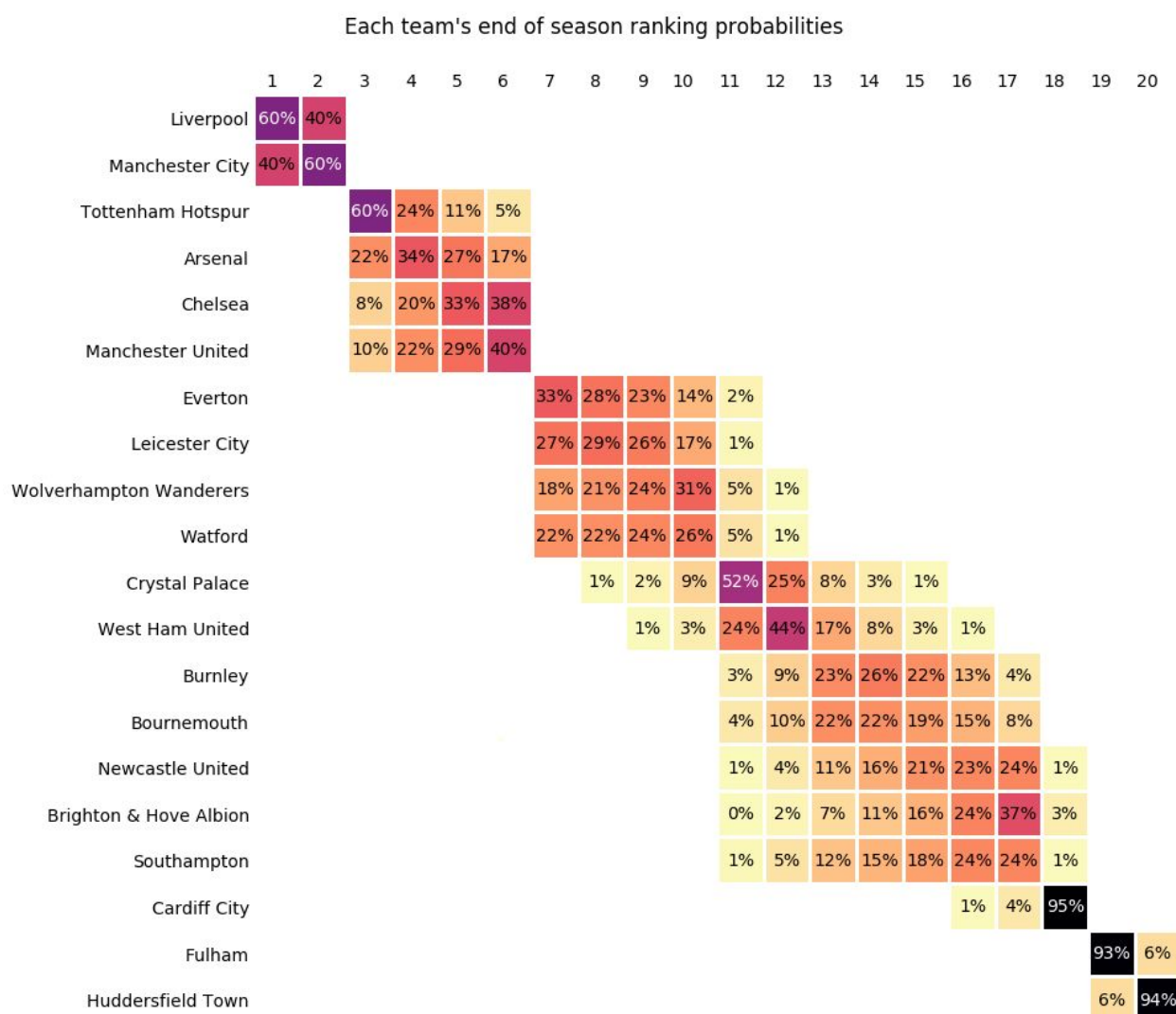


The end of Premier League season — who will fall and who will rise to the top?

