

Analysis of Online Chess Games

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MDS202423

Abstract

This project presents an **Analysis of Online Chess played on Lichess**, focusing on various matches with details like the winner, rating of players, number of moves etc. The study explores the effects of rating and opening moves on the result of match and the comparison of results according to the piece colour.

Introduction

Chess is a board game for two players. It is an abstract strategy game that involves no hidden information or elements of chance. It is played on a chessboard with 64 squares arranged in an 8×8 grid. The players, referred to as “**White**” and “**Black**”, each control sixteen pieces: one king, one queen, two rooks, two bishops, two knights, and eight pawns. White moves first, followed by Black. The game is typically won by checkmating the opponent’s king, i.e. threatening it with inescapable capture. There are several ways a game can end in a draw.

Lichess is a free and open-source Internet chess server. **Lichess** was founded in 2010 by French programmer *Thibault Duplessis*. Users of the site can play online chess anonymously and optionally register an account to play rated games.

Data Description

The **Online Chess Games** gives data for 20,058 chess games played on *Lichess*, including moves, victor, rating, opening details and more. Below is the list of column names:

| | Column Name | Description |
|----|----------------|--|
| 1 | game_id | Unique id for each match |
| 2 | rated | To show whether a match is rated or not |
| 3 | turns | To give total number of turns in a match played |
| 4 | victory_status | To show the result of match is due to Mate, Resign, Draw or Time Out |
| 5 | winner | To give winner piece colour |
| 6 | white_id | To show the id of player with white piece |
| 7 | white_rating | To give the rating of player with white piece |
| 8 | black_id | To show the id of player with black piece |
| 9 | black_rating | To give the rating of player with black piece |
| 10 | moves | To give the list of complete set of moves played in a match |

Table 1: Columns in Dataset

Exploratory Data Analysis

Percentage of Rated Matches:

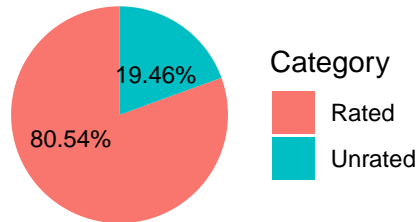


Figure 1: Rated vs Unrated Matches

There are 80.54% rated matches and 19.46% unrated matches amongst the data. According to the site, the ratings of player is affected by rated matches, the unrated matches, also called the casual matches, do not have any effect on the ratings. A new user has 1500 as their initial rating which increases or decreases according to their performance in the rated matches.

Players who played most number of matches:

There are 15635 unique players participating in the data given. The top 5 players who played the most are:

| Player ID | No. matches played | No. of Matches Won | Percentage of Winning |
|--------------------|--------------------|--------------------|-----------------------|
| taranga | 154 | 72 | 46.75% |
| vladimir-kramnik-1 | 96 | 50 | 52.08% |
| a_p_t_m_u_u | 96 | 46 | 47.92% |
| king5891 | 78 | 42 | 53.85% |
| saviter | 76 | 32 | 42.11% |

Most common Opening Moves:

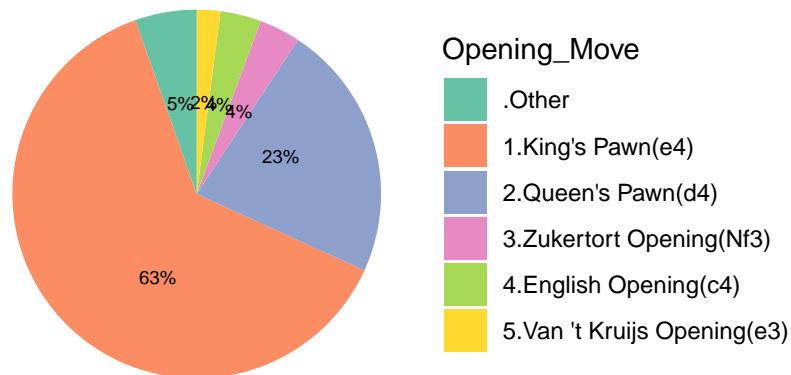


Figure 2: Most Common Opening Moves

The figure 2 shows that *King's Pawn* is the most commonly used opening move.

