



# Forecasting FIFA Ratings of Football Players from Real Football Stats

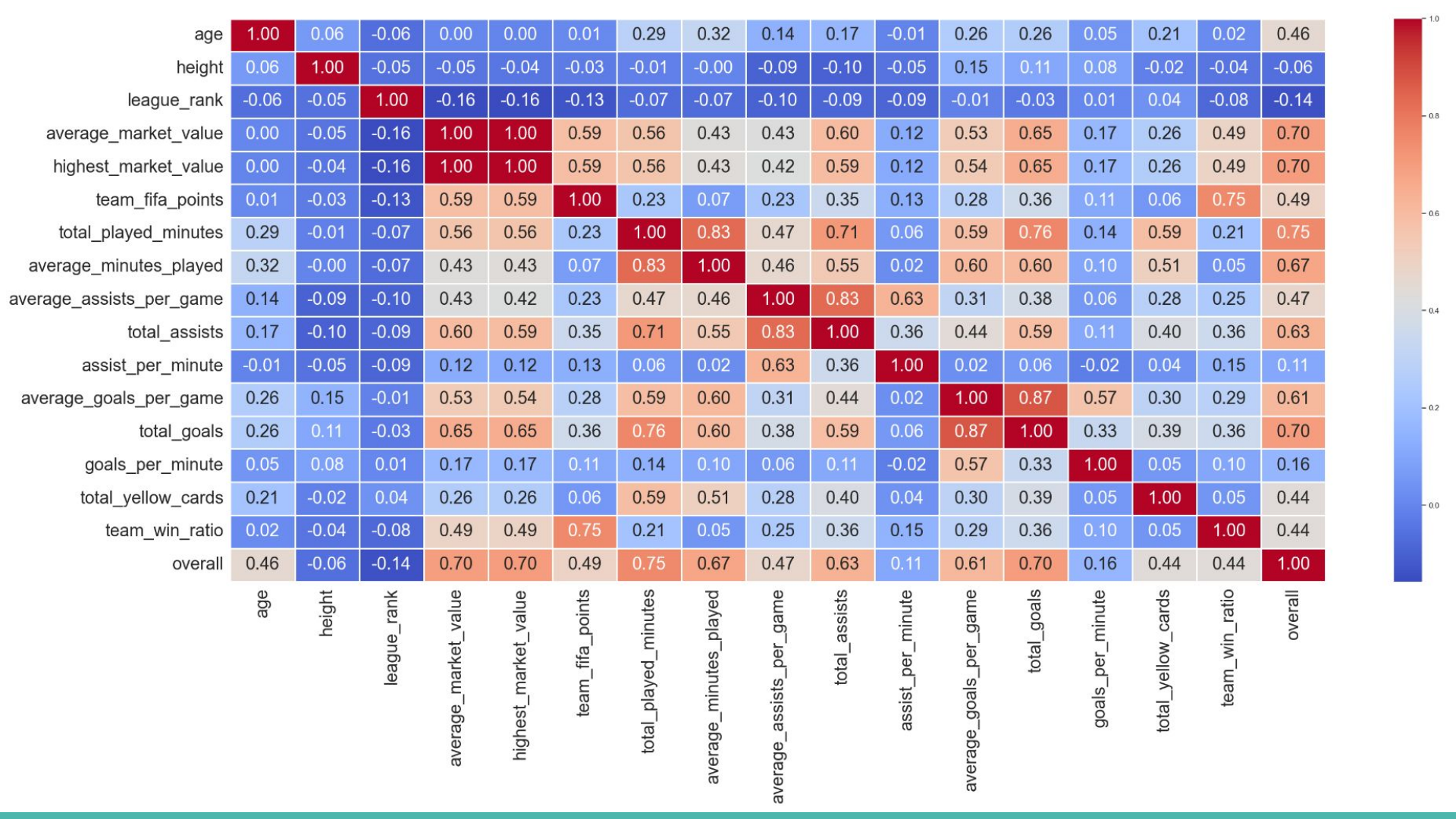
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Bogazici University