The 2018/2019 season of the Premier League is coming to an end. While there are five or six matches left for each team, Liverpool and Manchester City have secured the first and second places in one of the closest Premier League title races in years. Furthermore, there will be an interesting fight for the two remaining top-four places that guarantee Champions League football next season. Currently, only five points separate third-placed Chelsea and sixth-placed Manchester United. To predict how the season will end, I simulated the upcoming games 10,000 times to see what outcomes are most likely.

To do this, I performed three steps. First of all, I used historical data from 2008 to up to this day to estimate each team's skill as a measurement of how good they tend to perform. The technique is based on [TrueSkill](#), an algorithm developed by Microsoft to better rank players in online games. Second, I used historical data from other leagues to train a machine learning classifier that can predict the outcome of new games given the difference in strength between the opposing team, the importance of the game, current standings in the league table and how well the team performed during this season. Third, I simulated each upcoming game 10,000 times. The final results were accumulated to predict the most likely end of season ranking of each team. Enjoy!

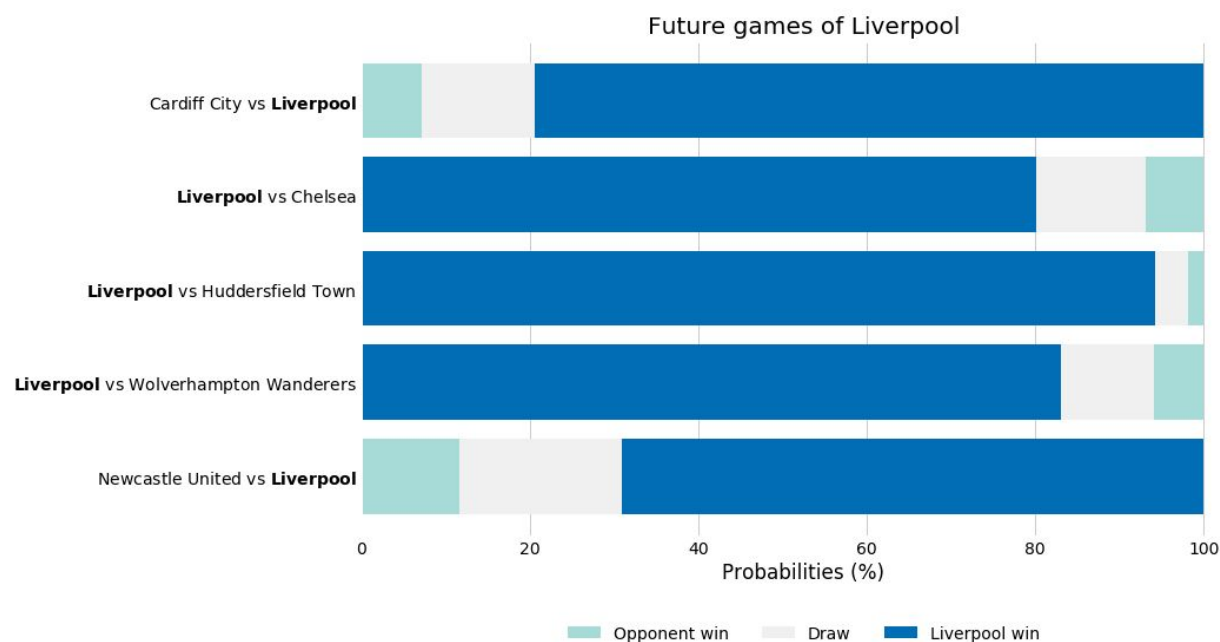


Who will win the Premier League?

