

Applied AI Homework-I

Football Player Price Estimator Engine

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Introduction:

This project aims at creating an engine to estimate the transfer value of a player in the current transfer market across Europe. Twice a year in Football (soccer) leagues across Europe FIFA lifts the transfer window open. During this period in Summer lasting from end of a league season's to beginning of next one and a month's duration in January, football clubs are allowed to sign the players from other teams participating in the same league or different league across Europe.

In recent times, we have observed how the football market has gone crazy with transfer fees with transfer fees for some players going as high as \$150 Million. We see that in every season the world record for the transfer fee is shattered for each of the player positions, which is unusual as defenders and goalkeepers were valued less as compared to forward more attacking players. However, that has changed in recent times. The major concern that these high transfer fee raises is whether it is a good business to buy players as such inflated costs because of inflation in the market.

In the current market of global recession where the football clubs are being run more like a business and less like a sports team, It becomes of prime importance for teams to scout the right player and estimate its accurate market value. This not only helps the club to carry out effective negotiations but also make sure that they can get the money invested in the right players by making a high probable bet to gain profits either from player's selling price some years later or through market value of a player.

Implementation:

There are many player attributes that could be considered while estimating price however sometimes only attributes are not sufficient to gauge a player's value. There are many organizations that provide statistics on players and ratings based on their on-pitch

performances. These ratings are calculated using very robust and complicated methods and we shall be using a few among these stats for the sake of simplicity and scope of the project. Following are the factors that we are using to gauge players estimate fees:

1. **Age:** rules are based on the age groups as age has a great influence on the price of the player. Young players with less experience are valued less, similar to players who are more the 30 to 35 years old. Players who are young from 20 to 30 years of age are most valued in the transfer market.
2. **Player Position:** The forwards more attacking players have been valued a slightly higher than the players playing in more defensive roles. However, recently there have been some anomalies in this case as fees as high as \$70 million were paid for defenders.
3. **Appearance:** More the appearance of a player will correlate to a higher value.
4. **Status in Squad:** If the player whose value is being estimated is an indispensable player for the current team he is in, he will come with a price tag slightly higher as compared a player with similar stats and attributes but with less important role in the team. This is because teams don't like their first team members leave easily, hence they have loftier transfer fees
5. Other attributes such as **pace, reflex, number of goals, interceptions made, assists score, dribbling score etc.**, are considered based on the position of the player to calculate his rating and then factors such as if the player is in the **same league, same division etc.**, are also factored in to estimate the current transfer fees of the player.

a. Facts

Templates were created for the **player** and positions like, **midfielder, goalkeeper, forward and goalkeeper.**

One such template is:

```
;template for a goalkeeper
(deftemplate goalkeeper
  (slot clean-sheets)
  (slot reflex (type INTEGER))
  (slot handling (type INTEGER))
  (slot kicking (type INTEGER)))
```

b. Rules

As stated above the rules were created based on the **age group** of the player. Withing each rule we estimated a player's rating, matched position and factored in various factors other than stats to estimate the player's price.

c. Functions

The implementation is carried out using different functions to calculate ratings such as **gk-rating** etc., and take player position specific inputs like **enter-forward-props**.

First, the attributes of the players are recorded by the user then the system **asserts** the player and position to the fact. Once the facts are asserted rules to calculate the ratings based on the position are implemented followed by rules that categorizes the players into age groups. Once the player fact is matched with an age bracket, the **base price** and other attributes are factored in to estimate the player's current market transfer fees.

Test Cases:

1. Player Position: Forward

Age: 23

```
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Jess Version 7.1p2 11/5/2008

This copy of Jess will expire in 1818 day(s).
f-0 (MAIN::initial-fact)
For a total of 1 facts in module MAIN.
Enter the footballer's Name:
Werner
Enter the footballer's Age:
23
Enter the footballer's Position: DEF MID FOR GK
FOR
Does the footballer belong to same(1) or different league(0)?
0
In which division does the team he play for belong?
1
Enter the footballer's appearances:
128
Is the player important(1) or a backup(0) in his current team
1
Enter pace score:
90
Enter goals score:
75
Enter shooting score:
86
Footballer is in learning age, estimated vale 80.0million Euros
```

2. Player Position: Midfielder

Age: 28

```
Jess, the Rule Engine for the Java Platform
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```

```
This copy of Jess will expire in 1818 day(s).
f-0 (MAIN::initial-fact)
For a total of 1 facts in module MAIN.
Enter the footballer's Name:
Kante
Enter the footballer's Age:
28
Enter the footballer's Position: DEF MID FOR GK
MID
Does the footballer belong to same(1) or different league(0)?
1
In which division does the team he play for belong?
1
Enter the footballer's appearances:
213
Is the player important(1) or a backup(0) in his current team
1
Enter pace score:
86
Enter assists score:
70
Enter dribble score:
74
Enter passing score:
86
midfielder is at Peak age, rating:0.4 estimated vale 48.0million Euros
```

3. Player Position: Defender

Age: 32

```
Jess, the Rule Engine for the Java Platform
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```

```
This copy of Jess will expire in 1818 day(s).
f-0 (MAIN::initial-fact)
For a total of 1 facts in module MAIN.
Enter the footballer's Name:
Azpi
Enter the footballer's Age:
32
Enter the footballer's Position: DEF MID FOR GK
DEF
Does the footballer belong to same(1) or different league(0)?
1
In which division does the team he play for belong?
1
Enter the footballer's appearances:
250
Is the player important(1) or a backup(0) in his current team
1
Enter interception score:
79
Enter tackle score:
82
Enter clearance score:
82
Enter marking score:
86
defender has Matured, estimated vale 33.00000000000001million Euros
```

4. Player Position: Goalkeeper

Age: 19

```
Jess, the Rule Engine for the Java Platform  
Copyright (C) 2008 Sandia Corporation  
Jess Version 7.1p2 11/5/2008
```

```
This copy of Jess will expire in 1818 day(s).  
f-0 (MAIN::initial-fact)  
For a total of 1 facts in module MAIN.  
Enter the footballer's Name:  
David  
Enter the footballer's Age:  
19  
Enter the footballer's Position: DEF MID FOR GK  
GK  
Does the footballer belong to same(1) or different league(0)?  
1  
In which division does the team he play for belong?  
2  
Enter the footballer's appearances:  
30  
Is the player important(1) or a backup(0) in his current team  
1  
Enter clean-sheets score:  
78  
Enter reflex score:  
82  
Enter handling score:  
73  
Enter kicking score:  
75  
Goalkeeper is young, rating:0.6000000000000001 estimated vale 2.5200000000000005million Euros
```

Some of the estimates has a **rating** attached to them. This will help the manager and clubs scouting young talents. Young players are priced more on the skill level and ratings help to gauge future rating and price of the players.

Limitations:

With respect to the scope of the project, not all the contributing attributes of the player was considered, this could influence the transfer fee of the player. Only the topmost important were chosen here. Another limitation would be the binary logic core implementation. It is very hard to gauge some of the aforementioned properties into binary values as they tend to carry much more information. For example, the attribute squad-status carries information about the player's role in the current team, we have implemented it as important or not important here, however, a player could be indispensable for his team, good substitute or just backup for a position. It becomes hard to integrate such details using just binary logic for calculation.

****Instruction for running the code:**

Please load the program into the eclipse environment and then run it as jess application (right click in the program pane)