**December 21, 2023**

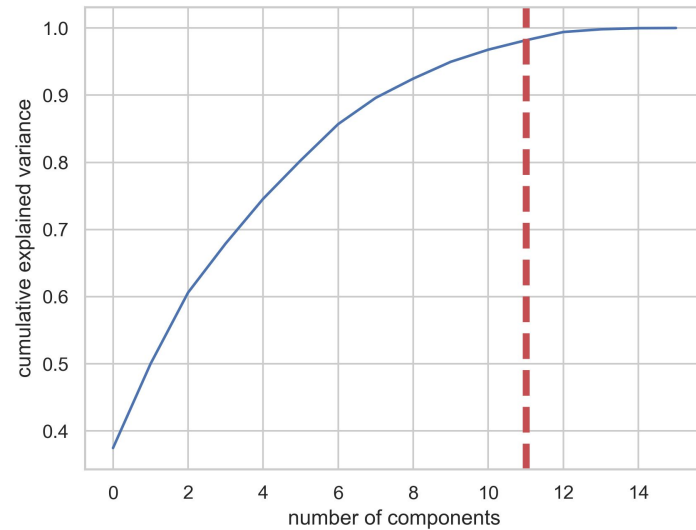
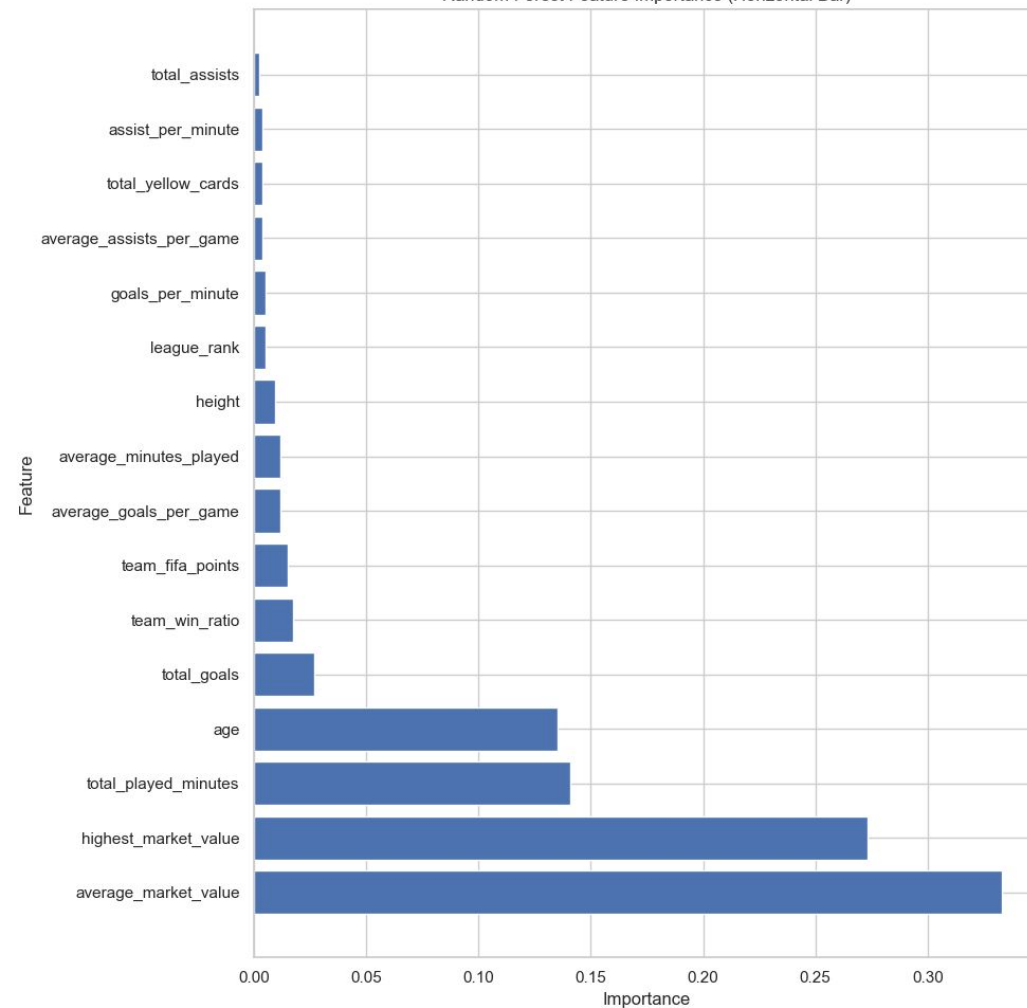
# Correlation Matrix





# PCA and Random Forest Importance Plot

Random Forest Feature Importance (Horizontal Bar)



Default Parameters:

R2 Score: 0.89

Mean Absolute Error (MAE): 1.61

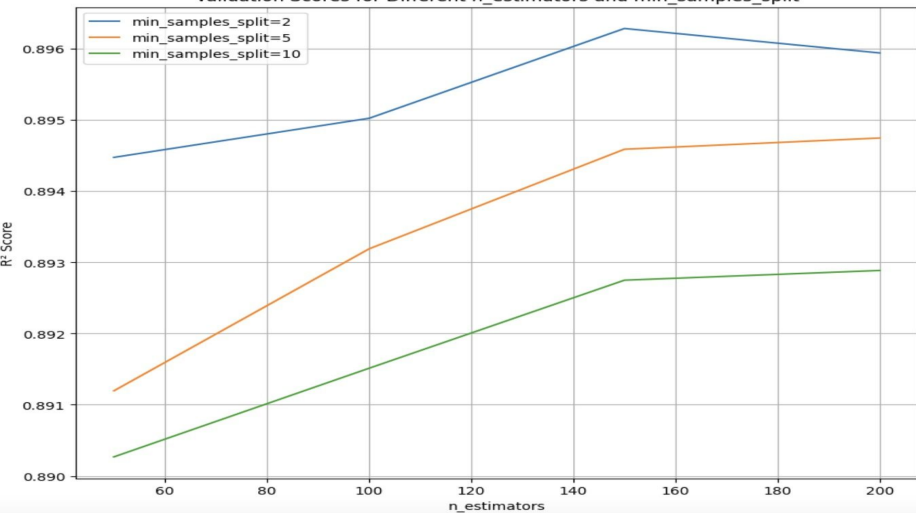
After PCA for k = 11:

