

Online Chess Game Analysis

Evaluation and Comparison vs Engine

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Abstract

In this project, we have taken a data set containing online chess games played on “Lichess”. We use visualization techniques in R to evaluate the level of play vs that of the “strongest” engine available. Following this, we try to compare the “centipawn loss” for “rating”, “blunders”, “mistakes”, and “inaccuracies”. This is done for both “black” and “white”. After the entire process of visualization is done we make a dashboard to explore the above-posed questions.

Keywords: Rating, Centipawn Loss, Opening Ply, R, ggplot, visualisation

Contents

1	Introduction	2
2	Definitions of Key Variables	2
3	Plots	3
4	Provisional Summary Of Analysis	7

1 Introduction

Chess has been a symbol of intelligence, impeccable strategy, and superior understanding for the last 4 thousand years. Its roots have been linked to India and sure enough, our country has produced some of the greatest players in the history of the game. But like most things, chess also been immense if not the most affected by the advent of computers and AI. Till now the game of chess has not been solved and therein lies the beauty of the game.

Things to remember:

- Chess is not solved
- Objective evaluation refers to the best move played by the “strongest” engine
- Ratings given to various players are relative to the play of the general community

2 Definitions of Key Variables

- **Rating-**A chess rating system is a system used in chess to estimate the strength of a player, based on their performance versus other players.

- **Opening Ply**-In two-player sequential games, a ply is one turn taken by one of the players. In standard chess terminology, one move consists of a turn by each player, therefore a ply in chess is a half-move.
- **Centipawn Loss**-Centipawn loss is how many hundredths of a pawn your move differs from the engine's best move. The closer to zero your score the better you are. Average Centipawn Loss is simply the average of all the centipawn losses per move over a whole game, or even many games if you care to calculate.

