

English Premier League Monte Carlo Analysis

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Article

We chose the article “Using Monte Carlo Simulation to Calculate Match Importance: The Case of English Premier League” by Jiri Lahvicka. This article describes the process of using Monte Carlo simulations to predict the outcome of a match given the results of previous matches. It then goes further and uses Monte Carlo simulations to predict the final ranking of the teams in the English Premier League at the end of a season.

Background Information

The English Premier League is regarded as the most popular sports league in the world due to its massive audience views and impressive revenue. There are 20 teams in the English Premier League. Manchester United is considered to be the most popular football club with the Liverpool club in second. In football, a game can result in a tie as well as a win or a loss. Three points are awarded for a win, one for a draw and zero for a loss. At the end of each season, the lowest ranking three teams will be “relegated” or demoted to the lower football league, the English Football League (EFL). The highest three ranking clubs in the English Football League will be “promoted” into the Premier League.

Data and Code Setup

We wanted to use the specific variables FTR, FTAG, and FTHG, along with the identifier variables of Date, Away Team, and Home Team. There were no NA values in any of our selected variables.

We used four seasons ranging from years 2011-2015. Each team played 19 away games and 19 home games. We created functions to get the points scored and the outcome of the team for each team over the four years, specifying away or home games.

MC Estimation

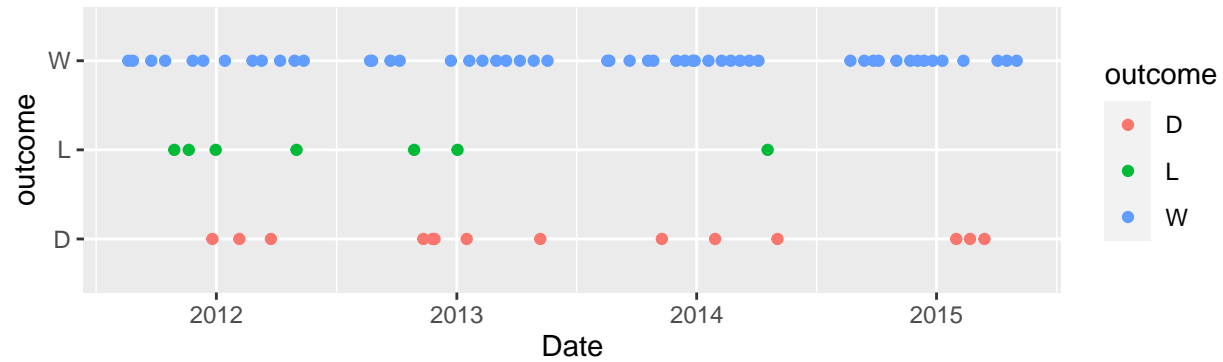
We estimated the lambda home and lambda away values, which are the expected goals scored by the home and away team respectively, using Monte Carlo. These lambda values are assumed to be independent Poisson distributed variables and are calculated using the last 19 matches for each team.

$$\lambda_{home} = \frac{\text{Average goals scored by home team} + \text{Average goals conceded by away team}}{2}$$
$$\lambda_{away} = \frac{\text{Average goals scored by away team} + \text{Average goals conceded by home team}}{2}$$

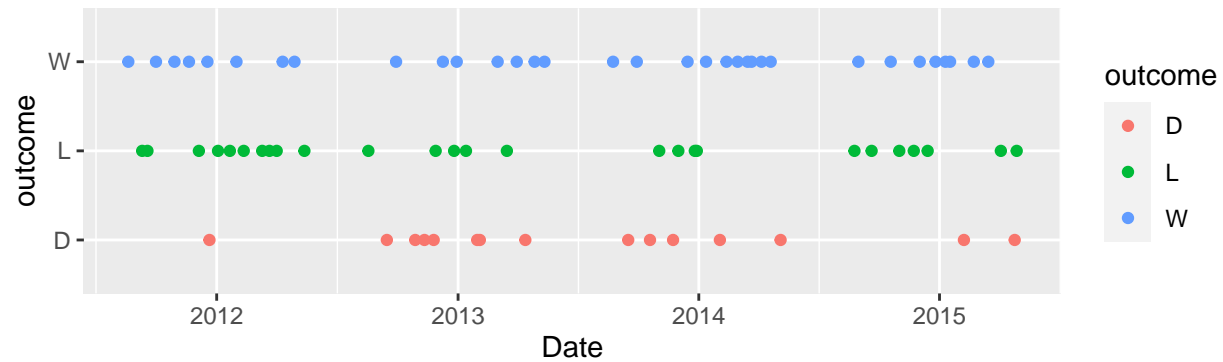
Chelsea (Home) vs Liverpool (Away) 5/10/2015

