FIFA PLAYERS MARKET VALUE PREDICTION

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ABSTRACT

Football is not only the world's most popular game, but it is also a major business. Many clubs generate significant income by nurturing young players and then selling them to larger clubs at higher prices. Player transfers can significantly impact a club's chances of success, and market values are an important factor in transfer negotiations. This project aims to analyze data to identify the most important factors that determine a player's market value and build a model to predict that value. This model can be used by club managers to assist in negotiations with players..

Introduction

Football is a popular sport that is also a major business. From a managerial perspective, important decisions related to player transfers, such as determining player values and transfer fees, are of significant concern. Market values, or estimates of transfer fees that could be paid for a player on the football market, play a crucial role in transfer negotiations.

The market value of a player can be used as a benchmark for transfer fees, which are the prices that clubs pay to acquire players from other clubs. However, there are many factors that can affect a player's market value, including their career span, risk of injury, and on-field performance. Transfer negotiations between clubs and player agents also play a role in determining a player's market value. It is important for both clubs and players to maximize their performance and value in the market. Finally, the transfer of players is a topic of interest for fans, as they are interested in knowing which players their club will acquire and how much money will be spent in the transfer window period.
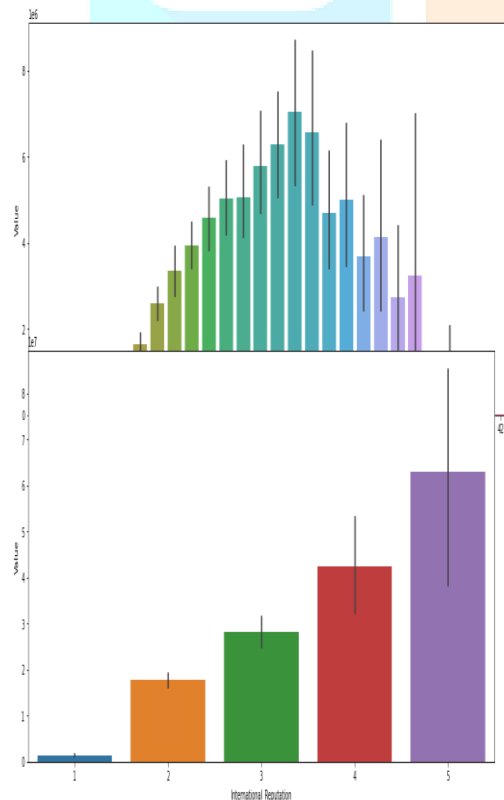
Business Use Case

Every year, football clubs spend a large amount of money to purchase professional football players during the transfer window. Predicting a player's value in the transfer market is a challenging task for club managers. This project aims to accurately predict the market values of FIFA players, which can serve as a baseline for simplifying the negotiation process and objectively estimating a player's market value quantitatively.

Dataset

The dataset used in this project was obtained from sofifa and contains information on 18,179 players. It includes approximately 74 features, such as the player's height, weight, age, preferred foot, skill moves, skill ratings, and international reputation. The skill ratings are further divided into domains, each of which is scored on a scale from 0 to 100. The skill ratings of the footballers in this dataset were calculated by taking the mean of their respective domains. The skill ratings and domains are as follows:

- **Ball Skills**: Ball Control, Dribbling

- **Passing**: Crossing, Short Pass, Long Pass

- **Defense**: Marking, Slide Tackle, Stand Tackle

- **Shooting**: Heading, Short Power, Finishing, Long Shots, Curve, Free Kick, Accuracy, Penalties, Volleys

- **Goalkeeping**: Positioning, Diving, Handling, Kicking, Reflexes

Workflow

In this project, we followed the standard data science workflow:

1. Exploratory Data Analysis (EDA)
2. Data preprocessing and feature Engineering
3. Model training, experiments, and evaluation