3 Plots

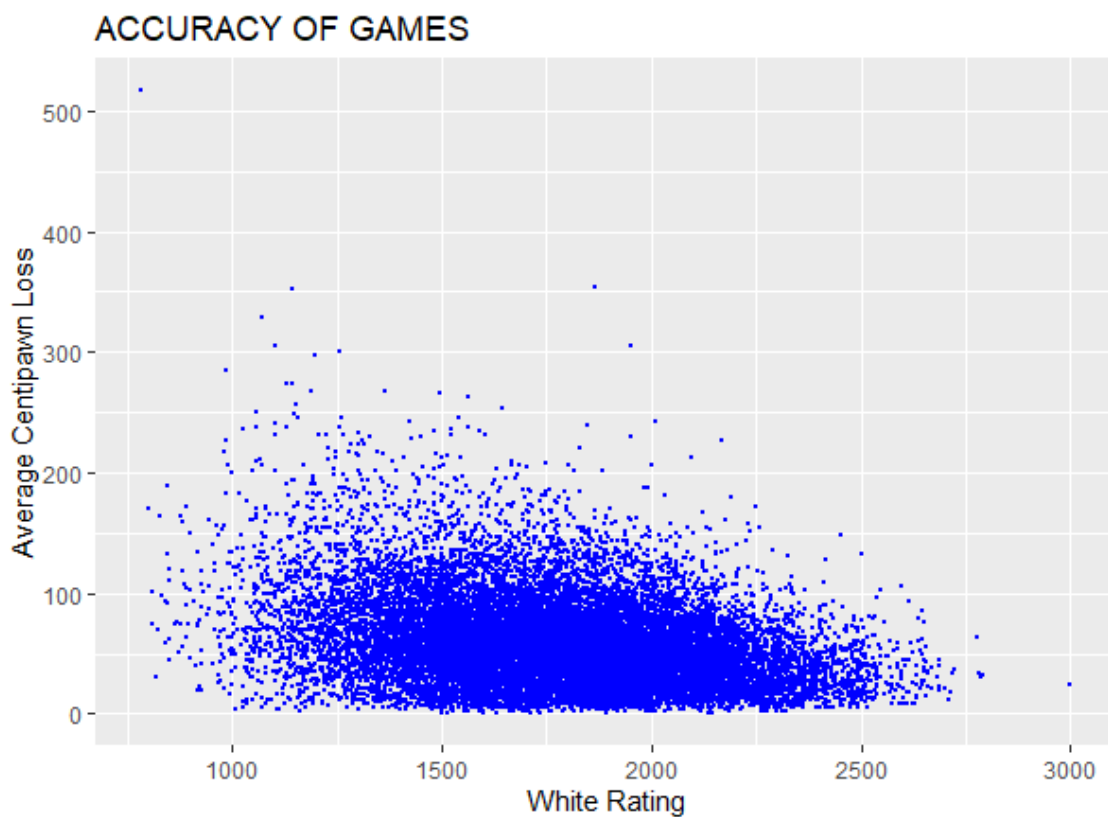


Figure 1: **Scatter Plot representation:**We see that with increasing rating the centipawn loss per game seems to decrease to a lower cluster.

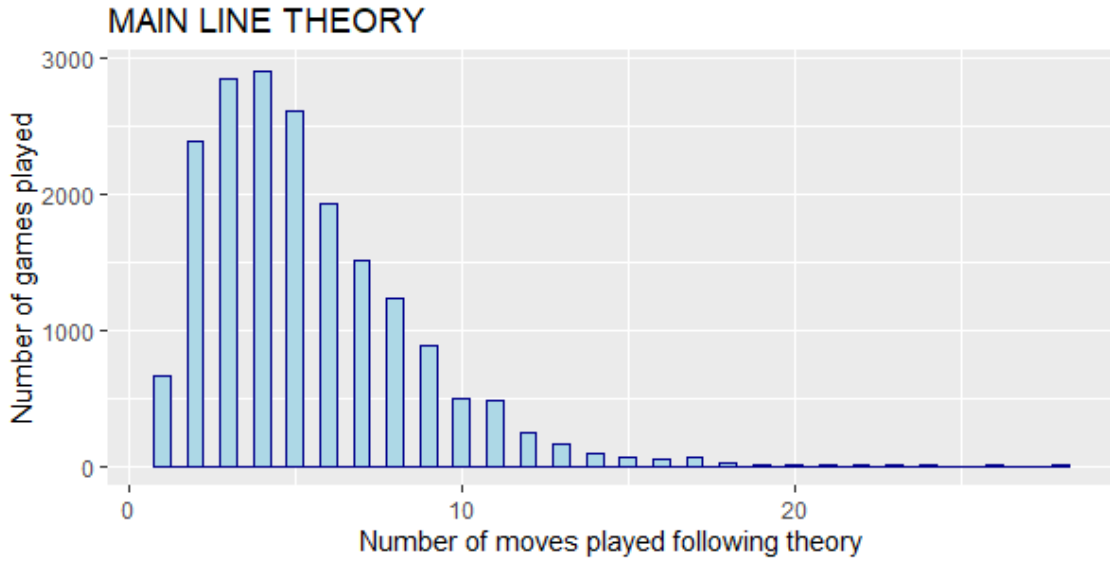


Figure 2: **Histogram representation:** We see that “Opening Ply” follows a highly positively skewed distribution. Games following more than 10 opening plies are rare.