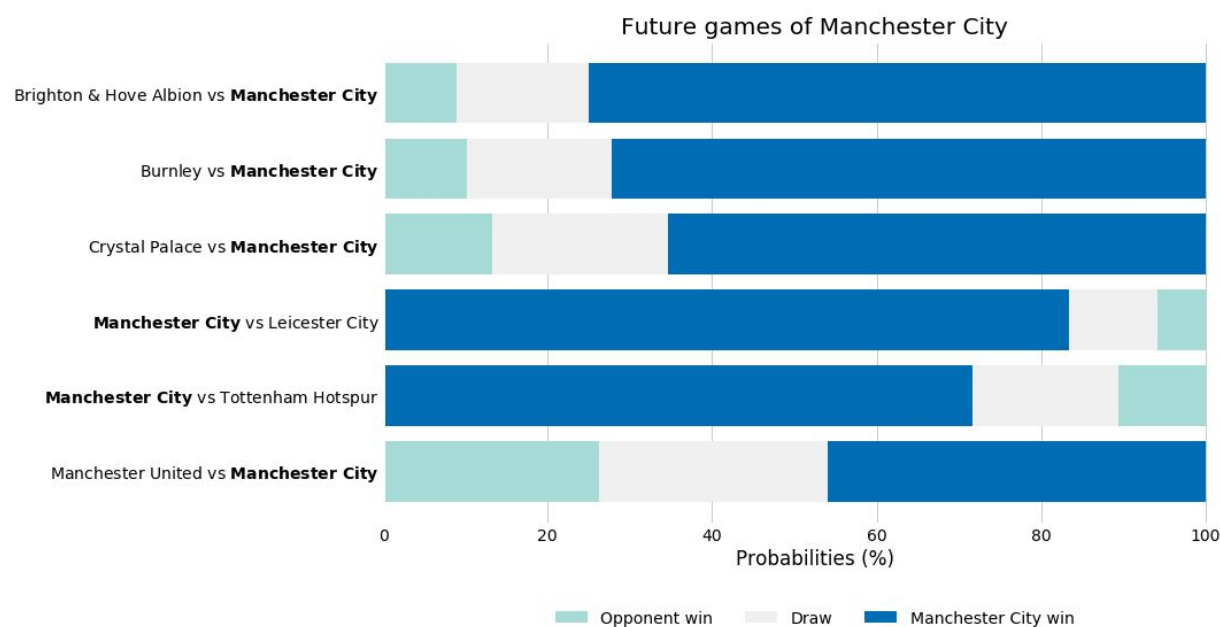
The moment that you have been waiting for. Who will the Premier League in 2018/2019 season? Will it be Liverpool or Manchester City? Only two points separate both teams, though Manchester City has one more upcoming game than Liverpool. If the teams would end their season with perfect games, the upper hand is for Manchester City. However, how likely is such a turn of events? Let's look at the upcoming matches for both teams.

Liverpool has five upcoming matches in total. Those matches are against Chelsea, Cardiff City, Huddersfield Town, Newcastle United and Wolverhampton Wanderers. Two of them are most likely to be relegated and the other one is placed currently 15th in the table. Liverpool will most likely win these games. However, there is Chelsea and Wolverhampton Wanderers which currently are positioned as third and seventh respectively in the table. Those two matches are

most likely to impact the position of Liverpool at the end of the season. Luckily for them, they are playing them at their home arena where they are undefeated this season.



Then there is **Manchester City** with six upcoming games. Those are against Crystal Palace, Tottenham Hotspur, Manchester United, Burnley, Leicester City and Brighton & Hove Albion. The most troublesome encounters are against Tottenham Hotspur and Manchester United being home and away games respectively. If Manchester City would manage to win all the upcoming games — it does not matter how Liverpool will play their games — they would certainly take the Premier League cup for the second year in a row.



