
analysis_df <- fetch(analysis_result, n = -1)  # Fetch all rows from the result set
dbClearResult(analysis_result)  # Clear the result set
```

```
## [1] TRUE
```

```
# Convert the player_category column to a factor with ordered levels
analysis_df$player_category <- factor(analysis_df$player_category,
                                      levels = c('Superstar', 'Good Player', 'Role Playe
r', 'Bench Player'))

# Perform a linear regression analysis to study the relationship between average points
and usage percentage
lm_model <- lm(avg_pts ~ usg_pct + player_rank, data = analysis_df)
summary(lm_model)  # Display the summary of the linear model
```

```
##
## Call:
## lm(formula = avg_pts ~ usg_pct + player_rank, data = analysis_df)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -34.887  -2.499   0.200   2.379  11.571
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.823e+00  1.574e-01   37.01   <2e-16 ***
## usg_pct      3.933e+01  6.584e-01   59.74   <2e-16 ***
## player_rank -1.822e-03  2.305e-05  -79.03   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.232 on 10427 degrees of freedom
## Multiple R-squared:  0.6101, Adjusted R-squared:   0.61
## F-statistic:  8157 on 2 and 10427 DF,  p-value: < 2.2e-16
```

```
print("Hypothesis: I believe that as the usage percentage increases, we find that player
s tend to average more points.")
```

```
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rs tend to average more points."
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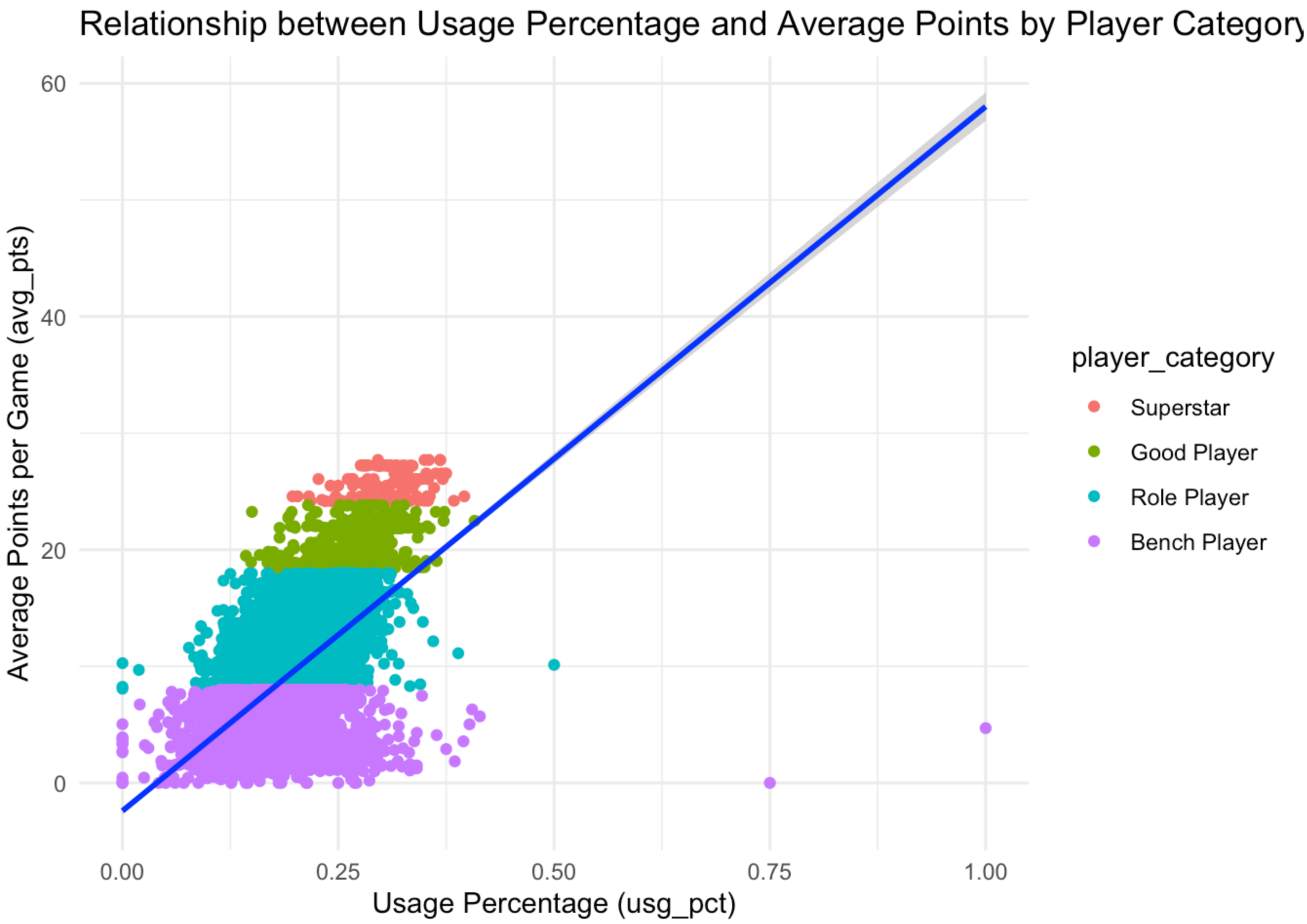
```
# Create a scatter plot to visualize the relationship between usage percentage and average points
library(ggplot2)  # Load the ggplot2 library for plotting
ggplot(analysis_df, aes(x = usg_pct, y = avg_pts, color = player_category)) +
  geom_point() +  # Add points to the plot
  geom_smooth(method = "lm", col = "blue") +  # Add a linear regression line
  theme_minimal() +  # Use a minimal theme for the plot
  labs(title = "Relationship between Usage Percentage and Average Points by Player Category",
       x = "Usage Percentage (usg_pct)",
       y = "Average Points per Game (avg_pts)")
```

```
## `geom_smooth()` using formula = 'y ~ x'
```



```
# Disconnect from the MySQL database
dbDisconnect(mysqlconnection)
```

```
## [1] TRUE
```

```
print("In general, I saw that as usage rate increases, the number of points typically in
crease as well. I also noticed that superstars had higher usage rates than the other typ
es of players. This makes sense as superstars, who tend to be much better players, have
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