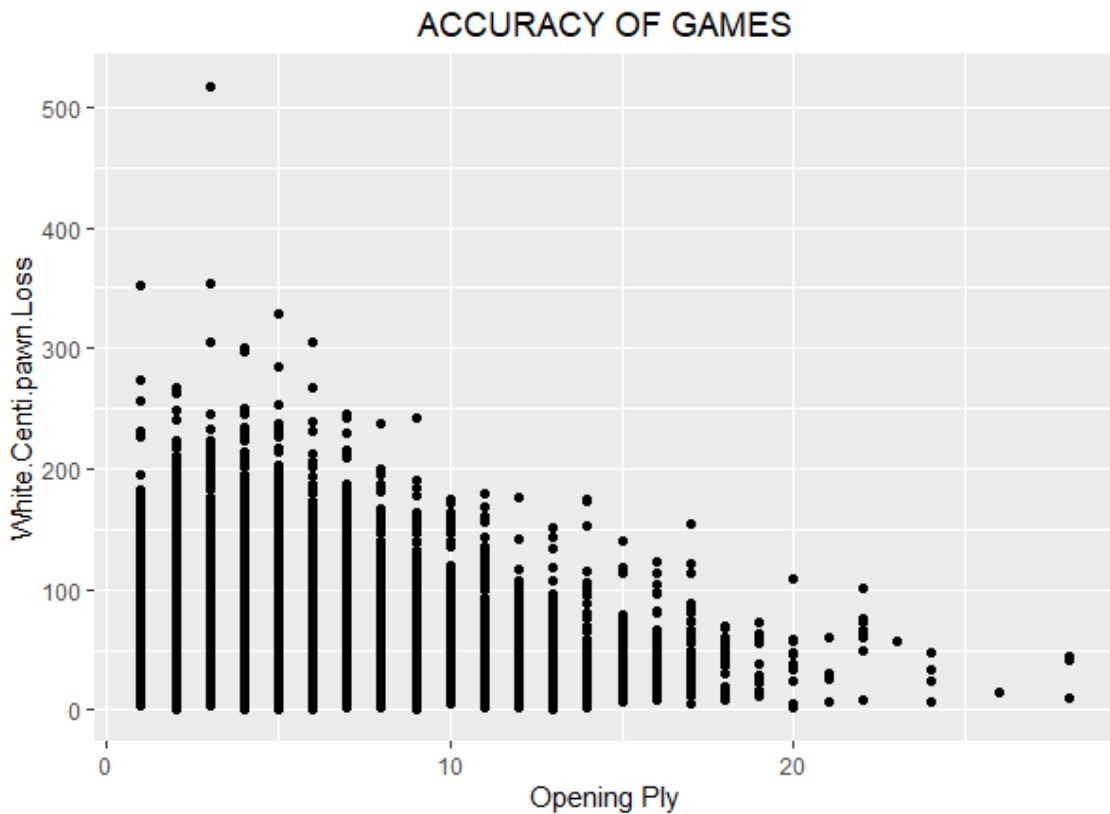


Figure 3: **Scatter Plot representation:** As intuition would have suggested, centipawn loss decreases with more no of “opening plies” i.e theory being followed.