Number of Turns in a Match:

The summery of number of turns in a match is given below:

| Maximum | Minimum | Mean | Median |
|---------|---------|--------|--------|
| 349 | 1 | 60.466 | 55 |

Percentage of winners with respect to piece colours:

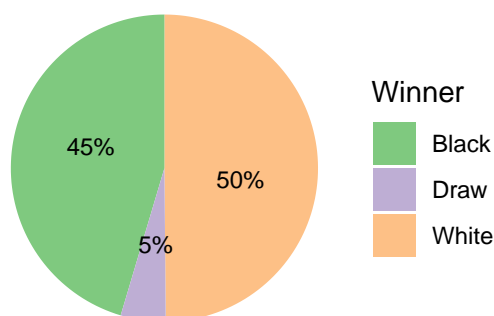


Figure 3: Winners per coloured piece

The figure 3 shows the percentage of different coloured pieces winning matches. It is seen that by less margin the player starting first wins more.

Different Victory status percentage:

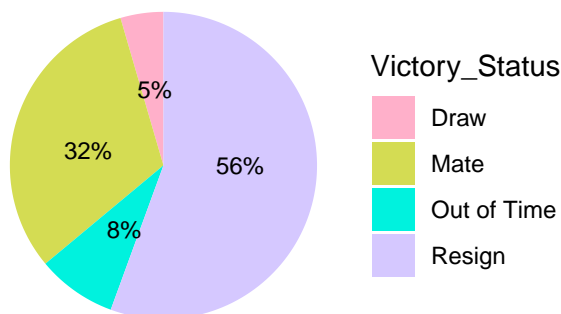


Figure 4: Victory Status

The figure 4 shows that 56% matches got over due to resignation by a player (this gives the reason of only one move in a match) and there are 8% of matches which got over due to running out of time (this gives the occurrence of moves as many as 300+ moves).

First Moves by Winners:

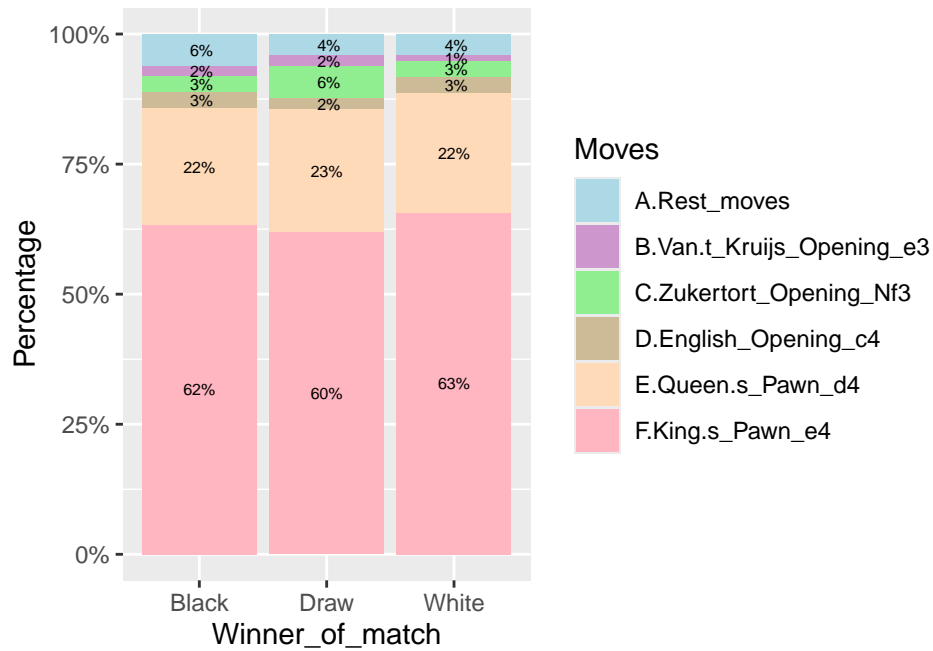


Figure 5: First Moves by Winners

The figure 5 shows that irrespective of colour of the winner, the move King's Pawn is preferred as an opening move followed by Queen's Pawn and English Opening.