R2 Score: 0.84

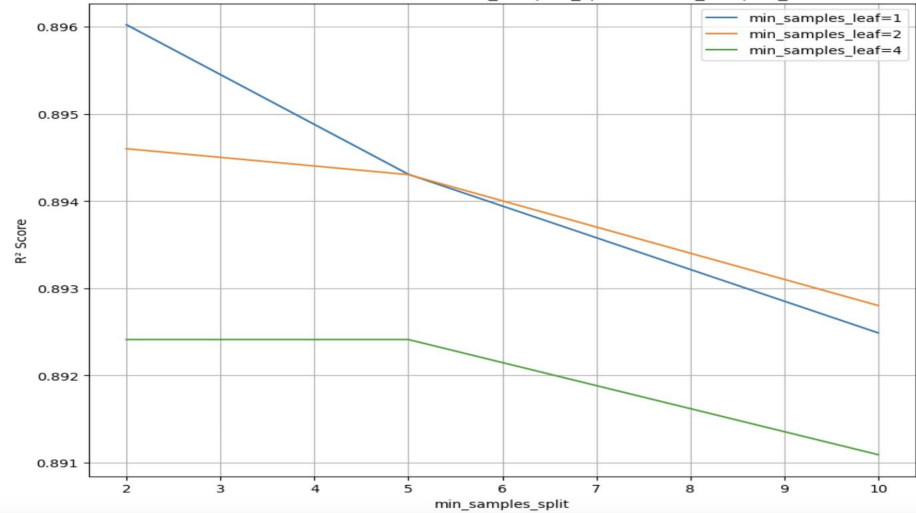
Mean Absolute Error (MAE): 1.91

# Random Forest Regressor

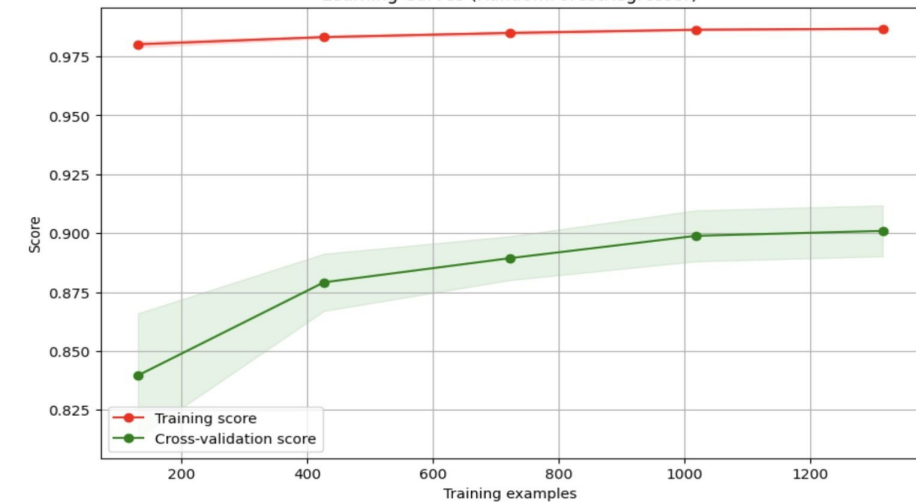
Validation Scores for Different n\_estimators and min\_samples\_split



Validation Scores for Different min\_samples\_split and min\_samples\_leaf



Learning Curves (RandomForestRegressor)