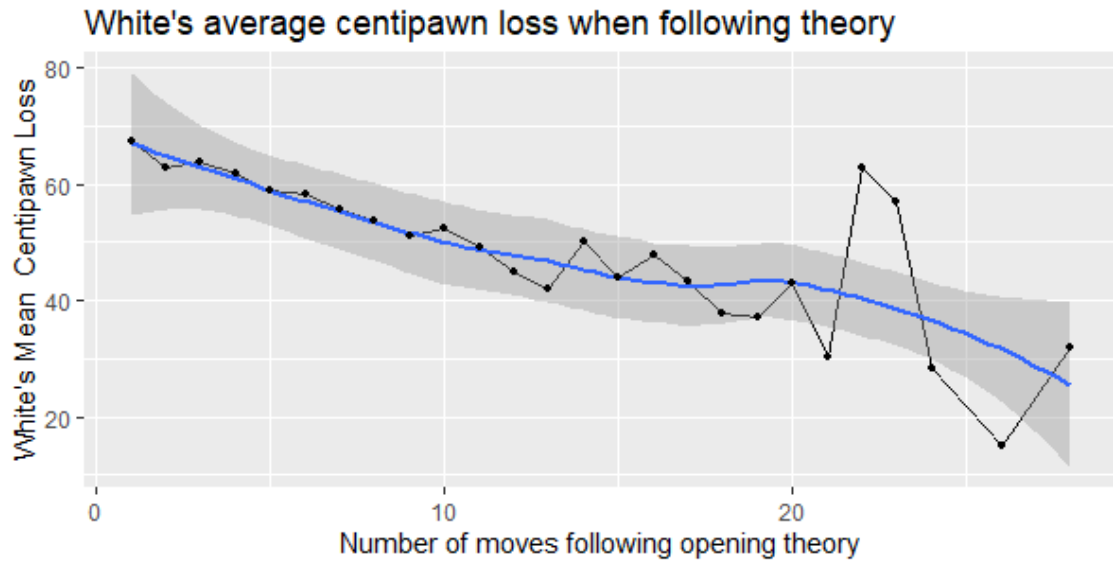


Figure 4: **Line Graph representation:**The average centipawn loss of white decreases with increase in opening plies

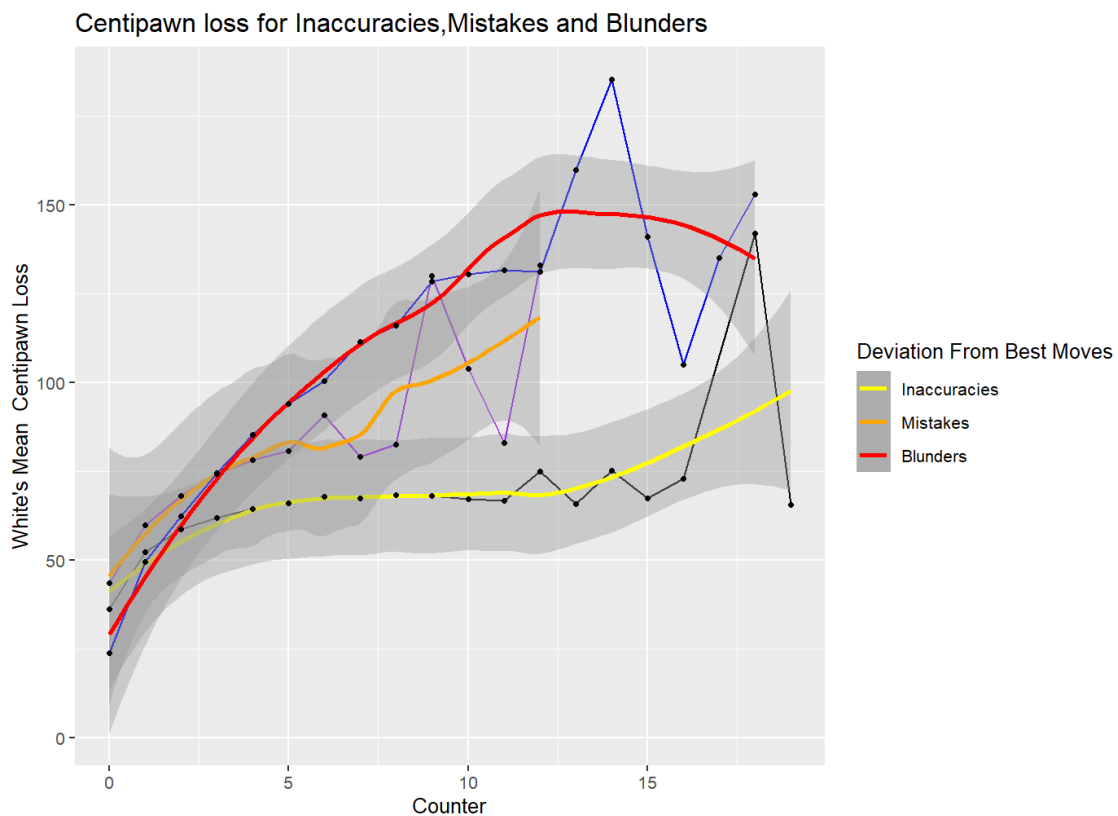


Figure 5: **Line Graph representation:**“Blunders ”result in maximum centipawn loss followed by “Mistakes” and least effect is due to “Inaccuracies.”

