

Decision Support System for a Soccer League

Introduction:

The scope of this project is to show the data of the soccer teams from England which play in a league called English Premier League. The league comprises of 20 teams play against each other season of which one crowned champion of that season. Also, each season bottom three teams are eliminated and new three teams come into the league. Every team plays a total of 38 matches in one season. 17 in their home stadium and 17 in the away (every opponent's) stadium. For every match won the team gets 3 points and for a draw result both the teams get 1 point each. At the end of the season the team with the most points win the league that season.

The database consists of different data that are used for different purposes. These data are extracted to form different statistics, comparing results and showing what decisions managers can make to improve their team's performance in the coming matches or for the next season.

The Data included are:

General Attributes- Teams, Points in a season, Rank in a season, Goals scored, goals conceded

The following are the attributes used to determine how strong a team is.

Attack attributes – Total passes, total through balls, corners, total long balls

Defense attributes – Tackles, clearances, interception, dispossessed, clean sheet

Goal Keeper attributes – Penalties conceded, penalty saves.

Match attributes – Match played, the result of the match

Another attribute

New Player – If a player decides to buy a new player then this data will help them choose.

Demand of User:

A system has been created for a user who could be a manager in a soccer league. This system could help the manager be prepared for future matches or for the whole season. There are statistics and visualization of data that will help the manager identify the key areas which needs to be improved. This could help the team be prepared for the matches. Identify weakness of the opposing teams etc.

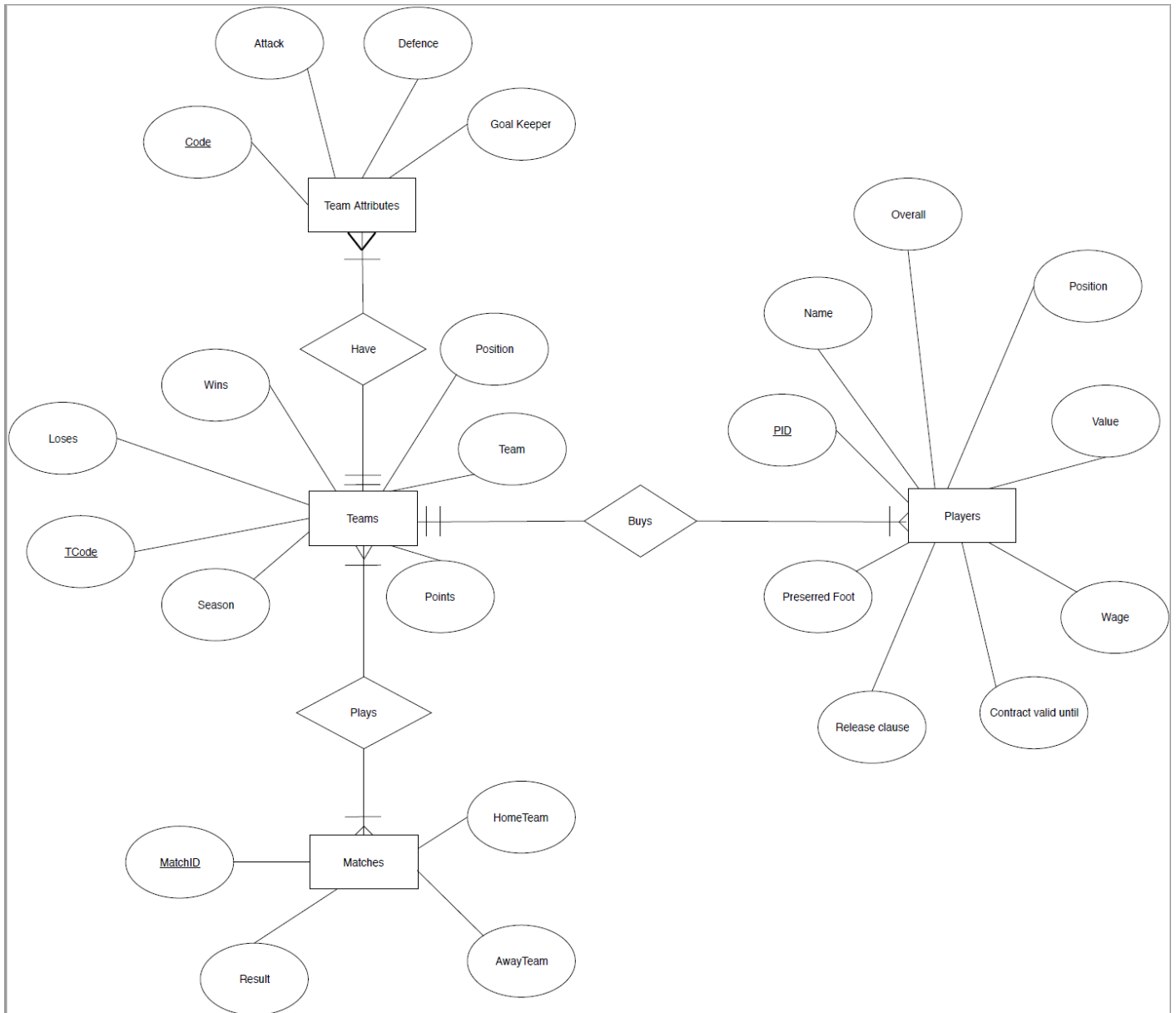
These types of systems are common in the soccer world. As every team wants an advantage over the opponent and it would be helpful if this data is gotten way before the match. As this will help the team train with specific drills and improve attack or defense tactics.