Let's focus on those four crucial games of City and Liverpool. We will consider only three possible outcomes for both teams: (1) two wins, (2) one win and one draw, and (3) two losses. Then the probability of finishing first for both teams ends up being:

Probability of first place given different possible outcomes

<div>Man City</div> <div>Liverpool</div>	2 wins	1 win 1 draw	2 losses
2 wins	<div>53%</div> <div>47%</div>	<div>22%</div> <div>78%</div>	<div>2%</div> <div>98%</div>
1 win 1 draw	<div>83%</div> <div>17%</div>	<div>53%</div> <div>47%</div>	<div>9%</div> <div>91%</div>
2 losses	<div>99%</div> <div>1%</div>	<div>95%</div> <div>5%</div>	<div>53%</div> <div>47%</div>

■ Liverpool
 ■ Manchester City

As we can see from the table — if the outcomes of two games of Manchester City will be the same as the outcomes of Liverpool games or better — Manchester City has slightly upper hand to end up in the first place of the table. However, the teams that Manchester City will be facing are stronger than Liverpool's opponents. So, it comes to those four games:

Liverpool vs Chelsea (04-14)
 Manchester City vs Tottenham Hotspur (04-20)
 Manchester United vs Manchester City (04-24)
 Liverpool vs Wolverhampton Wanderers (05-12)

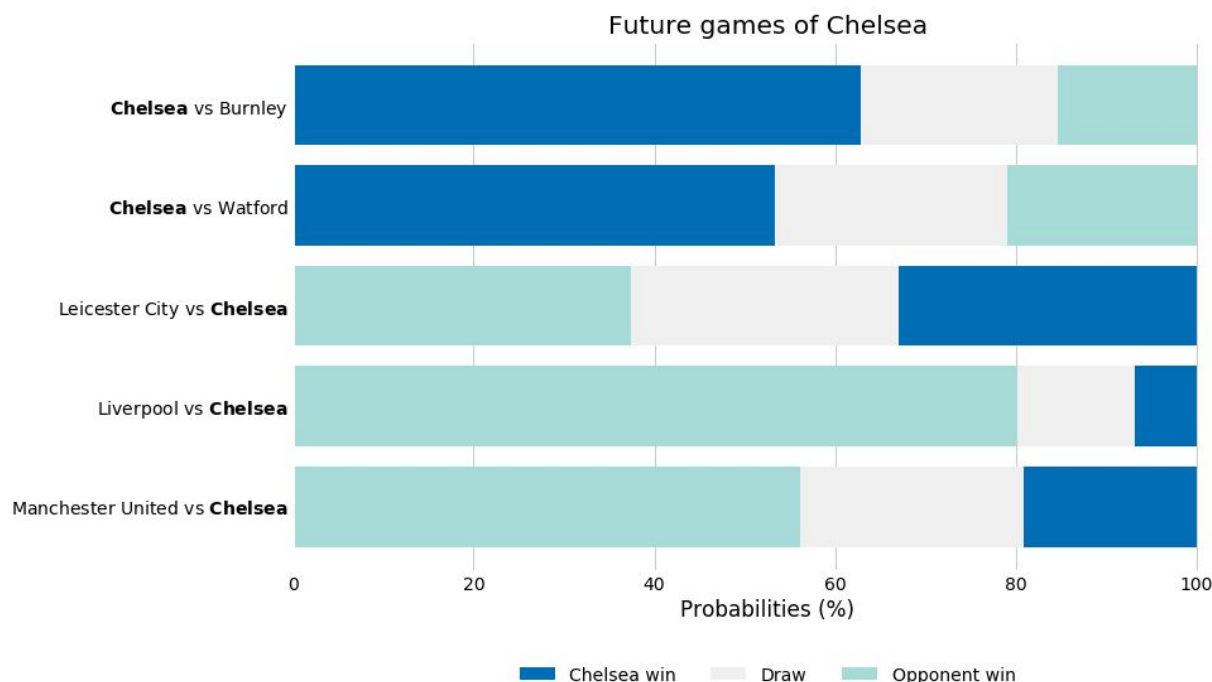
Currently, my model favours Liverpool over Manchester City with 60% vs 40% as it will play against weaker teams. However, everything could change. One game, one mistake or one successful attack could determine the outcome of the end of season table. And that is why football is called “the beautiful game”.