Exploratory Plot of Outcomes Before Match

A Chelsea



B Liverpool



Prediction for Match

Predictions are in terms of the home team

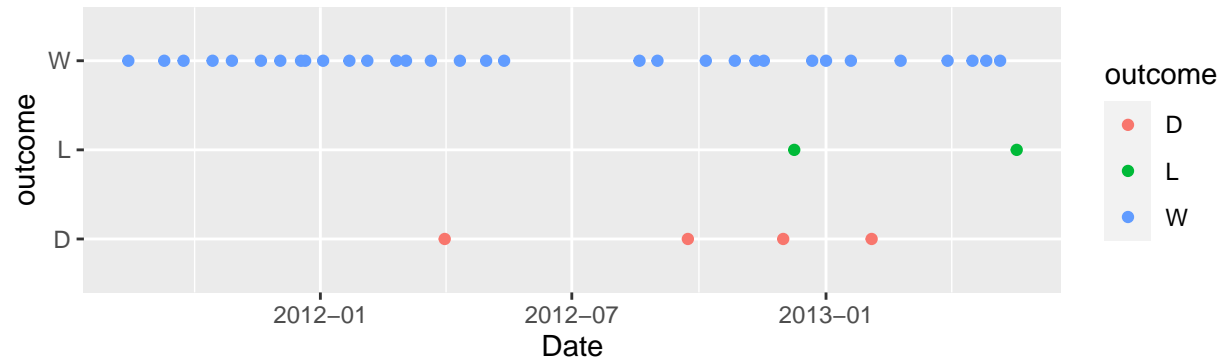
Actual result was a draw

##	Match Result	Occurrences	Percent
## 1	Win	51999	51.999
## 2	Loss	29180	29.180
## 3	Draw	18821	18.821

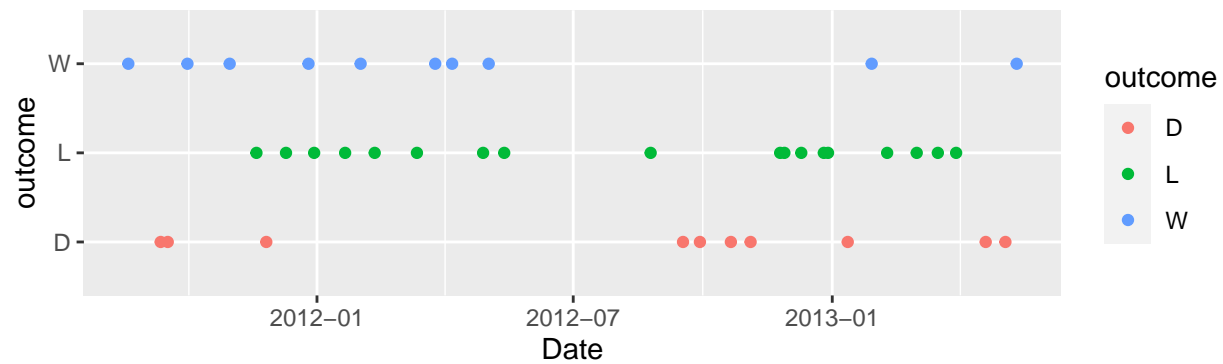
Manchester City (Home) vs Newcastle (Away) 8/19/2013

Exploratory Plot of Outcomes Before Match

A Manchester City



B Newcastle



Prediction for Match

Predictions are in terms of the home team

Actual result was a home win

##	Match Result	Occurrences	Percent
## 1	Win	60084	60.084
## 2	Loss	23188	23.188
## 3	Draw	16728	16.728