R2 Score: 0.8974890204526679

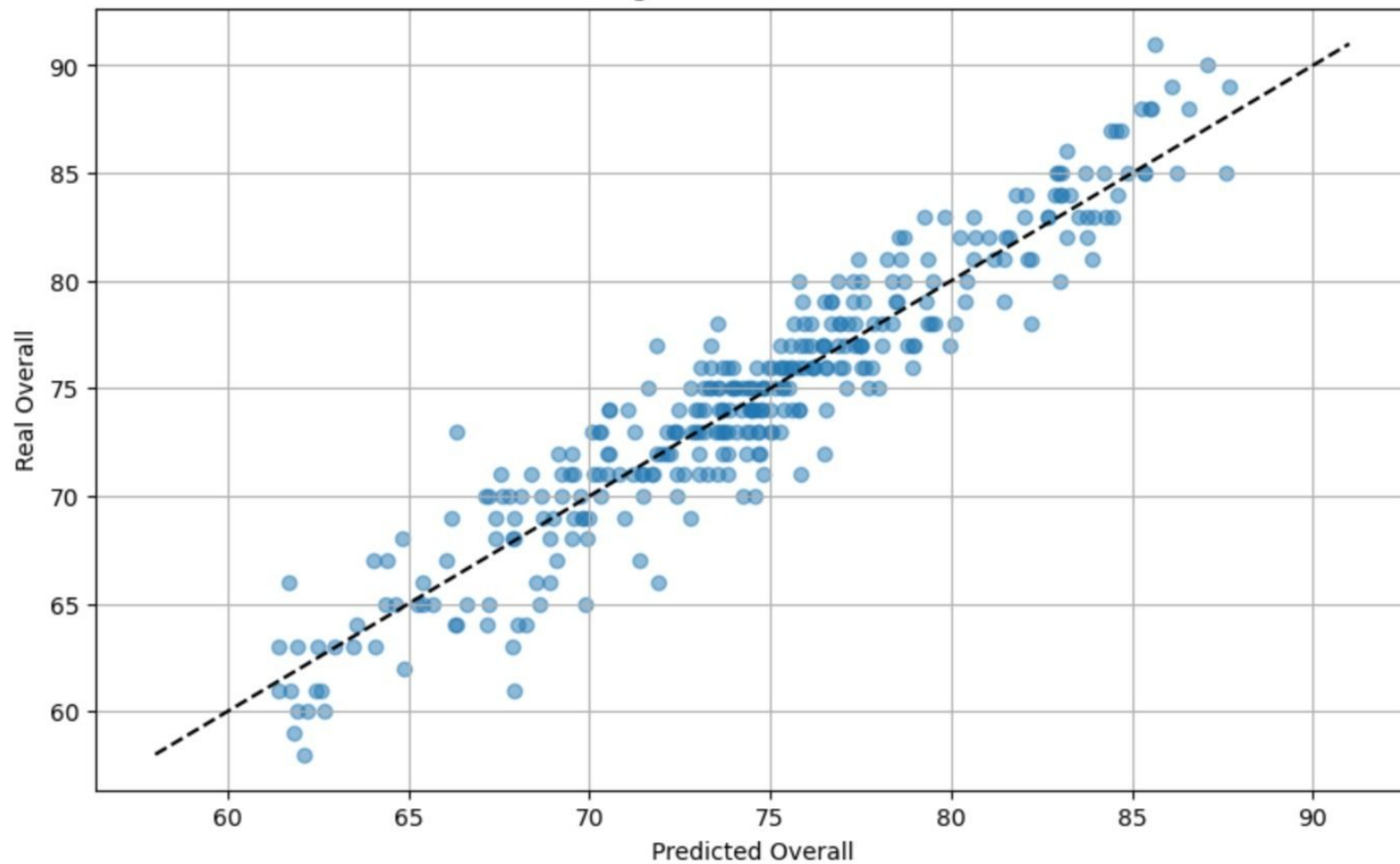
Mean Absolute Error (MAE): 1.59278787

Best Hyperparameters: {'min\_samples\_split': 2, 'n\_estimators': 150, 'min\_sample\_leaf': 1}

|   | name            | Predicted Overall | Real Overall |     | name              | Predicted Overall | Real Overall |
|---|-----------------|-------------------|--------------|-----|-------------------|-------------------|--------------|
| 0 | Lionel Messi    | 85.680            | 91.0         | 160 | Florian Kainz     | 72.785            | 75.0         |
| 1 | Sadio Mané      | 87.050            | 90.0         | 161 | Mama Baldé        | 73.990            | 75.0         |
| 2 | Harry Kane      | 87.825            | 89.0         | 162 | Vedat Muriqi      | 75.305            | 75.0         |
| 3 | Sadio Mané      | 86.125            | 89.0         | 163 | Opa Nguette       | 73.540            | 75.0         |
| 4 | Eden Hazard     | 85.820            | 88.0         | 164 | Ibrahima Traoré   | 71.635            | 75.0         |
| 5 | Harry Kane      | 85.085            | 88.0         | 165 | Eldor Shomurodov  | 77.115            | 75.0         |
| 6 | Erling Haaland  | 86.605            | 88.0         | 166 | Maxwel Cornet     | 77.725            | 75.0         |
| 7 | Raheem Sterling | 85.790            | 88.0         | 167 | Romain Hamouma    | 74.535            | 75.0         |
| 8 | Thomas Müller   | 84.965            | 87.0         | 168 | Admir Mehmedi     | 75.600            | 74.0         |
| 9 | Jadon Sancho    | 84.280            | 87.0         | 169 | Christian Benteke | 74.185            | 74.0         |