The fight for Champions League football

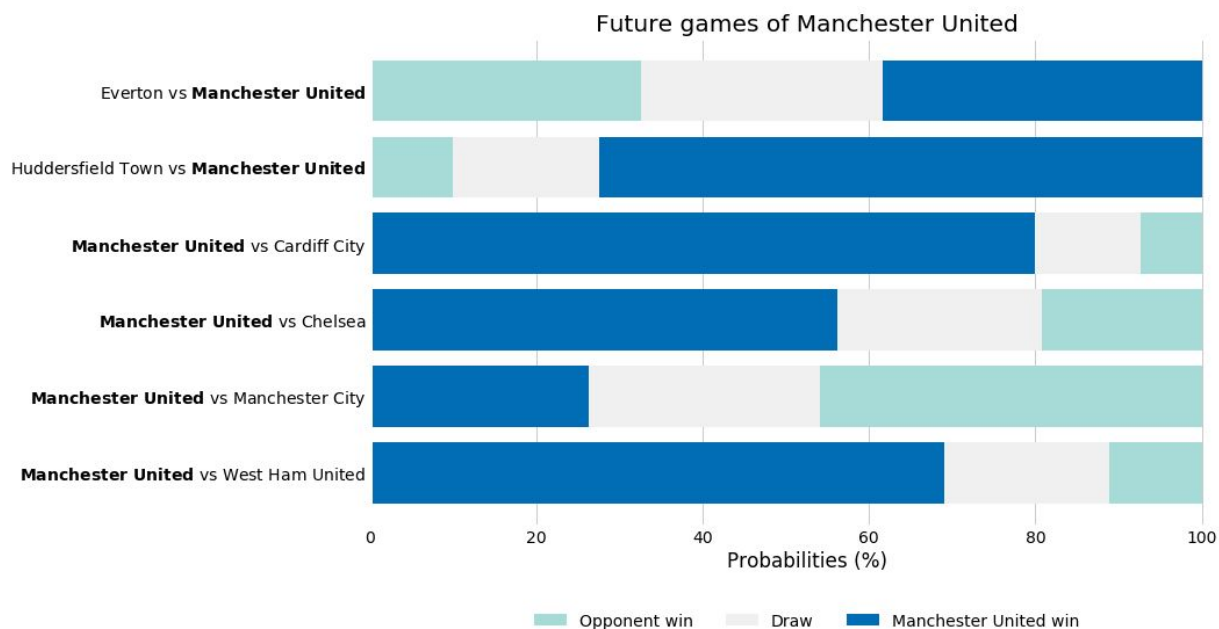
Four teams are fighting for places three and four that give access to next season’s Champions League. Those teams are Chelsea, Tottenham Hotspur, Arsenal and Manchester United which have 66, 64, 63 and 61 points respectively.

While there is no chance for **Chelsea** to compete for the first or even second place, they are currently leading the race for the third spot. Will they be able to defend this position? According to my predictions, the probability of staying in third place is only 8% and 20% for fourth place. Let’s take a deeper look at what awaits the team. The upcoming match that Chelsea plays is against Liverpool. As Liverpool stands at the top of the table, the match will be difficult for both teams. To make it even more complicated, Liverpool is playing at home where it never lost a match and drew only twice during this season (against Manchester City and Leicester City). Can Chelsea expect to win this game? Not by a long shot. The model predicts only a 7% chance of a win for Chelsea and 80% that Liverpool will defeat them. Additionally, Liverpool might try to go all in, as this match might decide if they remain at the top of the leaderboard by the end of the season. But about that later on.