Winner as per ratings:

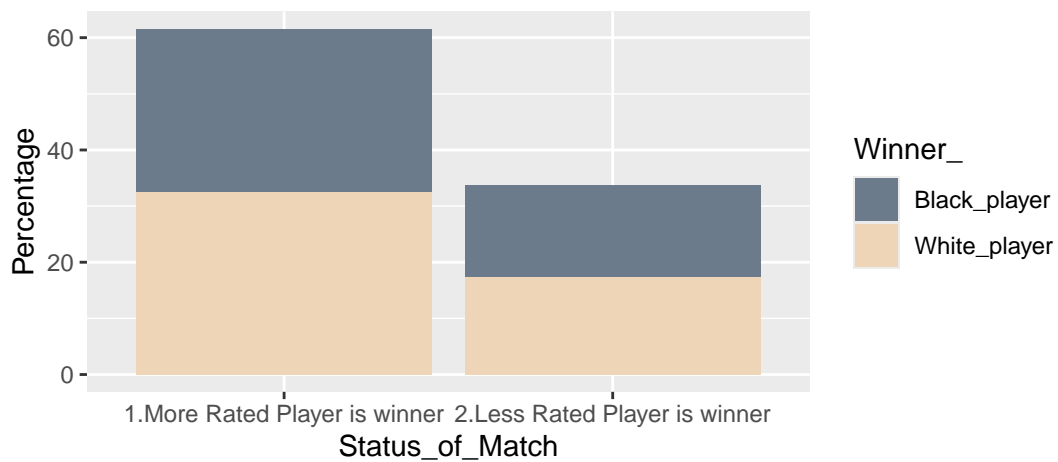


Figure 6: Rating vs Piece Colour of winner

The data for figure 6 shows that 61.58% winners were the player who has more rating and among them (32.56%) were players with white piece.

Results

- From dataset, including 20058 matches, it is observed that the users play rated matches more than unrated.
 - The average number of turns per match in the data set is 60.466.
 - More number of matches are won by player with white coloured piece.
 - A large number of matches ended due to resignation of any player followed by , winning by checkmate and draw.
 - *taranga* is the user who has played the most number of matches with winning percent 46.75%.
 - *King's Pawn* is the most used opening move followed by *Queen's Pawn*, *Zukertot Opening*, *English Opening* and *Van 't Kruijs Opening*. *King's Pawn* as an opening contributes approximately in 60-63%, *Queen's Pawn* contributes 22% and *English Opening* contributes 4% of the match winner's matches irrespective of winner's colour. This shows that whether or not the match is won by player with white coloured piece the most preferred opening is *King's Pawn*.
 - The maximum rated player has a rating of 2700, least rated player has rating 784 and mean of the ratings is 1597.
 - It is observed that high rated players won more irrespective of their colour.
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Conclusion

The pie chart of the *rated vs unrated matches* gave the proportion of rated matches which contributed to change in ranking of the players. The pie chart and stacked bar graph used to show the most common opening moves also showed the relation of the opening move with the winner of the match. Both the graphs showed the preference of King's Pawn as the opening irrespective of colour of the winning piece. The pie chart of *winners per colour* gave the percentages of matches won, showing that the player with white coloured piece won the most and the *Rating vs Piece Colour of winner* stack chart furthermore showed that irrespective of colour of the player's piece, player with more rating won more matches.

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