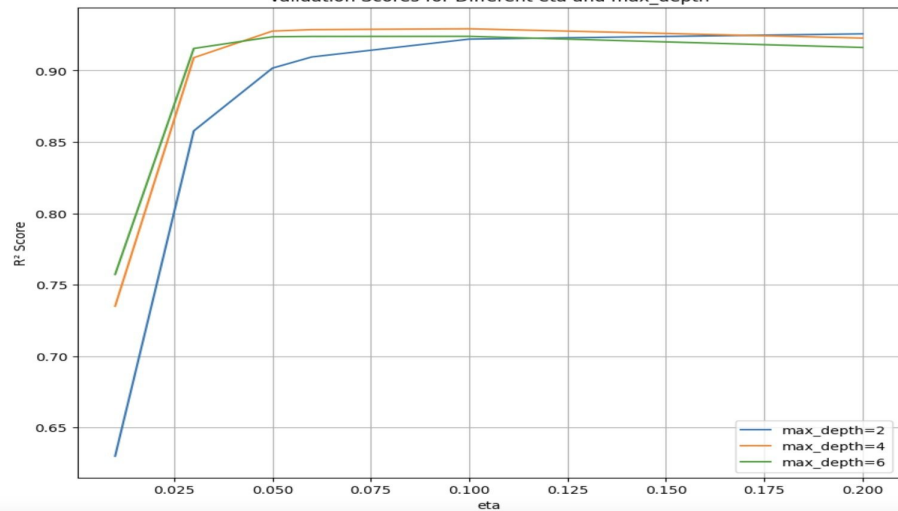


RandomForestRegressor Predictions vs Real Values

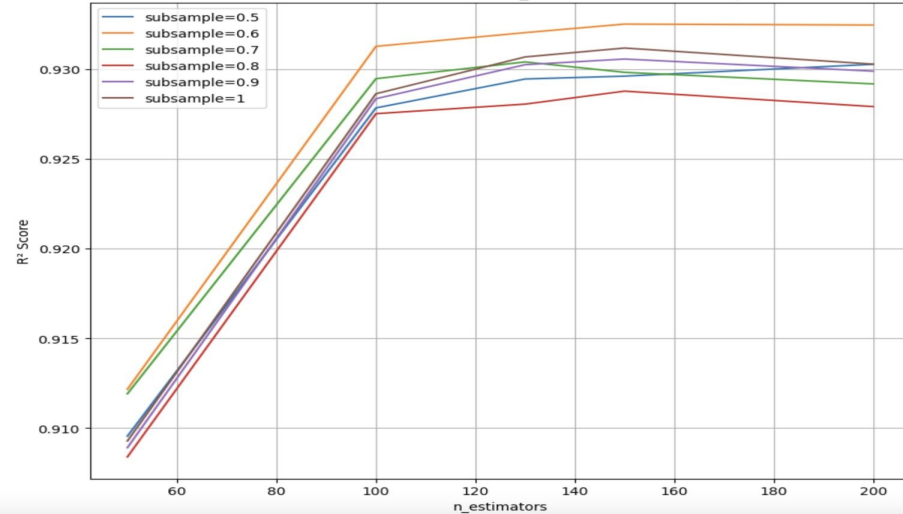


# XGBoost Regressor

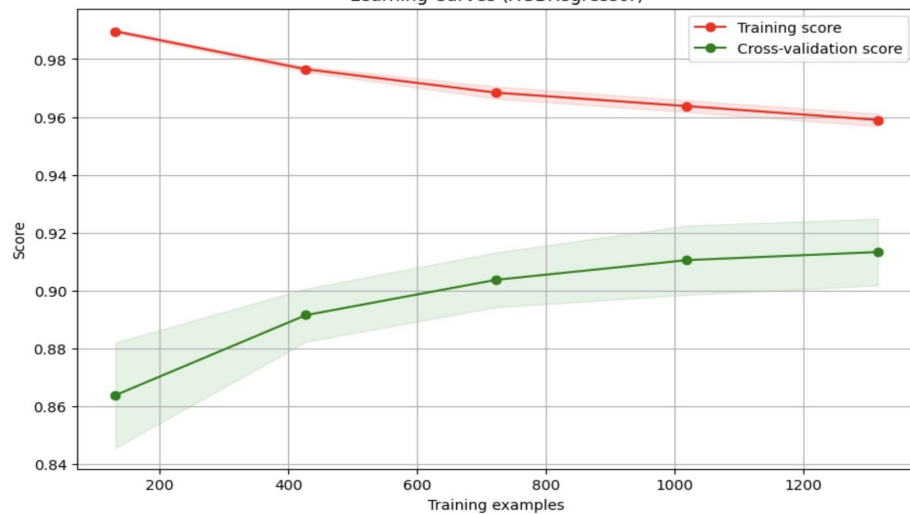
Validation Scores for Different eta and max\_depth



Validation Scores for Different n\_estimators and subsample



Learning Curves (XGBRegressor)



R2 Score: 0.9430896410121901

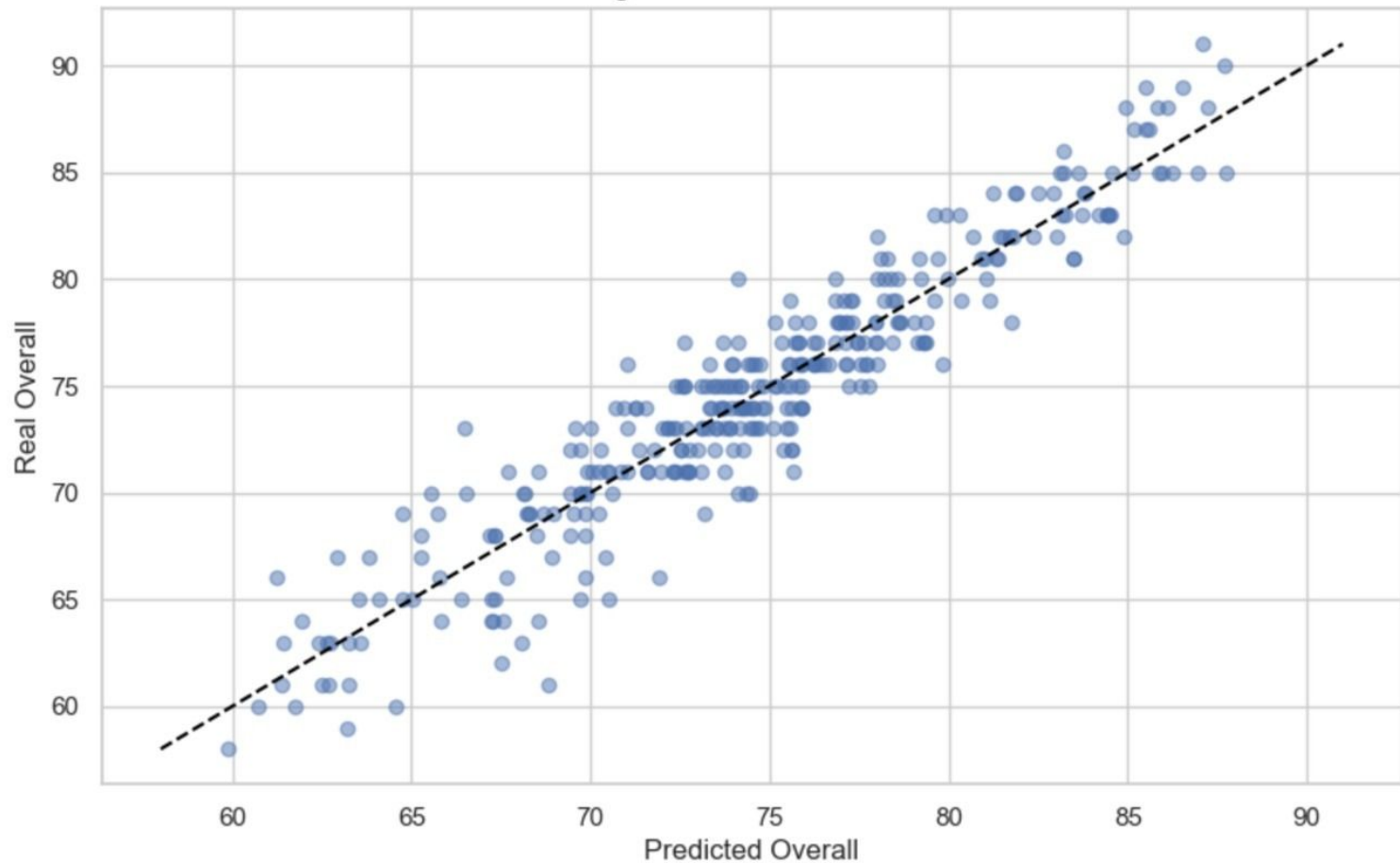
Mean Absolute Error (MAE): 1.1514671325683594

|    | name                | Predicted Overall | Real Overall |
|----|---------------------|-------------------|--------------|
| 77 | Juanmi              | 74.610023         | 75.0         |
| 78 | Matías Vargas       | 76.844894         | 75.0         |
| 79 | Iván Alejo          | 71.653671         | 75.0         |
| 80 | Mohamed Bayo        | 76.164047         | 75.0         |
| 81 | Aleksandar Mitrović | 75.488098         | 75.0         |
| 82 | Anwar El Ghazi      | 75.642387         | 75.0         |
| 83 | Manolo Gabbiadini   | 74.330025         | 75.0         |
| 84 | Romain Hamouma      | 75.835457         | 75.0         |
| 85 | Dennis Man          | 73.109550         | 74.0         |
| 86 | Borja Mayoral       | 76.213341         | 74.0         |