What are the different types of decisions made and how are these demands being met are explained on the document.

Entity-Relation Diagram:

Here we make one assumption.

A player is always in certain team. In the actual football worldS there can be players that may be out of contract and can be not part of any team.




The database was created and loaded into MySQL. A connection was established between VBA and MySQL where the query that was created returned the data from.

Decision Support Function: (System)

UserForm1: Main Page

Main Page

Premier League Statistics from seasons 07/08-17/18



Last 11 years

Detailed Stats

Match Stats & Probability

Buy a New Player

EXIT

UserForm2: Team Stats and Graph

Team Stats and Graph

Last 11 years Main Stats

Manchester United

2009-10

Select Team

Select Season

Points & Position

Goals Scored/Against

Win %

2

85

86

28

84.21

10.53

Position

Points

Scored

Conceded

Home

Away

Graph

Graph

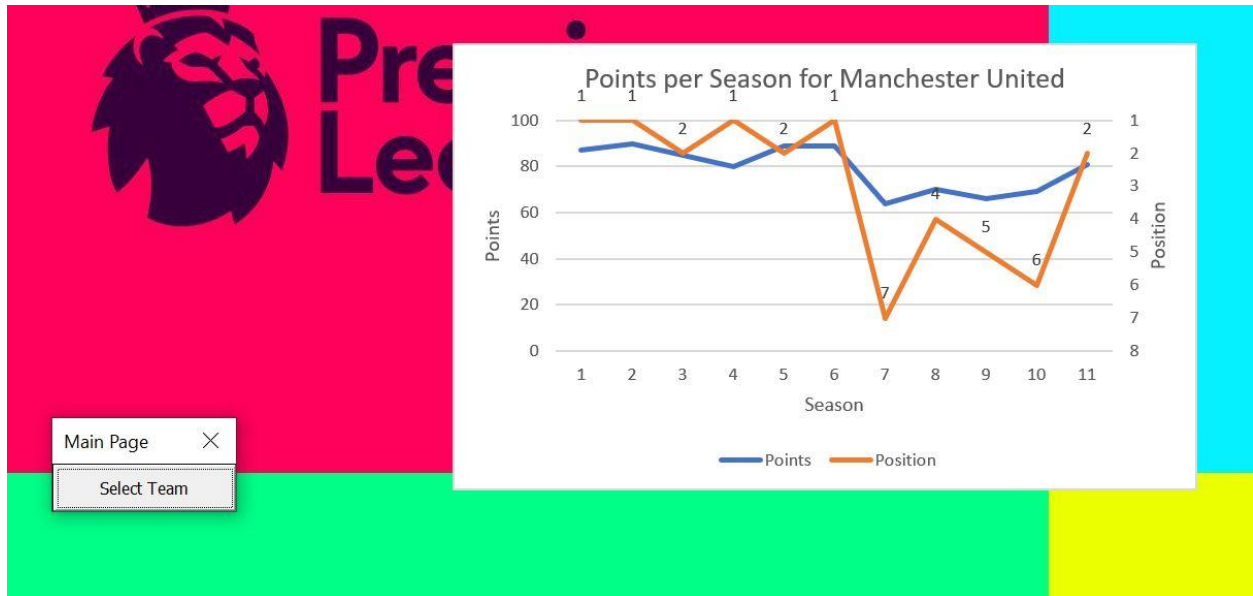
Home

Next

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This is the form that appears when Last 11 years is chosen from the initial page. Here we must select the team who's details we want to know. We come to know the rank of the team and the position on the left most side of the form. In the middle of the form we come to know the goals scored by and against a team and in the right most part of the form we come to know the win percentage that is calculated from the data of wins and losses.

In the same form we can come to know the same statistics that will be displayed in graphical format. This can be used to see the performance of the team across the years by any team. We can choose different season and see the Rank and Points



In the previous graph we plot the points by the selected team. Along with this we can choose other parameters like goals scored and conceded. An example is shown below. This visualization can be done for any team in the list.