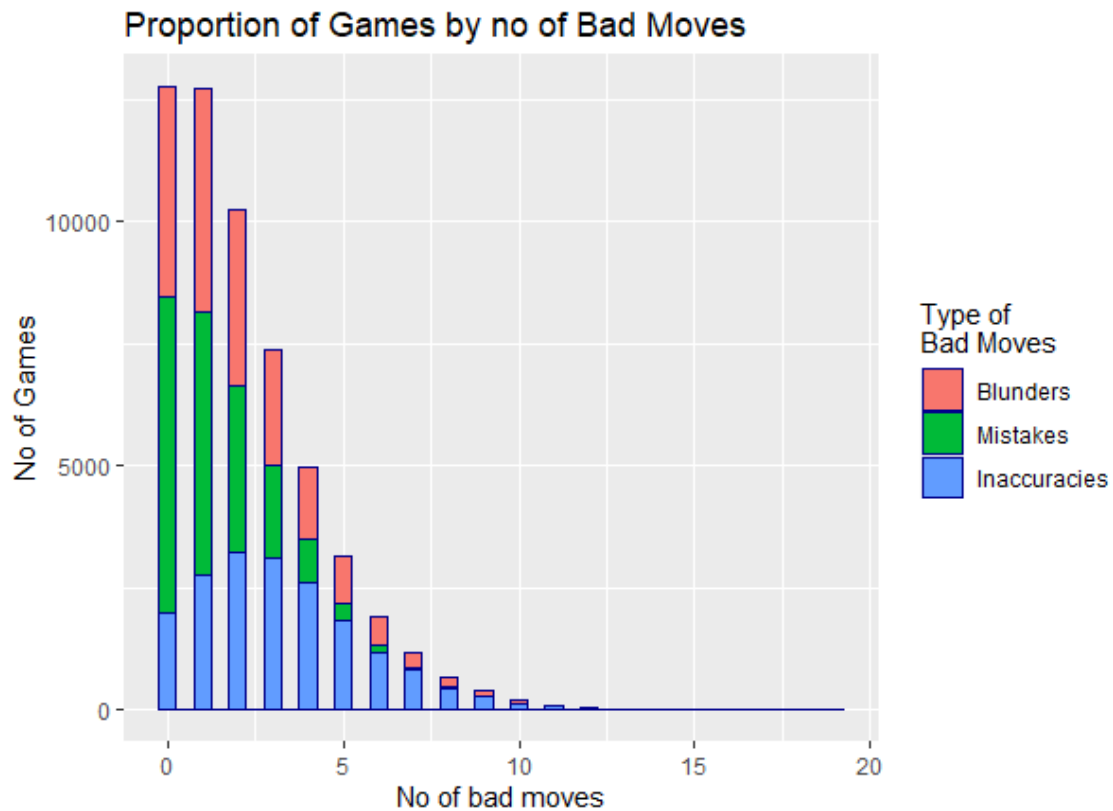


Figure 6: **Divided stacked bar plot:**As no of bad moves increase, the no of games for those moves decreases and the proportion of blunders decrease significantly.**Inaccuracies are more prone to occur.**