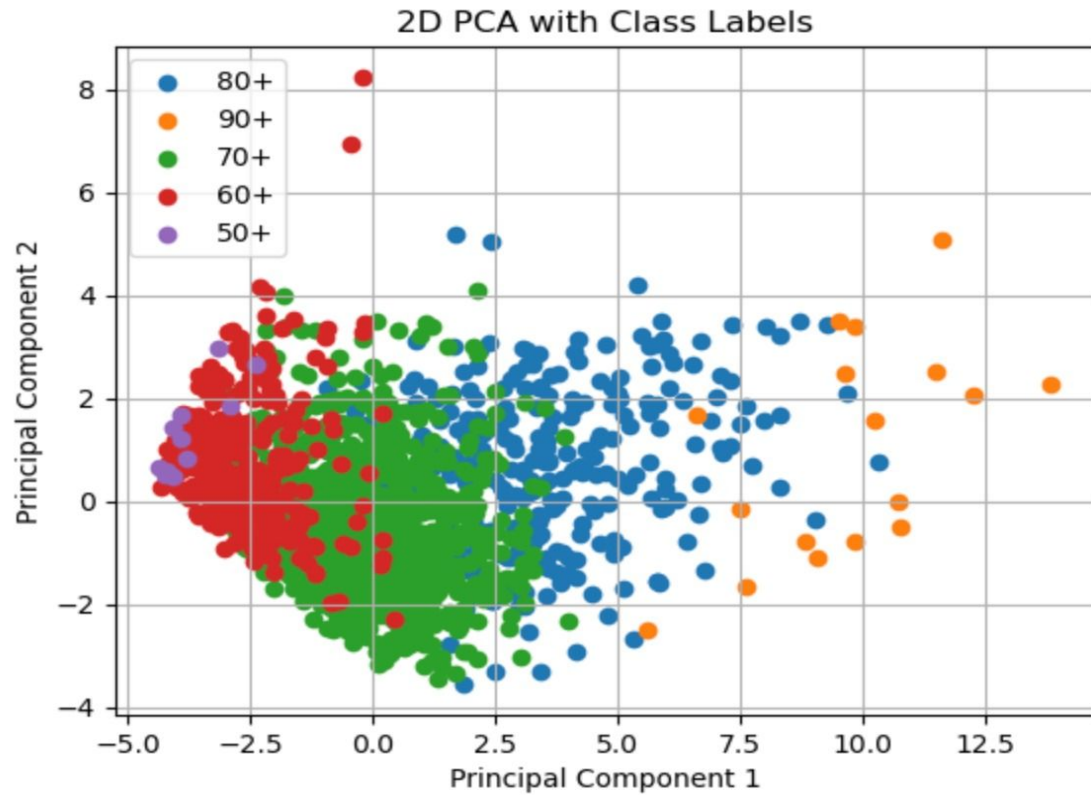


```
XGBRegressor(
    objective="reg:squarederror",
    eta=0.06,
    max_depth=4,
    subsample=0.6,
    n_estimators=150,
    min_child_weight=6)
```