UserForm3:

This form is useful mainly to the managers to understand the team's performance and compare them to the average performance that year in the league. The attributes on which the teams are mainly evaluated are the attack, defense and penalty record.

Attack		
Passes	19802	16161.1
Throughballs	101	81.75
LongBalls	2040	1954.1
Crosses	794	860.85
Corners	284	211.75

Defence		
Tackles	795	727
Interceptions	526	591.1
Clearance	914	1227.65
Own Goals	1	2.35
Dispossed	529	453.65

Penalty Record		
Penalties Conceeded		5
Penalty goals		4
Penalty saves		1
GK save %		20

UserForm4: Team wise Stats

The next part shows result of all the matches that were played from season 2007-2008 to 2017-2018. Any two teams from the result can be selected and a result can be found. The form also gives a probability that is shown at the bottom of the form this shows what is the chance of the team to win in future.

Result	Probability
Home Win	0.55
Draw	0.09
Away Win	0.36

Userform5: Buy a Player:

If a manager decide to buy a new player to strengthen his team. Then they can look up in this database according their requirement. The position and preferred foot must be selected of the options we need to look for. Then in the list box all the values with the two selected options are shown.

The screenshot shows a web form titled "Buy a Player". It has two dropdown menus: "Select Position" with "RF" selected and "Preferred Foot" with "Left" selected. Below these is a list box containing the names: L. Messi, L. Podolski, C. Ciano, D. Moberg Karlsson, K. Tamada, and G. Notsuda. To the right of the list box are two buttons: "Find" and "Find Details". At the bottom are three buttons: "Home", "Back", and "Exit". On the right side of the form, there is a vertical stack of labels for player statistics: Overall, Potential, Current Club, Worth, Wage, Contract Valid Unit, and Release Clause. Each label is next to an empty input field.

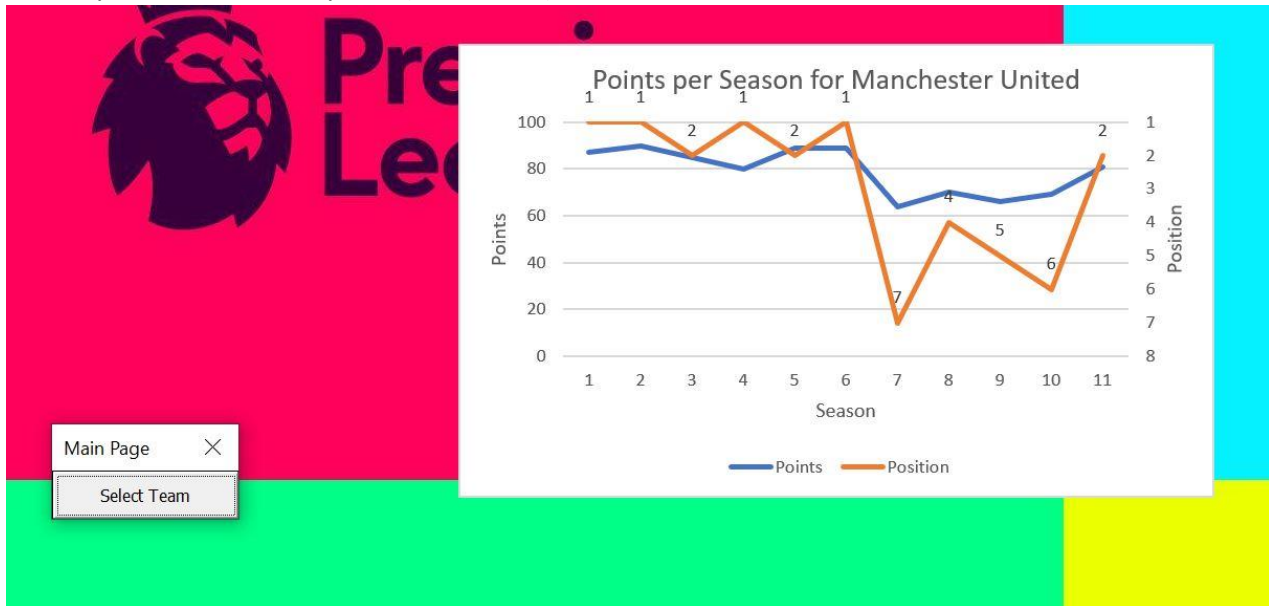
Then when we select from a list box and then all the details of that player are being shown. This could help the manager set aside budgets if they decide to buy a player.

This screenshot shows the same "Buy a Player" form, but now the player "L. Podolski" is selected in the list box. The "Find" button is highlighted. The statistics on the right are now populated with data for L. Podolski: Overall (78), Potential (78), Current Club (Vissel Kobe), Worth (€6.5M), Wage (€11K), Contract Valid Unit (2019), and Release Clause (€8.1M). The background image of the form shows a soccer player in a blue jersey.