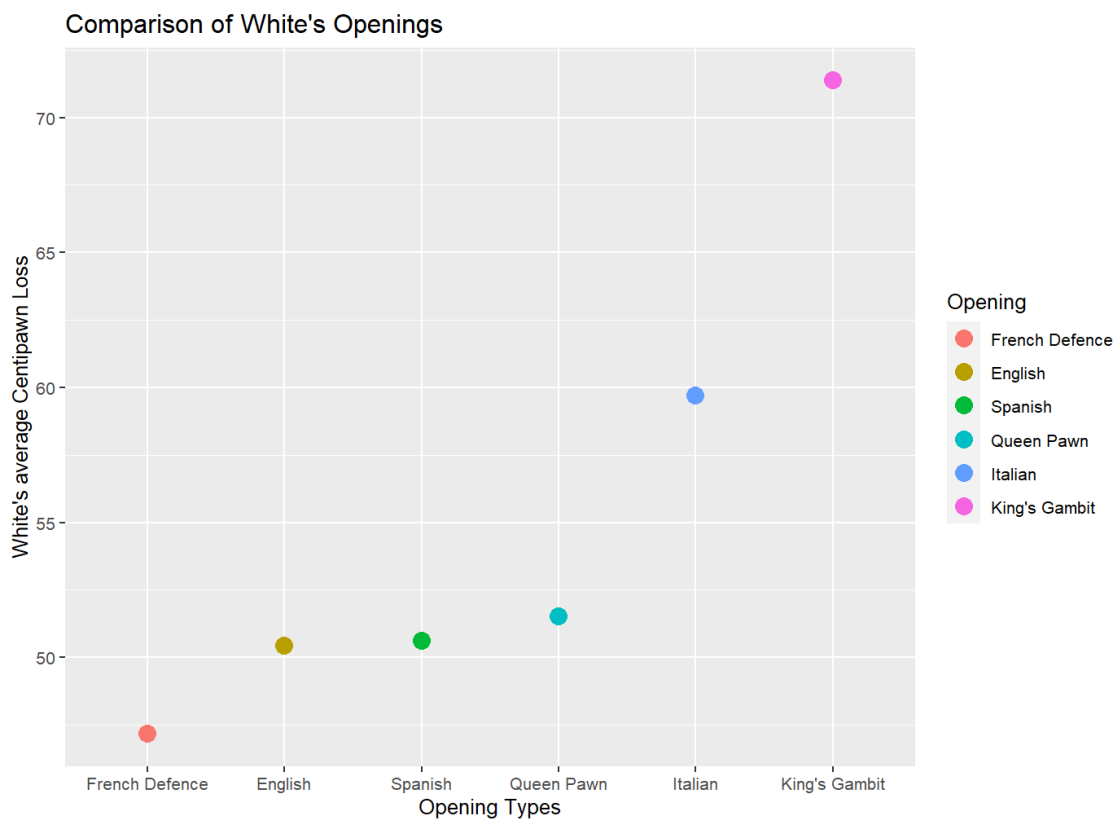


Figure 7: **Scatter Plot representation:**“French Defence” result in maximum advantage to white ,followed by “English” , “Spanish” , “Queen Pawn”.Moreover “Italian” opening results in a dual edge play and least advantage is due to “King’s Gambit.”

4 Provisional Summary Of Analysis

- **Effect of Rating**-General play from white leads to lower centipawn loss with increasing rating.
- **Effect of Theory**-General play from white leads to lower centipawn loss when following more “Opening Plies”.
- **Effect of “bad moves”**-Blunders lead to greater centipawn loss affecting accuracy levels for the same number of Mistakes and Inaccuracies. The least is due to inaccuracies.
- **General Trend of “Bad Moves”**-In general more games have more minor inaccuracies in comparison to blunders or big mistakes.
- **Effect of Opening Choice**-Certain opening choices, in the long run, favor white like that of the “**French Defence**”, some pretty solid positions result from “**English**”, “**Spanish**”, “**Queen Pawn**”.The “**Italian**” leads to a dual-edged position, whereas “**King’s Gambit**” is dubious for white with correct play.

NOTE

Similar Exploratory Analysis can be done for Black’s play as well. This will be further shown in the dashboard created for the second part of the project.

Shortcomings:

- Engines are ever evolving. There is no absolute best
- Ratings are relative.
- There is bias of theory.

References

- [1] Data Set- [Kaggle-Lichess:Python Chess Games Statistics](#)
- [2] Dashboard- [ShinyDashboard](#)
- [3] Youtube- [Youtube Presentation](#)