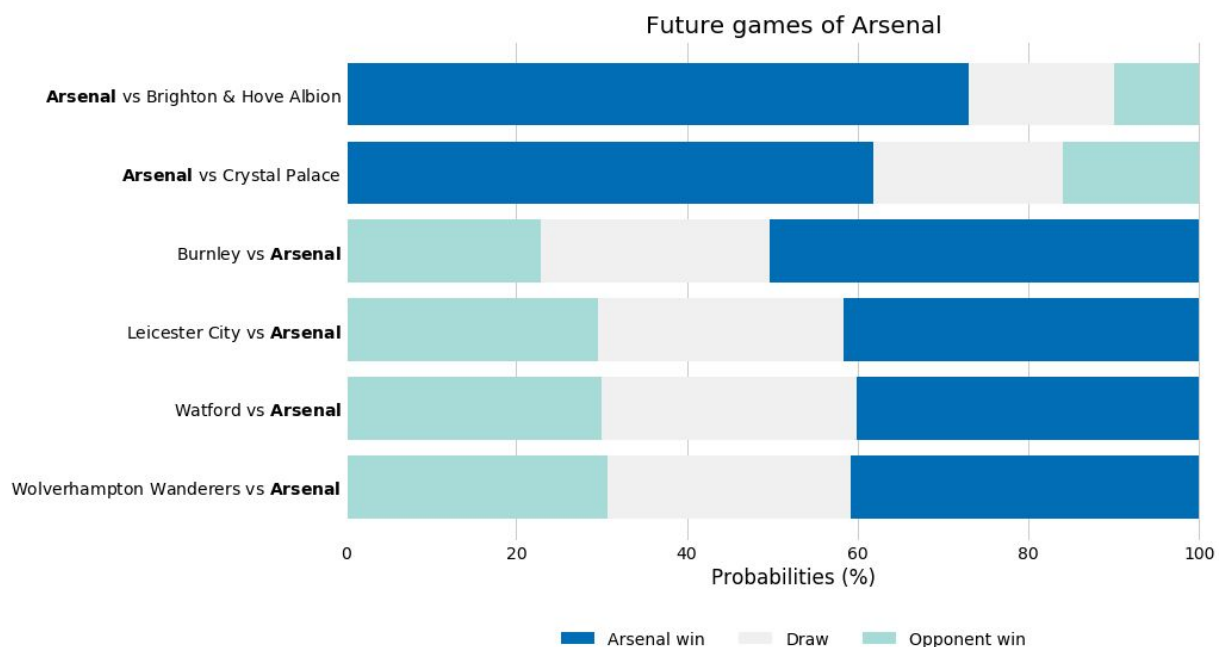
Other upcoming games are against Burnley and Watford where Chelsea is playing at home. Those games should not be that challenging to win, although there is quite a high chance of one of them ending in a draw. By winning both games, Chelsea would increase its chances from 28% to 49% to be in the top four. Then there are two away games both of them against strong teams: Manchester United and Leicester City. Undoubtedly, these games have high uncertainty and multiple outcomes are possible. Only by winning both of them, Chelsea would secure its third place. The overall probability of such a turn of events: only 8%.