Decision Support:

By the system created we can make a few decisions. These statistics will help the manager make decisions that will help the team improve and work on their weaknesses.

1. From the graphs that were created we could come to know around how many points will a team have to get to stay in the top 5 teams or top 10 teams. Points by each season from the team who was ranked 1 in most years in the last 11 years. (UserForm2)



2. From the graphs a user can also say how many goals need to be scored to win matches or score certain points. Below are the graphs of a team who has been on the top which can be used to compare. We can clearly see in the beginning season the conceded more goals than scored. (UserForm2)



3. From the below image we can see a team who is below average. From the stats we can see that the attacking stats are below average. From this the Manager can take decisions like he can buy a new attacker or a better passer. Even when we look at the penalty records are not acceptable. So, the manager may think to buy a new Goal Keeper. (UserForm3)

Teamwise Stats

Select Team: Wigan Athletic | Select Season: 2010-11

Attack			Defence			Penalty Record		
Passes	14823	15211.6	Tackles	677	778.45	Penalties Conceded	4	
Throughballs	82	129.85	Interceptions	520	620.25	Penalty goals	4	
LongBalls	2350	2161.65	Clearance	1205	1238.3	Penalty saves	0	
Crosses	1104	880.6	Own Goals	2	1.95	GK save %	0	
Corners	241	208.15	Dispossed	426	489.1			

Buttons: Find Attack Stats, Average, Find Defence Stats, Average, Find Penalty Stats, Home, Next, Back

4. Based on the decision the manager can buy a player according to the team's budget. So, if the manager wants to buy an attacker so he can score more goals the user can look up positions ST, RF, LF, CF from the positions and select a player according to the budget and availability. **Release clause** is an attribute of a player where if a team wants to buy a player before his contract ends at the current club then they would have to pay a higher fee than the worth amount. So, the manager would have to request a higher budget amount. (UserForm5)

Buy a Player

Select Position: CF | Preferred Foot: Left

Find | Find Details

Player List:

- A. Milik
- A. Ruiz
- G. dos Santos
- B. Kuwas
- G. Stewart
- S. Skrabbe
- M. Starke
- J. Villarreal
- J. Dürer
- T. Lee

Player Details:

- Overall: 75
- Potential: 75
- Current Club: LA Galaxy
- Worth: €6.5M
- Wage: €10K
- Contract Valid Until: 2019
- Release Clause: €9.8M

Buttons: Home, Back, Exit

Development and Implementation: (UserForm4)

In the UserForm4 there is a place where the probability of the teams can be calculated. This value is calculated from the previous match data of the two teams. Since there is an advantage of the team playing in its home ground it could have a higher probability of winning.

In the below image we can see the same two teams are selected and the results are displayed. The one on the top shows the home record of the team "Chelsea" and the bottom one shows "Tottenham".

From this statistic we can show that both teams have a high chance of winning at their home. But if you see the second image it shows "Chelsea" can draw at the home ground of the other team. Which could be a positive thing for "Chelsea" but similarly "Tottenham" would want to improve their attack if the want to win at their home stadium against "Chelsea".

The probability was calculated using inner joins on the table by selecting different count values from the database.

The screenshot shows a web form titled "Result and Probability". It features three dropdown menus at the top: "Home Team" (set to Chelsea), "Away Team" (set to Tottenham), and "Season" (set to 2009-2010). Below these are buttons for "Home", "Show Result", "Calculate", and "Back". The main display area shows the calculated probabilities: "Home Win" at 0.55, "Draw" at 0.36, and "Away Win" at 0.09. The background is a collage of football-related images, including the Chelsea and Arsenal crests and players in action.

Result	Probability
Home Win	0.55
Draw	0.36
Away Win	0.09

The screenshot shows the same "Result and Probability" form, but with the roles reversed: "Home Team" is now Tottenham and "Away Team" is now Chelsea. The "Season" remains 2009-2010. The calculated probabilities are: "Home Win" at 0.36, "Draw" at 0.45, and "Away Win" at 0.18. The layout and background are identical to the first screenshot.

Result	Probability
Home Win	0.36
Draw	0.45
Away Win	0.18

Conclusion:

This is a very user friendly system with easy inputs from the user. From the support system created managers of the teams can make decisions to improve their weak areas. They can have an advantage before playing matches. Or even buy new players that will bolster the squad for the next year.

Main Decision that can be made from the System:

- Position based on points
- Goals that must be scored or conceded to claim a position in the league
- Attack, defense attributes and comparing to the average
- A player that can be bought to improve the team strength
- Probability of a match win/lose/draw

Future scope:

- Implement a system that predicts points of a team for the next few years.
- Predict how a new player can affect the performance of the team