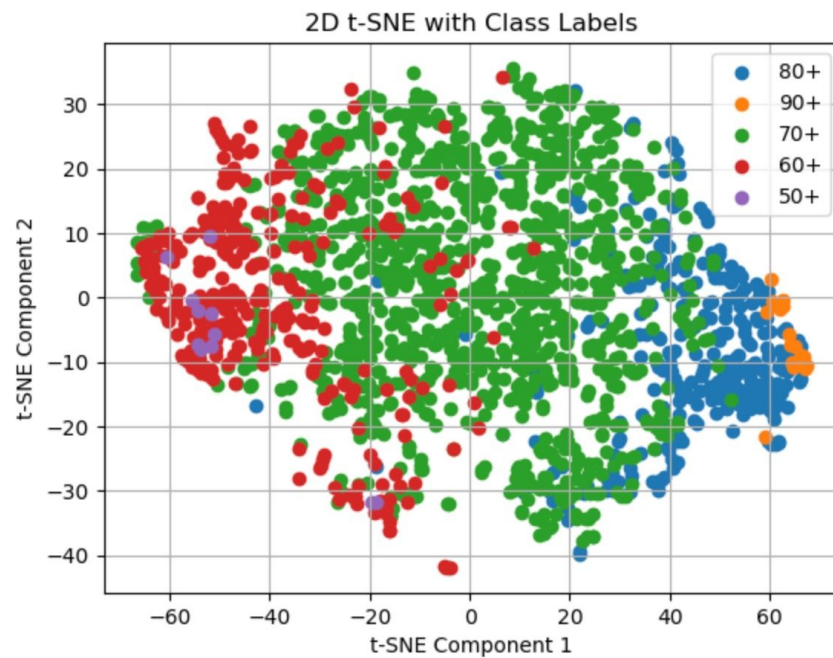
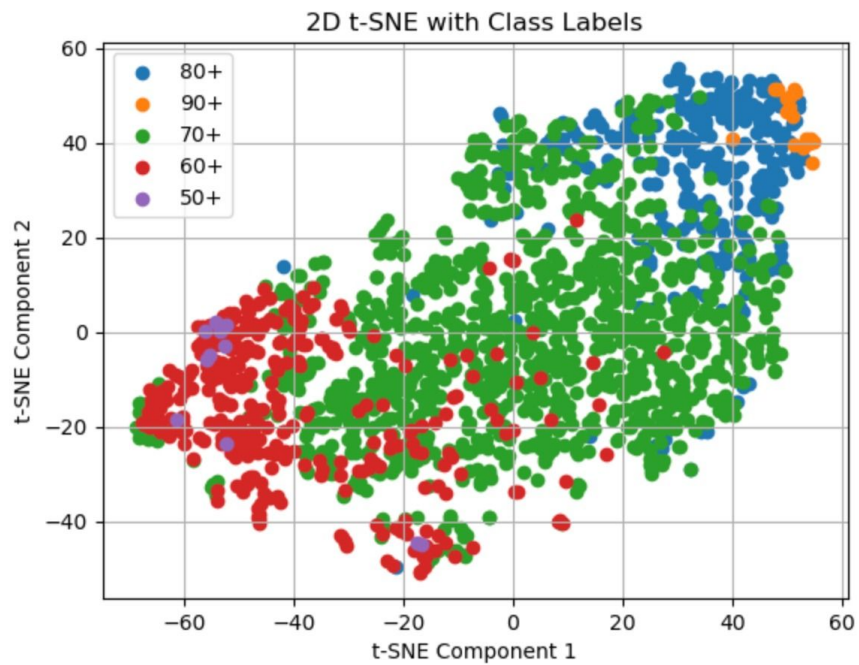
XGBoost Regressor Predictions vs Real Values



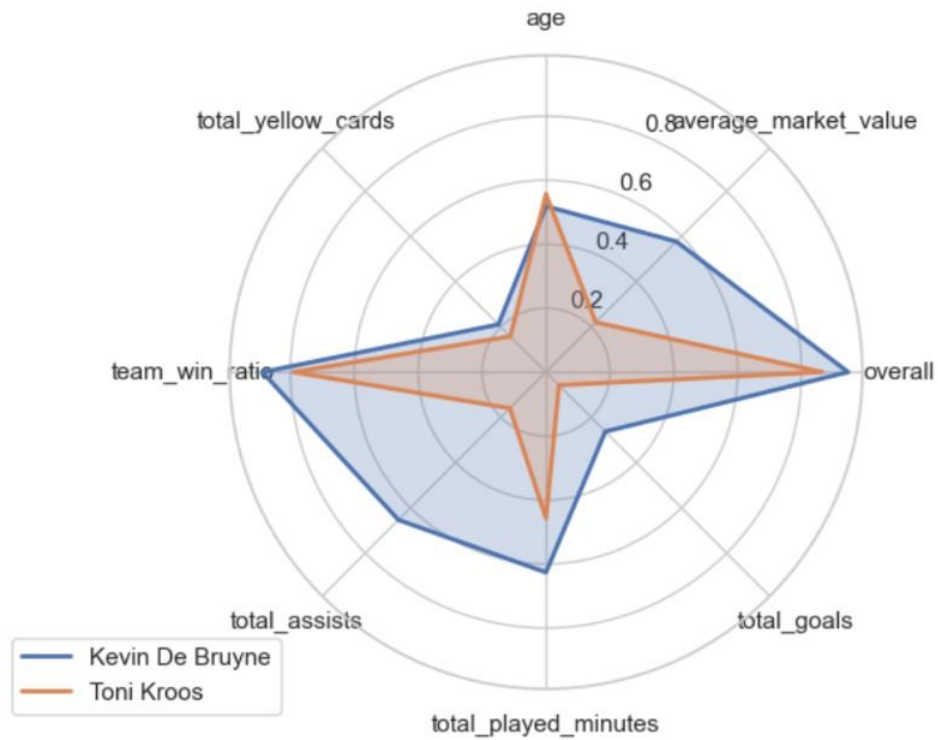
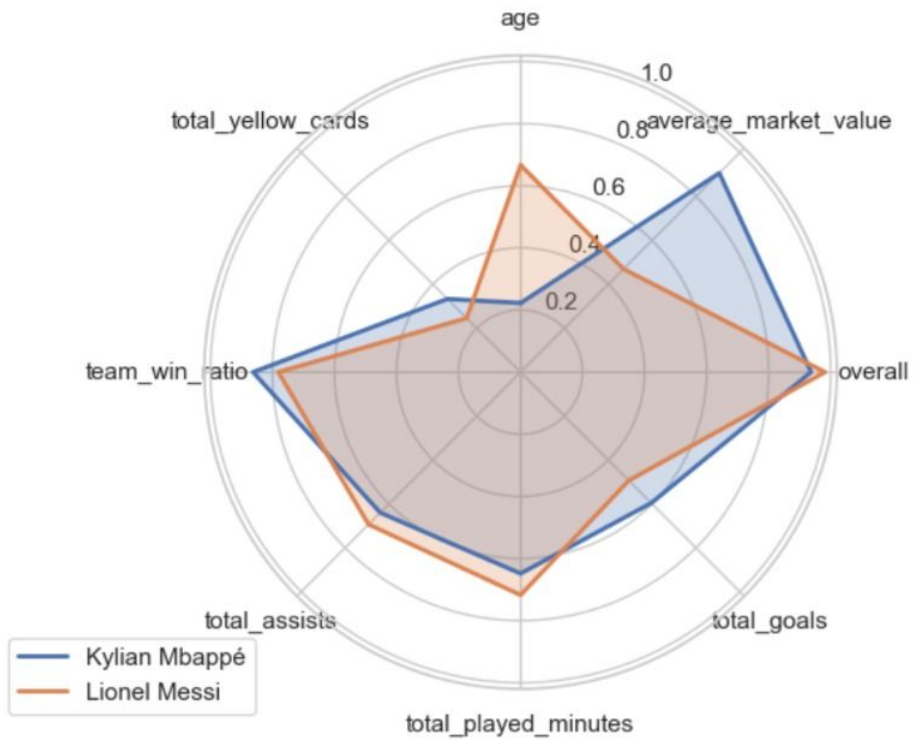
# Data Visualization