1. EXPLORATORY DATA ANALYSIS

Figure 1

Before beginning our analysis, the first step is to clean the dataset and generate visualizations to see if we can uncover any insights that will help us achieve our business goals.
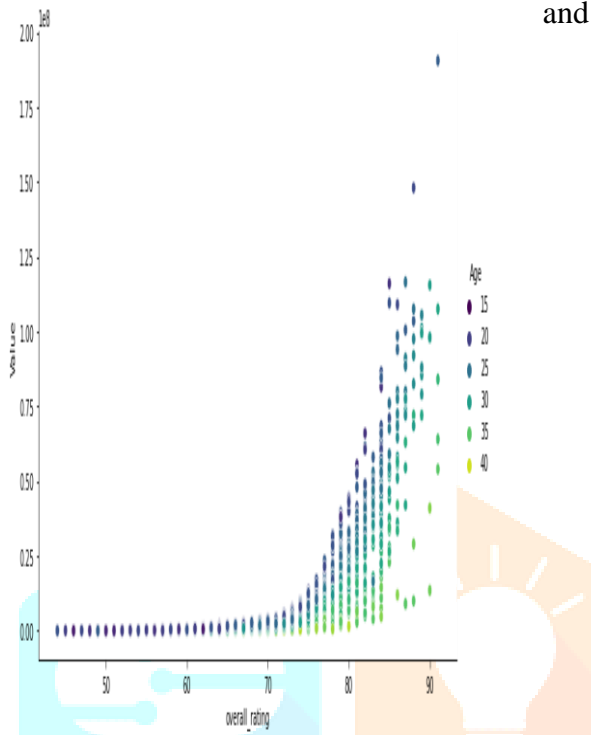
After cleaning the data, we generated the following visualizations:

Please refer to the plots below.

(1) Age is an important factor in determining a player's market value, as it reflects both their experience and ability. From the plot, we can see that the majority of players fall in the age range

Figure 2

- **Mental**: Aggression, Reactions, Attack Position, Interceptions, Vision, Composure

- **Physical:** Acceleration, Stamina, Balance, Sprint Speed, Agility, Jumping

of 18 to 22. This suggests that younger players with fewer years of experience tend to have a higher market value. As a player approaches retirement, they have fewer years left to continue performing at a high level, which leads to a decrease in their market value.

(2) In addition to a player's talent, their popularity and

"superstar status" also play a role in determining their market value. A player's image outside of football, including their ability to draw a crowd and sell jerseys, can influence their market value, even if they are not necessarily the best players on the pitch. From the plot, we can see that players with a 5-star or 4-star rating have a higher market value than those with a lower international reputation. The popularity of an athlete has a commercial value to clubs, and even if players like Messi, Ronaldo, and Ibrahimovic are approaching the end of their careers, their brand value remains high due to their international status and fame. Their well-known faces can also be leveraged to negotiate sponsorships with commercial brands.
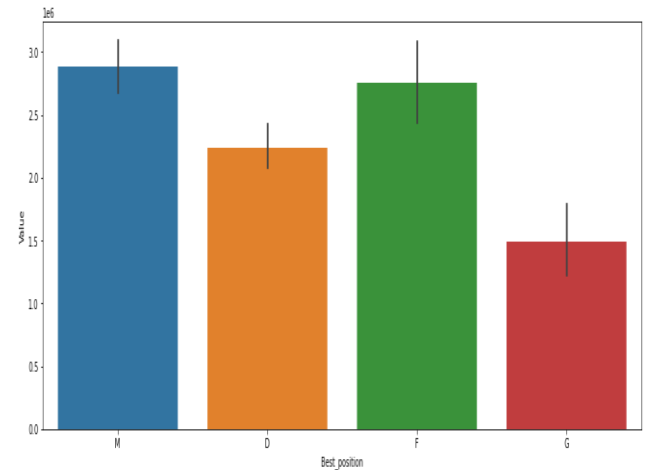

Figure 3

A player's position is an important factor in determining their market value. Positions such as goalkeeper, defender, midfielder, and forward can all impact salaries and transfer fees. This reflects a player's level of specialization and their ability to attract fans. In general, attackers tend to receive more attention and rewards than goalkeepers because they are more visible to the crowd and have a greater capacity to draw in spectators.