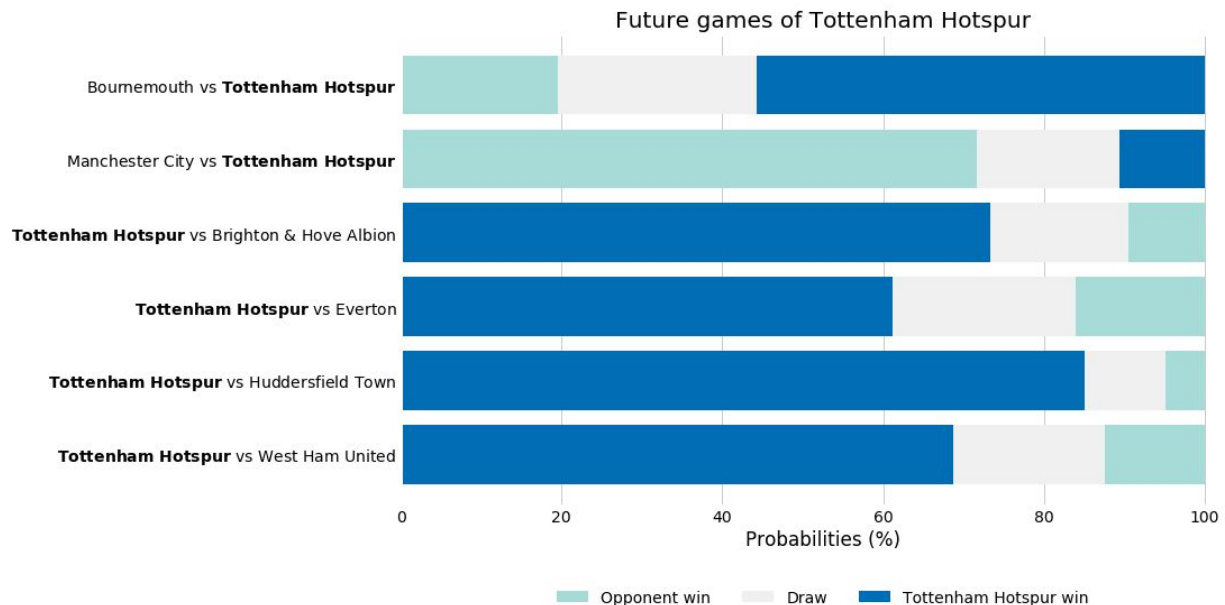
Then there is **Manchester United**. After Ole Gunnar Solskjær became the manager of the team it had quite a nice spur, winning 14 out of 19 matches. However, they are in the sixth position. They have only a 32% chance of placing in the top four, slightly higher than Chelsea. The most difficult upcoming games are against Everton, Manchester City and Chelsea respectively. And all those games are during a period of seven days. It is difficult to imagine the team being in top shape for all these games but winning against Chelsea might be the most important game left for Manchester United this season. It is also important how the team will start the week - with the most uncertain game against Everton. The model gives both teams similar probabilities of all possible outcomes with slight favour of the win for Manchester United. Next is the Manchester derby against City. While a win for City is twice more likely than a win for United, maybe the Red Devils could pull off a draw. By such turn of events (win against Everton and then a draw), the chance of ending in the top four would increase from 32% to 47%. Nonetheless, the week from April 21st to April 28th will be crucial for the team.



Arsenal also competes for a spot in the top four. One could say that they have the easiest upcoming games when compared to the other three teams. But by no means, they have secured a place in the top four as they are placed fifth in the table now. The team faces four away games with the first three of them against Watford, Wolverhampton Wanderers and Leicester City. While the model favours wins for Arsenal in those matches, the Gunners should not be too easy about it. The model assigns a win probability of about 40% to Arsenal in each of these three games. I expect at least one game to end in a draw or even home win. If one of those games ends up in a draw and Arsenal manages to win the other, the probability of being in the top 4 increase from 56% to 83%.



Last but not least is **Tottenham Hotspur**. Of all four competing teams, it has the highest chance of ending up in the top four: 84%. With only six games left to play, Manchester City and Everton are the most challenging teams it will face. Tottenham will most likely suffer a loss against City, but it has quite good chances to beat Everton as the team will be playing at home. Furthermore, the game against Everton will be during the last week of the season so by that time the final table should be pretty clear. Nonetheless, if the Toffees would lose against Manchester City and Everton their chances of staying in the top four would diminish from 84% to 64%.



In the end, there is still a lot of uncertainty left on how this season will turn out. While the relegations seem to be decided, we should see some interesting games from the top six. The title race between Liverpool and Manchester City is a must-to-watch for hardcore football fans, especially the games that were discussed in the previous paragraph. In contrast to bookmakers, my model favours Liverpool over City even though the Manchester team has played one game fewer than Liverpool. In addition to these games, we should keep an eye on the battle for Champions League qualifications, as four teams will fight for the remaining two spots. While Tottenham Hotspur and Arsenal have higher chances to take them, Chelsea and Manchester United will not go down without giving their best.