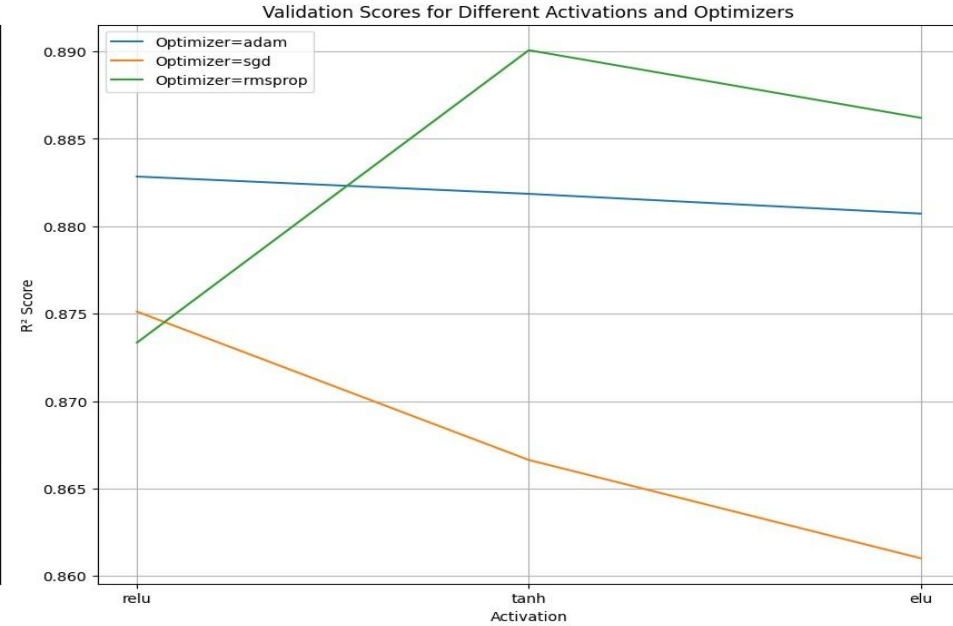
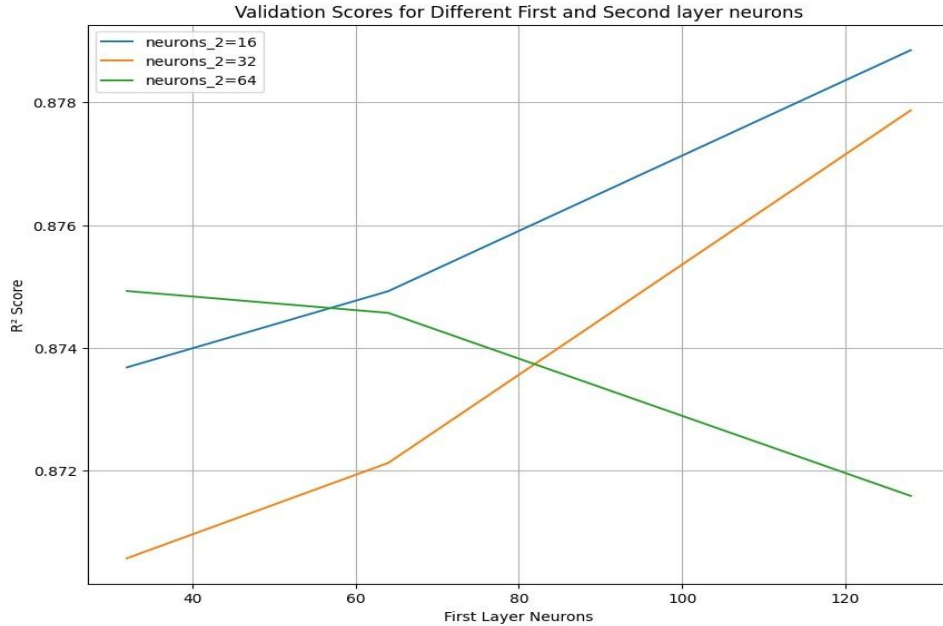


# Radar Chart



# Neural Network

# Hyperparameter Tuning for Neural Network



**Mean Absolute Error: 0.262**  
**R-squared Score: 0.879**

## Some Results From Neural Network Model

| Player             | Actual_Rank | Predicted_Rank |
|--------------------|-------------|----------------|
| Lionel Messi       | 93.0        | 92.113258      |
| Robert Lewandowski | 92.0        | 92.101891      |
| Jan Oblak          | 91.0        | 90.467979      |
| Kevin De Bruyne    | 91.0        | 91.082100      |
| Kylian Mbappé      | 91.0        | 89.974350      |
| N'Golo Kanté       | 90.0        | 88.732925      |
| Virgil van Dijk    | 90.0        | 90.134613      |
| Mohamed Salah      | 90.0        | 90.703880      |



Neural Network Predictions vs Real Values