The plot shows the relationship between a player's overall rating and their value. We can see that value tends to increase with overall rating. However, there may be situations where players with similar overall ratings have different values. In such cases, we can consider the age of the players as a factor. Younger players tend to

have higher values, even if they have a similar overall rating to an older player.
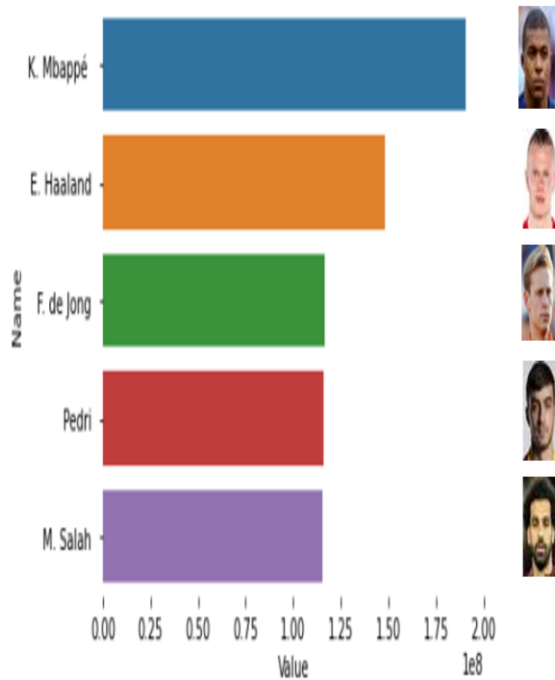

Figure 4

The plot labeled "Figure 5" shows the top five most valuable players in the dataset.

2. DATA PREPROCESSING

Through our exploratory data analysis, we observed how a player's value is influenced by various features such as age, overall rating, and international reputation. After encoding the categorical columns, we needed to identify the most important features that describe a player's value from the more than 70 numerical features in the dataset. To do this, we used feature importance techniques to reduce the dimensionality of the dataset and focus on the most important features.

3. MODEL TRAINING

After preprocessing the data, we split it into a training set and a test set in a ratio of 80:20. We then applied various machine learning algorithms, including Decision Tree, Random Forest, XGBoost, and AutoKeras, to the data. Of all the algorithms, we obtained the highest accuracy using

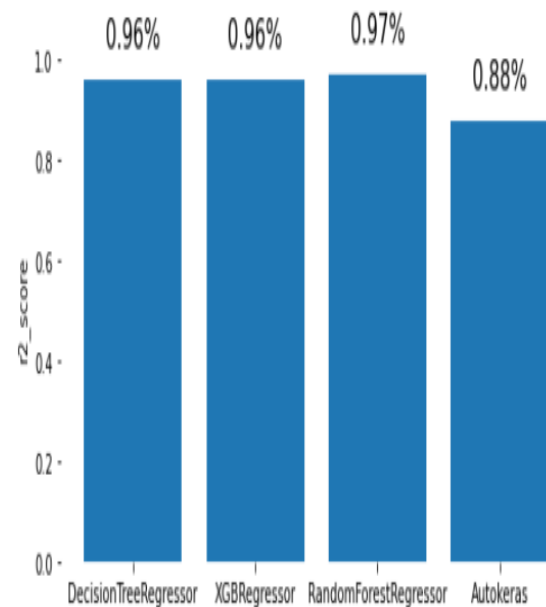Random Forest, as indicated by the 0.97 r2 score in Figure 6.

Figure 6

Conclusion

Our study evaluated the effectiveness of different non-linear methods for predicting the market value of soccer players and found that the proposed methods outperformed other methods. We believe that these models could be useful in negotiations between football clubs and player agents by providing a quantitative, objective way to estimate player market values and potentially streamlining the negotiation process